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ABSTRACT BOOK



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TABLE OF CONTENTS

Rapid Fire 1

Poster Abstracts 44

- Artificial Intelligence & Big Data 45
- Epidemiology, Quality of Life & Health Economics 90
- Genetics, Genomics & Biomarkers 209
- IOP Physiology & Pathophysiology 246
- Laboratory Sciences 311
- Laser Therapies 352
- Medical Treatment & Non-Incisional Surgery 435
- Other 517
- Structural & Functional Testing 647
- Surgery & Wound Healing 843

Index 1253

Support 1291

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RAPID FIRE

RP-001

VALIDATING TREND-BASED ENDPOINTS FOR NEUROPROTECTION TRIALS IN GLAUCOMA

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Purpose

To evaluate the power of trend-based visual field (VF) progression endpoints against future long-term development of event-based endpoints accepted by the Food and Drug Administration (FDA).

Methods

3,352 eyes (one per patient) from five glaucoma clinics in the United Kingdom with ≥10 24-2 VFs were analysed. Two alternative FDA compatible event-based criteria were applied to the whole series to label "true progressed" eyes; both required ≥5 locations changing from baseline either by more than 7 dB (FDA-7) or by more than the expected test-retest variability (GPA-like) in two consecutive tests

Then, pointwise rates of progression (RoPs) were calculated with a hierarchical model and used as "true" RoPs to simulate series of 16 VFs over 2 years, replicating the United Kingdom Glaucoma Treatment Study. Variability was modelled according to sensitivity using the method proposed by Wu and Medeiros[1]. We then randomly assigned (1,000 times) these generated series to either a placebo or a treatment arm. We simulated trials with different neuroprotective effects (no effect, 20%, 30%, and 50%) by changing the proportion of "true progressed" eyes in the two arms, without altering the observed "true" RoPs.

Two trend based methods for mean deviation (MD) were assessed: 1) Linear Mixed Model (LMM), testing the average difference in RoP between the two arms ($p < 0.05$), and 2) Time-to-progression (TTP), calculated as the time needed for the MD to decline by predefined cut-offs from baseline (0.5 dB, 1 dB and 2 dB), estimated by linear regression; a survival analysis with a proportional hazard model tested the difference between the two arms ($p < 0.05$).

Power curves with 95% confidence intervals were produced for the trend-based methods and compared with the power of the event-based FDA-7 and GPA-like methods calculated on the generated series (also using a proportional hazard model).

Results

Figure 1 reports the power curves for the different methods. The trend-based methods were all superior to the event-based methods. TTP with the 2 dB cut-off performed the least well.

Image

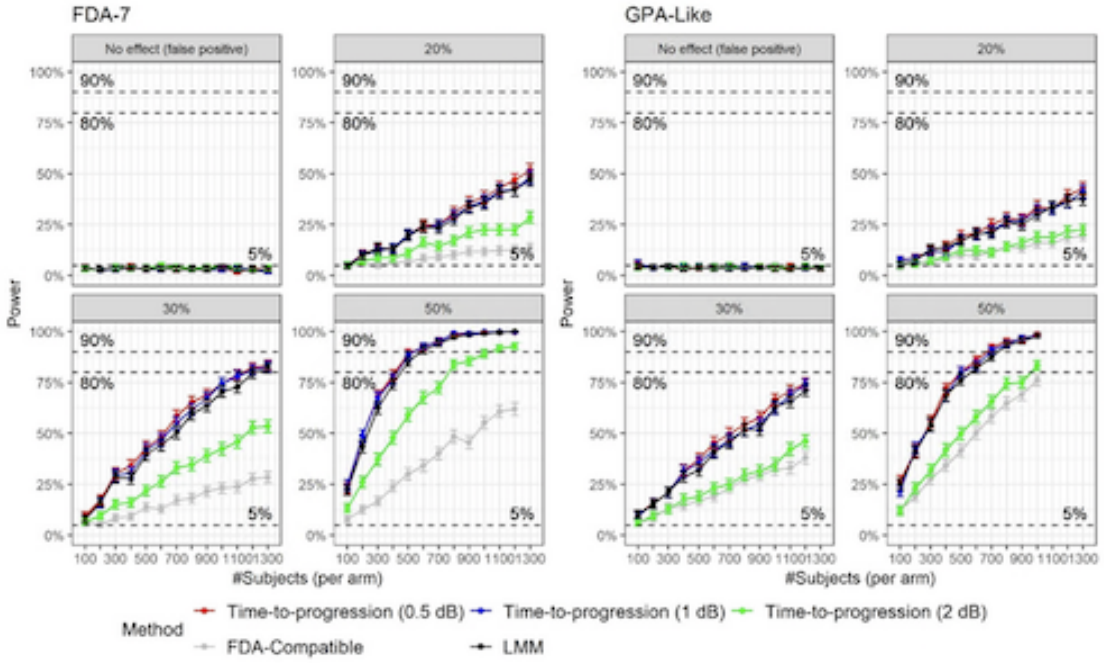


Figure 1. Power curves for different treatment effect sizes for all the proposed methods, using the two FDA-compatible criteria for classification. The error bars indicate the 95%-Confidence Intervals.

Conclusions

Trend-based methods can efficiently detect treatment effects defined according to long-term FDA compatible event-based progression and should be preferred for trial design. TTP has the same power as LMMs while allowing an interpretation of the results similar to event-based methods.

References

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RP-002

MACHINE LEARNING DERIVED VISUAL FIELD PATTERNS ARE ASSOCIATED WITH GLAUCOMA POLYGENIC RISK SCORE IN THE OCULAR HYPERTENSION TREATMENT STUDY

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Purpose

Primary open angle glaucoma (POAG) is a highly heritable disease with over 127 identified risk loci[1]. POAG polygenic risk score (PRS) is associated with increased risk of glaucoma and progression to severe disease[2]. Unsupervised machine learning with archetypal analysis (AA) can identify interpretable loss patterns in glaucomatous visual fields (VFs)[3]. We evaluate for associations between PRS and VF patterns in the Ocular Hypertension Treatment Study (OHTS).

Methods

AA models for identification of VF patterns were trained using 24-2 total deviation values from 5583 VFs acquired after POAG diagnosis, from 709 eyes of 483 participants in OHTS. Best model was selected with cross validation. Identified archetypes (ATs) were grouped into VF loss patterns (Fig 1). VFs retained for data analysis were selected from participants who had 1) at least 2 years of endpoint committee follow-up after POAG diagnosis and 2) completed genotyping for calculation of PRS. AT decomposition coefficients (DCs) were calculated for first four VFs from each eye meeting criteria. PRS was calculated using genome-wide association study summary statistics from the largest cross-ancestry meta-analysis to date, with Lassosum regression. PRS was transformed to normal distributions within genetic ancestry (European or African). Univariate and multivariable logistic regression (adjusted for age, sex, and ancestry) assessed PRS associations with primary VF loss patterns.

Results

Identified ATs and grouped loss patterns are shown in Figure 1. Highest prevalence AT was AT7 (Fig 1). 1086 VFs from 282 eyes meeting criteria were selected for analysis. A one standard deviation (SD) higher PRS conferred increased odds of superior loss pattern in univariate (OR=1.40 [1.18-1.66], p<0.01) and multivariable analysis (OR=1.39 [1.16-1.66], p<0.01). Higher PRS conferred decreased odds of paracentral pattern in univariate (OR=0.43 [0.28-0.67], <0.01) and multivariable analysis (OR=0.42 [0.26-0.67], p<0.01). Increased PRS also conferred decreased odds of nasal pattern in univariate (OR=0.67 [0.49-0.92], p=0.01) and multivariable analysis (OR=0.67 [0.49-0.92], p=0.01).

Conclusions

High genetic risk for POAG is associated with primarily superior VF loss patterns within 2 years of clinically detectable disease onset in patients with ocular hypertension. Paracentral and nasal loss pattern prevalence may be driven by environmental factors, unidentified genetic risk variants, or confounding ocular comorbidities.

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RP-003

GLAUCOMA RISK PREDICTION IN OCULAR HYPERTENSION: A COHORT STUDY USING ELECTRONIC MEDICAL RECORDS TO VALIDATE A RISK PREDICTOR: GRIP STUDY

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Purpose

The aim of the GRIP study is to validate and update a model to optimise the management of people in the UK with OHT using data on the risk of conversion to glaucoma and to compare the clinical and cost-effectiveness of different monitoring schemes proportionate to 5-year glaucoma risk.

In this abstract we will describe the cohort characteristics. At the meeting we will present the results of the risk predictor.

Methods

Data analysis of Medisoft electronic medical records (EMR) from 10 Hospital Eye Services in the UK.

Inclusion criteria: adults with newly diagnosed OHT in one or both eyes with IOP between 22 mmHg and 32 mmHg and normal reliable VF, with Glaucoma Hemifield Test (GHT) within normal limits on two consecutive examinations, and without significant ocular co-morbidity.

Conversion to glaucoma was defined as two consecutive reliable visual fields (VFs) with Glaucoma Hemifield Test 'outside normal limits'.

Candidate risk factors: age, ethnicity, sex, IOP, VCDR, CCT, PSD, family history, high blood pressure (HBP), diabetes, treatment, and OCT global RNFL thickness.

Primary outcome: conversion to glaucoma in at least one eye within 5 years.

Statistical Analysis: Harrell's c-index to assess discriminative ability. Calibration plots of observed against predicted risk will be used.

Results

We had data on 276,222 eyes belonging to 138,461 patients attending 10 glaucoma units in the UK. A total of 21851 eyes from 15042 patients with OHT were included. The characteristics of the cohort are summarised below:

Age (median): 63.2 years

Sex, Female: 7126 (47.4%)

Ethnicity: White 9062 (60.2%). Not stated 4577 (30.4%)

HBP: 2583 (17.2%)

Diabetes: 2056 (13.7%)

Family history: 4228 (28.1%)

IOP, mean (SD): 25.3 (2.78) mmHg

VF PSD, mean (SD): 1.7 (0.581) dB

CCT, mean (SD): 563 (51.3) microns

CDR, mean (SD): 0.48 (0.187)

VF during follow-up, n = 108,245

VF median (range): 4 (2, 29)

VF years of follow-up, median (range): 3.93 (-0.00184, 24.1)

Conclusions

A large cohort of patients with OHT with appropriate EMR data and long-term follow-up is available. An updated and validated risk prediction tool incorporating all relevant risk factors for glaucoma will help inform effective and efficient OHT management.

The GRIP study is funded by the NIHR HTA (https://fundingawards.nihr.ac.uk/award/NIHR131808). The views expressed are those of the authors and not necessarily those of the NIHR or the Department of Health and Social Care.

RP-004

A DEEP LEARNING APPROACH TO PREDICT VISUAL FIELD USING RETINAL NERVE FIBER LAYER OPTICAL TEXTURE ANALYSIS MAPS

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Purpose

To develop and validate deep-learning models for predicting the visual field (VF) sensitivity of the 54 locations in the 24-2 visual field test from retinal nerve fiber layer (RNFL) optical texture analysis (ROTA)[1] images, RNFL thickness maps, and OCT volume data.

Methods

6763 pairs of OCT volume datasets and 24-2 VF data collected from the University of Hong Kong Glaucoma and Optic Nerve Diagnostic Centre were included. All paired data were divided into the training set (70%), validation set (15%), and testing set (15%); no data from the same eye were included in more than one category. Two deep learning models (ResNet18[2] and EfficientNetB0[3]) were combined (Fig.1A) to estimate the visual field from the RNFL thickness maps and the ROTA maps. In addition, a 3D deep learning model, ResNet3D[4] (Fig. 1B), was trained to predict the visual field from 3D OCT volume data by stacking b-scans of each eye. Dense layers were applied to condense feature representations from convolutional layers into 54 final outputs in the last step for all models. Mean absolute error (MAE) was computed with reference to ground truth VF sensitivity measurements to evaluate the performance of the models.

Results

A total of 1076 OCT-VF pairs were allocated as an independent testing dataset to evaluate model performance. Deep learning models trained with RNFL thickness maps, OCT volume data, and ROTA maps achieved MAEs of 4.83 (95% CI: 3.53- 6.14), 5.13 (95% CI: 4.70- 5.55), and 4.53 (95% CI: 3.53-5.56) decibels (dB), respectively, in predicting the visual field sensitivity values of all 54 locations. The MAEs of the models were 4.59 dB (95% CI: 4.27-4.90 dB), 5.13 dB (95% CI: 4.70-5.55 dB), and 4.48 dB (95% CI: 3.15-5.81 dB) in the prediction VF sensitivity of VF locations within 12mm × 9mm OCT-scanned region, and 5.04 dB (95% CI: 4.89-5.20 dB), 5.27 dB (95% CI: 5.06-5.49 dB), and 4.60 dB (95% CI: 4.49-4.71 dB) in predicting VF sensitivity in VF locations outside the OCT-scanned region (Fig. 2A&B). The model trained with ROTA maps showed lowest MAE and there was no significant difference between MAEs inside and outside the 12mm × 9mm scanned region (p=0.381).

Image

Figure 1. The architecture of deep learning models

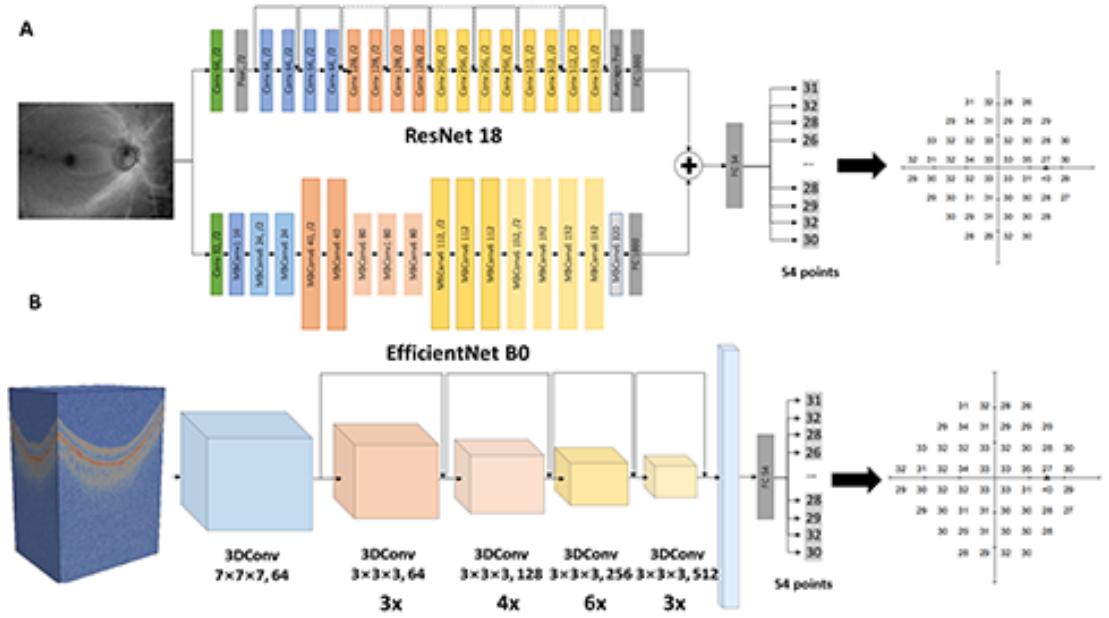
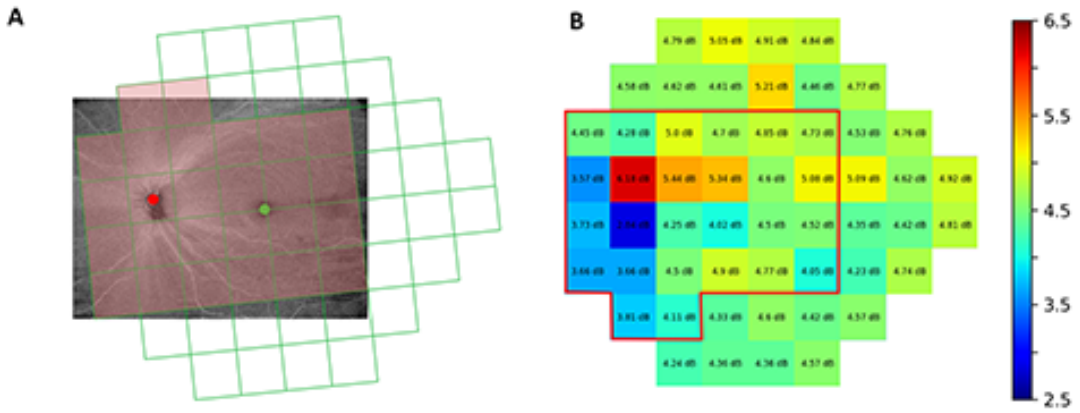


Figure 2. Predictive performance of visual field in the overlapping region and non-overlapping region



Conclusions

The deep learning model trained with ROTA maps had high accuracy in predicting VF sensitivity of individual 54 locaitons of the 24-2 VF test and outperformed the models trained with other OCT imaging data.

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RP-005

GLAUCOMAI - THE FIRST IN CLASS, INTELLIGENT DECISION SUPPORT SYSTEM FOR GLAUCOMATOUS OPTIC NEUROPATHY RISK DIAGNOSTICS

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Purpose

Interactions between volumetric/biomechanical eyeball properties and functional cardio-vascular system (CVS) parameters are key players in glaucomatous optic neuropathy (GON) pathomechanism. We are presenting the idea , properties and the performance of predictive model for GON detection.

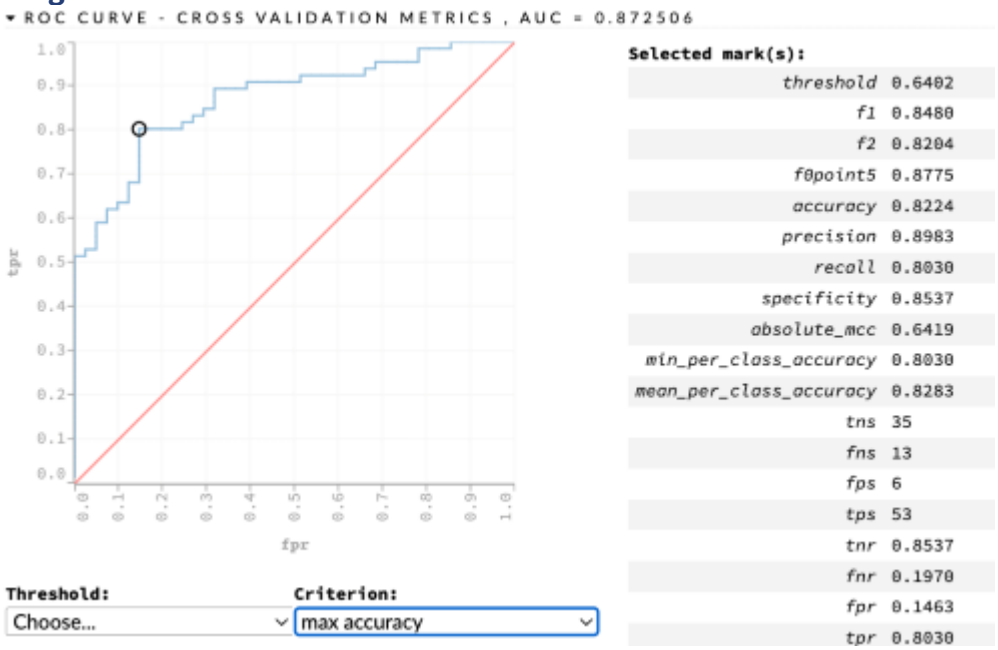
Methods

Time synchronized, 24 hours, continuous ocular dimensional profile recordings and CVS parameters (blood pressure, heart rate, cardiac output, blood oxygen saturation) measurements, were performed with a contact lens sensor-based device (CLS, Sensimed Triggerfish, Sensimed AG, Switzerland) and cuff-less PTT holter system (Somnotouch INBP, Somnomedics AG, Germany). Biomechanical eyeball properties (CH, CRF) at the beginning of session, were measured with Ocular Response Analyser (ORA, Reichert, USA). Attributes derived from interactions between CVS and CLS data in specific time-periods, together with biomechanical cornea properties data , were used for creation of predictive model with use of machine learning processes. 10-fold cross-validation were used to assess the accuracy of the prediction.

Results

A total of 280 synchronized measurement sessions of 280 patients were included in the analyses. GlaucomAI system, without IOP attribute usage, quantitatively discriminate GON (POAG/NTG) from non-glaucomatous optic neuropathy & healthy eyes with stabile very high AUC = 0,87. GlaucomAI system quantified subject-specific directions and power of mutual interactions between volumetric eyeball properties and functional cardio-vascular parameters.

Image



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Conclusions

GlaucomAI is the first in class, IOP independent intelligent decision support system for glaucomatous optic neuropathy risk diagnostics & differentiation. Unique system features, enables support of therapeutic decision making in ocular hypertension cases and evaluation of GON treatment effectiveness. Characteristics of GlaucomAI IDSS will allow for personalization of GON therapy by indication of its local and systemic risk factors in given Patient.

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RP-006

GENOME WIDE DISCOVERY VIA FEATURE SPACE MAPPING OF DEEP-LEARNING DERIVED CLINICAL OCT PHENOTYPES TO THE UK BIOBANK

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Purpose

Large population-based biobanks provide a rich source of genetic data but due to the nature of collected data, clinical relevance may be limited. Here we use a large clinical glaucoma dataset to discover macular OCT-based phenotypes using unsupervised deep learning (DL) and subsequently test these phenotypes in the UK Biobank to allow for genome wide discovery.

Methods

Ganglion cell complex (GCC) thickness maps of 7966 high-quality macular optical coherence tomography (OCT) scans from 4926 glaucoma patients in MEE dataset were used to train a DL model based on unsupervised representation learning, data augmentation and contrastive learning. After training, an encoder associates a 3-channel image into a 128-element feature vector. Dimensionality reduction using UMAP and Gaussian Mixture Model clustering was used to group semantically similar GCC patterns. Optimal number of clusters was determined using probabilistic model selection method. The trained DL model on the MEE dataset was used to map 86115 GCC thickness maps of 50115 UKBB subjects into the feature space. We performed GWAS for each GMM-identified feature dimension using linear mixed models adjusted for age, sex, and 10 principal components of ancestry.

Results

We identified 11 optimal macular GCC patterns (q0-10) in MEE dataset which were successfully mapped to UKBB. The distribution of GCC phenotypes in UKBB is shown in Fig1 except for q3 which was not found. GWAS was performed with 9329555 imputed genotypes after quality control. We found no evidence of unaccounted stratification ($lambda_{GC}$ 1.000-1.0208). We identified several (range: 1-15) independently associated SNPs ($P < 5e^{-08}$) for each phenotype and numerous genomic regions associated with at least one variant/phenotype related to glucocorticoid interaction (q5, nearest gene (NG): MDFIC), neurological development/disease (q5, NG: ATRNL1; q6, NG: SHISA9, MEIS3; q9, NG: ATP8A2; q10, NG: ZNF423), cholesterol synthesis (q6, NG: TM7SF2), immune system (q6, NG: IGLL5), and malignancy (q9, NG: ETV7, PCTP; q10, NG: PARD3B, ZNF423). The genomic regions were enriched for association with interferon-I activity (n=91 genes) based on MAGMA (FDR<0.05).

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Image



Conclusions

We demonstrate that OCT derived DL phenotypes discovered in a clinical cohort can be successfully transferred to an independent large biobank allowing for potential discovery of disease-relevant variants.

RP-007

RACIAL DIFFERENCES IN PREVALENCE AND RISK FACTORS OF SHALLOW ANTERIOR CHAMBER DEPTH: THE MULTIETHNIC OPHTHALMOLOGY COHORTS OF CALIFORNIA STUDY

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Purpose

Why Asians are disproportionately affected by primary angle closure glaucoma (PACG) compared to other racial populations is a longstanding, pervasive question in glaucoma. One theory is that Asians tend to have shallower anterior chamber depth (ACD), an important determinant of angle closure status.[1] In this study, we use population-based epidemiological data to assess racial differences in ACD among Asians (Chinese), Hispanics, and Blacks, and identify risk factors for anterior chamber shallowing.

Methods

Participants aged 50 years or older from the Chinese American Eye Study (CHES), Los Angeles Latino Eye Study (LALES), and African American Eye Disease Study (AFEDS) underwent ultrasound A-scan biometry. Biometric parameters, including ACD, axial length (AL), central corneal thickness (CCT), and lens thickness (LT), were measured in phakic right eyes. Logistic regression models were developed to predict mild anterior chamber shallowing (MACS), defined as a ACD less than 2.7 mm (high risk of angle closure), and severe anterior chamber shallowing, defined as a ACD less than 2.2 mm (high risk of PACG).[2]

Results

Data from CHES (N=4,005; 37% male), LALES (N=3,503; 42% male), and AFEDS (N=4,412, 37% male) were combined for analysis. Mean ACD was 2.8mm (CHES), 2.8mm (LALES), and 2.7mm (AFEDS). Mean AL was 23.8mm (CHES), 23.3mm (LALES), and 23.7mm (AFEDS). The prevalence of MACS was 32.4% (CHES), 36.6% (LALES), and 46.9% (AFEDS). Risk factors ($p < 0.05$) for MACS in the multivariable analysis included Black race (OR=2.2; Asian reference); age 60 to 69 (OR=1.4) and over 70 (OR=1.9) years (50-59 reference), female sex (OR=1.3; male reference), greater LT (OR=1.9 per 1mm), and shorter AL (OR=2.0 per 1mm). The prevalence of SACS was 4.2% (CHES), 3.9% (LALES), and 6.8% (AFEDS). Risk factors ($p < 0.05$) for SACS in the multivariable analysis included Black race (OR=1.9; Asian reference); age 60 to 69 (OR=1.9) and over 70 (OR=3.8) years (50-59 reference), greater LT (OR=3.0 per 1mm), and shorter AL (OR=3.7 per 1mm).

Conclusions

While mean ACD was similar among Asians, Hispanics, and Blacks, adjusted risk of mild and severe anterior chamber shallowing was highest among Blacks. Therefore, racial differences in ACD do not appear consistent with racial differences in PACG prevalence. While ACD is a strong determinant of angle closure in Asians, other biometric factors may predominate to determine which Hispanics and Blacks develop PACG.[1]

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RP-008

ELUCIDATING THE ROLE OF PRIMARY ANGLE CLOSURE GLAUCOMA (PACG) SUSCEPTIBILITY GENES, EPDR1 AND PLEKHA7 IN PACG PATHOGENESIS

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Purpose

Ependymin Related 1 (EPDR1) and Pleckstrin Homology Domain Containing A7 (PLEKHA7) genes have been identified as PAC susceptibility genes.(1) However, their role in PAC pathogenesis is unknown. Using transgenic rodents with loss of Epdr1 and Plekha7 expression, we aim to elucidate their role in PAC pathogenesis.

Methods

Epdr1 knock out (KO) and control mice and Plekha7 KO and control rats were evaluated using slit lamp, anterior segment optical coherence tomography (ASOCT), Icare tonometry and fluorotron analysis for PACS phenotype, intraocular pressure (IOP) and breakdown of blood aqueous barrier (BAB). Mid-dilation provocation and intraperitoneal lipopolysaccharide (LPS) injection were also performed. Expression of Epdr1 and Plekha7 in rodent tissues was determined. Gene and protein expression of EPDR1 and PLEKHA7 in human tissues and cells were also determined.

Results

EPDR1 expression in PACS human lens capsule was lower than primary open angle glaucoma controls. PLEKHA7 expression was seen in the human non pigmented ciliary epithelium (NPCE) apical border. Epdr1 KO mice showed loss of Epdr1 expression in the lens that was associated with a significantly increased in lens vault and shallower anterior chamber on ASOCT. When mid-dilated, Epdr1 KO mice show a rise in IOP. Plekha7 KO rats showed loss of PLEKHA7 protein expression in the ciliary processes but no PACS phenotype. Untreated Plekha7 KO rats

As increased lens vault and BAB breakdown have been implicated in PACG pathogenesis, our finding suggests that EPDR1 and PLEKHA7, PACG susceptible genes, may contribute to the spectrum of PACS phenotype and BAB breakdown mediated by loss EPDR1 expression in the len epithelium and PLEKHA7 loss in the NPCE respectively.

showed BAB breakdown similar to control rats with LPS induced inflammation.

Conclusions

As increased lens vault and BAB breakdown have been implicated in PACG pathogenesis, our finding suggests that EPDR1 and PLEKHA7, PACG susceptible genes, may contribute to the spectrum of PACS phenotype and BAB breakdown mediated by loss EPDR1 expression in the len epithelium and PLEKHA7 loss in the NPCE respectively.

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RP-009

ALTERED LEVELS OF SOLUBLE IMMUNE FACTORS IN TEARS OF EYES WITH EXFOLIATION GLAUCOMA

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Purpose
Exfoliation syndrome (XFS) is an age-related fibrillopathy which may lead to a secondary increase in intraocular pressure and exfoliative glaucoma (XFG). Although characterized by a dandruff-like material in the anterior segment of the eye, XFS deposits have also been found in the conjunctiva of the ocular surface. Therefore, analysis of the tear fluid has the dual benefit of being non-invasive and allows procurement of treatment-naïve ocular fluid to study the molecular mechanisms of this disease. Hence, the purpose of this study was to determine the levels of soluble immune factors in tear fluid of eyes with exfoliation glaucoma (XFG), exfoliation syndrome (XFS), and controls.

Methods
In this cross-sectional study, tears of 137 eyes were collected using sterile Schirmer's strips and analysed for levels of soluble immune factors including interleukin (IL)-1β, IL-6, IL-10, IL-17A, tumour necrosis factor-α (TNF-α), matrix metalloproteinase-9 (MMP-9), soluble intercellular adhesion molecule-1 (sICAM-1), and vascular endothelial growth factor (VEGF). This included 24 eyes of 24 patients with treatment-naive XFG, 65 eyes with XFS, and 48 control eyes. Tear cytokines were measured based on fluorescence-based multiplex ELISA using a microfluidic chip (Bio-M Pathfinder). Kruskal Wallis test with Dunn's multiple comparison was performed to compare the levels of the factors between the study groups.

Results
The three groups had similar demographic characteristics. The clinical features between the groups were also similar except for the mean intraocular pressure which was significantly higher in the XFG group (32.1 ± 10.7mmHg) compared to the XFS cohort (15.3 ± 3.6mmHg) and controls (14.8 ± 3.1mmHg; $p<0.001$). The cup: disc ratio was higher in the XFG cohort compared to the other 2 groups ($p<0.01$). The mean levels of IL-1β (32.9 vs 11.9 pg/ml), IL-17A (57.2 vs 13.8 pg/ml), and MMP-9 (348014 vs 218975 pg/ml) were higher in eyes with XFG compared to those with XFS ($p<0.05$). Levels of IL-1β and sICAM-1 were significantly lower in XFS eyes compared to controls ($p<0.05$). There was no difference in IL-6, IL-10, TNFα, and VEGF levels between the 3 groups.

Image

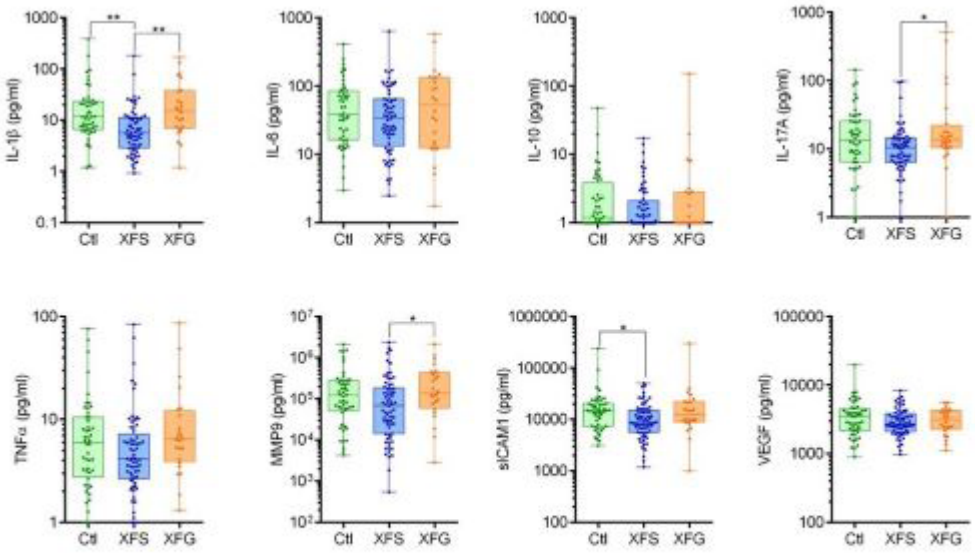


Figure.1 Levels of tear fluid soluble immune factors in patients with exfoliation syndrome and exfoliative glaucoma: Box and whisker plot with scatter dots indicates the level of IL-1b, IL-6, IL-10, IL-17A, TNFa, MMP9, sICAM-1, and VEGF in the tear fluid in control subjects (Ctl, n=48), patients with exfoliation syndrome (XFS, n=65), and patients with exfoliative glaucoma (XFG, n=24). *P<0.05, **P<0.01 Kruskal Wallis test with Dunn's multiple comparisons test.

Conclusions

A distinct immuno-inflammatory profile in XFG patients compared to XFS suggests the plausible role of IL-1β, IL-17A, and MMP-9 in the pathogenesis of glaucoma in patients with XFS. Hence, these factors can serve as targets for disease monitoring and therapeutic modulation in XFS patients.

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RP-010

ROLE OF CELL ORIGIN IN INDUCED PLURIPOTENT STEM CELL DIFFERENTIATION FOR TRABECULAR MESHWORK RESTORATION IN PRIMARY OPEN-ANGLE GLAUCOMA

E Bilir, R Oldershaw, C Sheridan

Purpose

TM-cell replacement by repopulating with induced pluripotent cells (iPSCs) differentiated to TM has therapeutic potential for primary open-angle glaucoma (POAG). The ideal source of cells and an optimised differentiation protocol for generating iPSC-derived TM cells is not established. We, therefore, aimed to determine the effect of the origin of iPSC from three different origins (blood mononuclear cells (BMC), mesenchymal stem cells (MSC) and, dermal fibroblasts (DF)) on their differentiation potential towards functioning TM via two differentiation pathways.

Methods

Three human iPSC lines were differentiated into TM cells either directly or via an intermediate neural crest cell (NCC) stage. After NCCs induction for 7 days, iPS-NCCs were cultured on TM extracellular matrix (ECM) in TM conditioned media (CM) for 14 days. For direct differentiation, iPSCs were cultured directly on TM-ECM in TM-CM for 21 days. Cell morphology was observed under a microscope and cells were characterised by immunofluorescent staining and qPCR for TM cell, stem cell, and differentiation lineage markers. The functionality of the NCC-TM cells was tested through phagocytosis analysis and Myocilin (MYOC) expression following treatment with dexamethasone (DEX).

Results

NCCs derived from all three different iPSC lines expressed SOX1 and FGF5 genes and protein, indicating neuroectodermal differentiation. Cells undergoing direct differentiation, only the iPSCs from dermal fibroblast origin (DF-iPSCs) expressed both SOX1 and FGF5 on the 7th day of differentiation. Additionally, NCCs expressed stem cell (OCT4 and SOX2) and neural crest markers genes (NGFR and HNK1) with reducing as the cells differentiated into TM cells ($p<0.01$). After induction into trabecular meshwork (TM) cells, TM cell differentiation was confirmed through the expression of the MGP, TIMP3, and Chi3L1 genes, which were 5, 6, and 2-fold higher respectively in comparison to undifferentiated iPSCs. The NCC-TM cells derived from DF-iPSCs displayed a spindle-like morphology characteristic of TM cells. Moreover, the DF-iPSCs cells had the highest phagocytotic activity and response to DEX treatment with MYOC expression.

Conclusions

Differentiating iPSCs via NCC to TM cells yielded the iPSC-TM cells with increased expression of TM cell markers and functional ability. DF-iPSCs demonstrated phagocytotic and DEX/MYOC functional response and is a promising candidate for iPSC-TM cell generation for TM transplantation and TM specific disease modelling.

RP-011
LOXL1 AND ITS REGULATING MIRNAS IN PSEUDOEXFOLIATION GLAUCOMA

A Khera, S Pndav, F Thattaruthody

Purpose
Lysyl Oxidase-Like Protein 1 (LOXL1) gene has a role in pseudoexfoliation syndrome (XFS), but the exact regulatory mechanism of this gene for pseudoexfoliation glaucoma (XFG) at molecular level is not known. Therefore, present study investigates the role of miRNAs that regulate LOXL1 gene in pseudoexfoliation glaucoma along with difference in miRNA expression pattern between XFS, cataract and XFG patients.

Methods
Patients were recruited from Glaucoma and Lens clinic of Advance Eye Centre, PGIMER, Chandigarh, India. Informed consent was obtained from each patient after complete description of the study. Patients were grouped in three groups:

Group 1: patients diagnosed as pseudoexfoliation syndrome (XFS)

Group 2: patients with pseudoexfoliation glaucoma (XFG)

Group 3: age and sex matched unrelated patients with cataract who underwent cataract surgery. Total of 43 patients in different groups were recruited. 3 samples (RNA from anterior lens capsule) from each group were send for sequencing and the rest of samples were used for miRNA and gene expression studies.

Bioinformatic tools ScanMir and TargetScan software were used to identify miRNAs and screened for their LOXL1 mRNA specificity. Seven miRNAs, LOXL1 and elastin were selected for validation in anterior lens capsule by real time PCR. Transcriptome sequencing was also performed. GO and KEGG pathway enrichment analysis of these genes showed their involvement in Extracellular matrix receptor interaction (ECM) in XFS Vs XFG samples.

Results
miR-125b and miR-296 showed significant upregulation in XFG whereas miR–185 showed significant downregulation in XFG samples. Also, LOXL1 and Elastin expression were checked in the same sample by real time PCR. The expression of elastin was increased significantly in XFG patients

Conclusions
Our study showed that there is a list of genes regulated by miRNAs that are involved in ECM receptor regulation in pseudoexfoliation glaucoma. Hence, ECM disturbed regulation could be the cause of pseudoexfoliation.

RPLB-001

A STUDY ON THE ANTI-FIBROTIC EFFECT OF GLAUCOMA IMPLANTS WITH HYDROGEL THAT RELEASES ANTI-FIBROTIC AGENTS

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Purpose

We aimed to confirm the sustained drainage and anti-fibrotic effect of an implant for glaucoma surgery, which contains an anti-fibrotic agent in biocompatible hydrogel. The hydrogel was attached to the glaucoma implant and transplanted into rabbit eyes.

Methods

Six New Zealand White rabbits were divided into six groups. The control group consisted of two groups, one transplanted with glaucoma implants w/o hydrogel(n=2), and the other transplanted with glaucoma implants w/o anti-fibrotic agent but with hydrogel (n=2). The experimental group, which received glaucoma implants with anti-fibrotic agents, was divided into four groups: 0.007% Mitomycin C group(n=2), 0.01% Mitomycin C group (n=2), 0.013% Mitomycin C group(n=2), and 5% dexamethasone group(n=2).

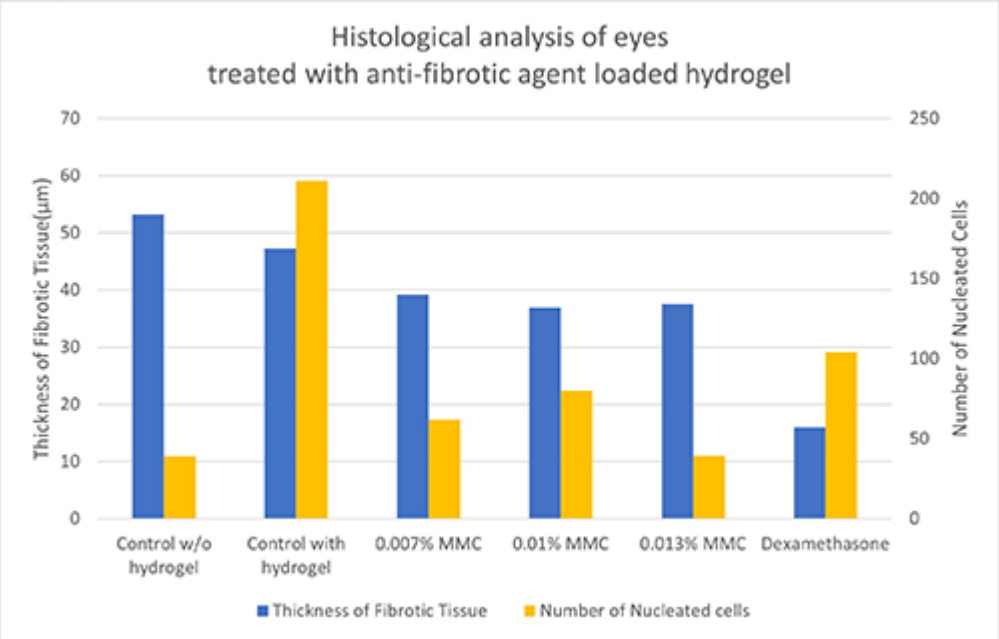
The glaucoma implants w/o hydrogel were transplanted for 4 weeks, while the other groups were transplanted for 26 weeks. During the observation, the presence of blebs was monitored to evaluate the drainage.

Results

The blebs were maintained for 6 weeks in both the 0.007% MMC group and the 0.013% MMC group, while they were observed up to 12 weeks in the 0.01% MMC group. Both the dexamethasone and control groups showed maintained blebs for 2 weeks.

The thickness of fibrotic tissue was observed to be 47.24±37.73μm in the control group with hydrogel, 53.20±11.83μm in the control group w/o hydrogel, 39.1±34.93μm in the 0.007% MMC group, 36.87±0μm in the 0.01% MMC group, 37.57±13.53μm in the 0.013% MMC group, and 16.0±7.80μm in the dexamethasone group. The number of nucleated cells were 211±97.6cells in the control group with hydrogel, 39±9.5cells in the control group w/o hydrogel, 61.7±19.60cells in the 0.007% MMC group, 80±0cells in the 0.01% MMC group, 39.3±16.05cells in the 0.013% MMC group, and 104±88.1cells in the dexamethasone group.

Image



Conclusions

The MMC group showed 6 times longer duration of aqueous humor drainage compared to the control group, indicating MMC is effective for maintaining AH drainage. In terms of the thickness of fibrous tissue and the number of nucleated cells, the MMC group showed similar or better results than dexamethasone, indicating that hydrogel with MMC is suitable as an adjuvant for glaucoma surgery. However, the sample size used in the experiment is small, and only one sample of the 0.01% MMC group was used for histological evaluation as data was lost during the tissue slide preparation process.

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RP-012

THE IMPACT OF PRE-TREATMENT INTRAOCULAR PRESSURE ON TREATMENT RESPONSE IN THE LIGHT TRIAL: SELECTIVE LASER TRABECULOPLASTY COMPARED TO MEDICATION

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Purpose

The randomised controlled 'LiGHT' trial demonstrated the efficacy and safety of selective laser trabeculoplasty (SLT) over topical hypotensive medication as 1st-line therapy for open angle glaucoma. The aim of this sub-study was to explore the impact of pre-treatment (baseline) intraocular pressure (IOP) on treatment response for SLT and drops.

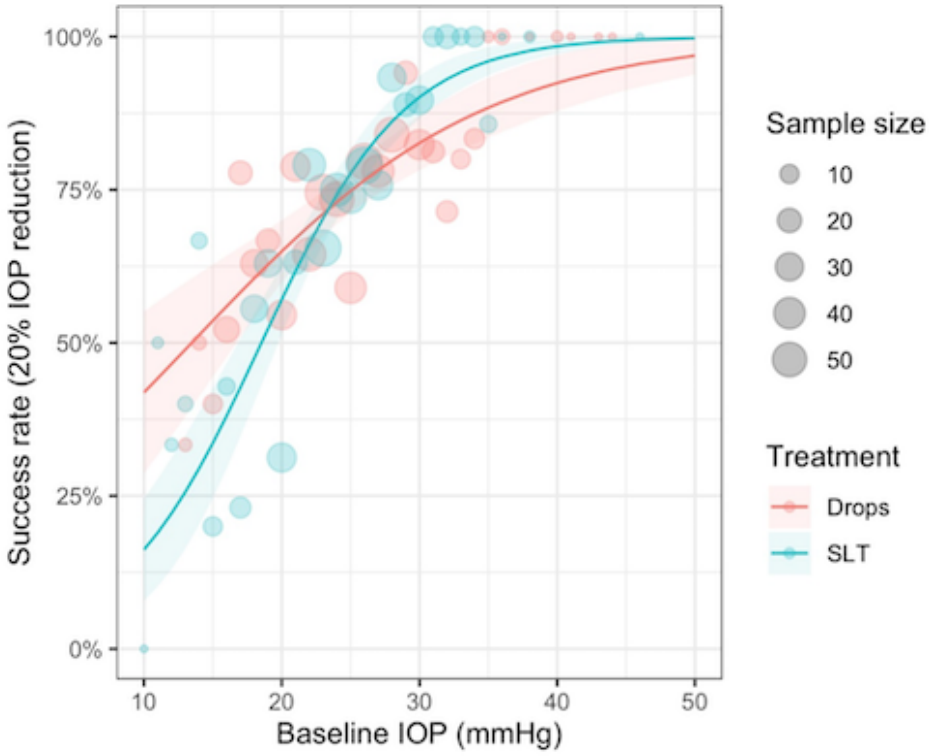
Methods

A post-hoc analysis of LiGHT trial data, compared IOP at baseline with 8 weeks following treatment initiation for those who received SLT or drops. For this analysis, adequate IOP reduction (success) was defined as ≥20% IOP lowering (not pre-set Target IOP). Logistic regression models were used to estimate probability of success at different baseline IOPs. Predictors were treatment (categorical) and baseline IOP (continuous); their interaction modelled the difference in relationship between success rate and baseline IOP for the two treatments.

Results

The probability of success at different baseline IOP is shown in Figure 1. The two treatments achieved similar success at the average baseline IOP (24.4 mmHg, p = 0.466). There was a significant difference in the relationship between baseline IOP and probability of success between the two treatments (p = 0.001), with SLT being more successful than drops for a baseline IOP ≥ 23.4 mmHg. At baseline IOP > 30 mmHg, 100% of SLT patients achieved success (60/60) compared to 83% of those treated with drops (54/65). There were no significant differences between the treatments for a baseline IOP between 20.2 mmHg and 27.1 mmHg (p > 0.05). At baseline IOP < 16 mmHg both groups demonstrated lower proportions of patients achieving success: 48% (13/27) of SLT patients and 53% (9/17) of drops patients.

Image



Conclusions

These data demonstrate the relative utility of SLT at higher baseline IOPs in treatment naïve patients. There was a trend towards greater efficacy with drops at lower baseline IOPs, but SLT achieved similar levels of success at baseline IOP < 16 mmHg.

RP-013

GLAURIOUS, A MULTICENTRE, RANDOMISED, CONTROLLED TRIAL OF DIRECT SELECTIVE LASER TRABECULOPLASTY IN OPEN ANGLE GLAUCOMA

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Purpose

Effective 1st line treatment of open-angle glaucoma (OAG) is limited by non-adherence to daily medication and lack of access to selective laser trabeculoplasty (SLT). Direct SLT (DSLT) is a novel, automated, non-contact laser to reduce intraocular pressure (IOP) without a goniolens or the specialised training of traditional SLT. GLAUrious (NCT03750201) is a clinical trial comparing safety and efficacy of DSLT with conventional SLT in OAG.

Methods

This evaluator-masked, randomised, controlled, non-inferiority study recruited patients ≥40 years with ocular hypertension or OAG, treatmentnaïve or on up to 3 hypotensive medications, and untreated/washout IOP 22–35 mmHg (November 2018 - April 2021, 13 centres in UK, Italy, Israel, Republic of Georgia). Eligible patients were randomised 1:1 to receive DSLT or SLT. Primary outcome was between-group difference in mean IOP change from baseline to 6 months, with 12 month data on IOP, medication need and adverse events

Results

192 patients were randomised: 84 to DSLT; 77 to SLT in modified per protocol (mPP) analysis. Baseline patient and eye characteristics were similar between groups, with no safety concerns. DSLT provided a mean (±SE) reduction of 6 month unmedicated IOP of 5.46 ± 0.51 mmHg (95% CI -6.48 to -4.45) vs SLT control of 6.16 ± 0.53 mmHg (95% CI -7.21 to -5.11). The difference in mean IOP reduction between groups (SLT-DSLT) was -0.70 mmHg (95% CI -2.15 to 0.76; p=0.091). The mean 12 months DSLT reduction from screening in non-washed out IOP of -3.20 ±0.38 mmHg was very similar to SLT mean reduction of -3.28 ± 0.40 mmHg. The difference in mean reduction of IOP from screening at 12 months (SLT-DSLT) was 0.01 (95%

CI -1.09 to 1.10; p<0.001). The mean (±SD) number of medications in the DSLT group at 12 months was reduced by half from 1.19 (1.01) at screening to 0.63 (0.94), similar to the SLT group mean medication reduction of 1.22 (0.98) at screening to 0.68 (0.94) at 12 months. The proportion of medication free subjects almost doubled between screening and 12 months for both groups. At 12 months, 61.7% of DSLT subjects were drop-free, slightly better than SLT (59.5%).

Conclusions

DSLT with the Eagle device is safe and effective providing a clinically meaningful 6 months IOP reduction sustained to 12 months. DSLT is poised to serve the immense, growing clinical need in glaucoma care for SLT due to the emergence of laser trabeculoplasty as the first-line treatment of choice across the world.

RP-014

COMPARISON OF IOP AND SYSTEMIC EFFECTS OF CONVENTIONAL VS. 10 ML TIMOLOL EYE DROPS

I Durai, A Odayappan, V Rengaraj, G Puthuran, J Steger, A Robin, E Colantuoni, R Raman

Purpose

Determine the non-inferiority of Nanodropper-mediated microdrops (Nano) to standard of care (SOC) commercially available drops of 0.5% timolol maleate (TM) in patients with OAG or OHT.

Methods

A prospective, randomized, interventional single-masked, parallel study. We randomized participants to receive either a single drop of SOC-TM (27.6 ± 2.9 µL drops, mean ± SEM) or the same TM using a Nano adapter (10 ± 1.5 µL drops, mean ± SEM). The primary outcome measured was IOP. Secondary outcomes were resting heart rate (HR) and systolic (SBP) and diastolic (DBP) blood pressure. We evaluated patients at a pre-drug baseline, 1, 2, 5, and 8 hours after TM instillation.

Results

206 eyes were enrolled in the SOC and 212 in the Nano groups respectively (Estimated sample size-200/group for power of 95%). Mean IOPs at baseline were 27.3 mm Hg (26.7-27.9 mm Hg) for SOC and 27.2 mm Hg (26.6-27.7 mm Hg) for Nano. Maximum mean IOP reduction was observed at hour 2 in both the SOC group (19.2 mm Hg, 18.5-19.8 mm Hg) and Nano group (19.6 mm Hg ,19-20.2 mm Hg). Mean differences in IOP between treatments (Nano-SOC) at 1, 2, 5, and 8 hours were 0.1 ± 0.5 mm Hg, 0.4 ± 0.5 mm Hg, 0.7 ± 0.4 mm Hg, and 0.3 ± 0.4 mm Hg (mean ±SEM), respectively. In the SOC group, the maximum decrease in SBP (97% of baseline, 95.6-98.3%), DBP (98.4% of baseline, 96.7%-100.2%), and HR (92.7% of baseline, 91.2-94.3%) were observed at hour 2. At this timepoint, subjects treated with Nano had mean BP measurements that were similar to SOC (SBP: 96.9% of baseline, 95.4-98.5%; DBP: 97.8%, 96-99.6%) but mean HR decreased to only 96.4% of baseline (94.4-98.4%). Treatment with TM decreased HR relative to baseline in both groups at all timepoints, but the decrease observed under Nano was less than that under SOC. Whereas HR under SOC ranged from 92.7% (t = 2, 91.2-94.3%) to 95.5% (t = 1, 94-96.9%) of baseline, HR under Nano ranged from 96.4% (t = 2, 94.4-98.4%) to 98% (t = 1, 96.1-99.9%) of baseline.

Conclusions

This well-powered evaluation found that minimizing drop volume of SOC using a Nano adapter provided similar IOP lowering. There may be an advantage to Nano regarding AEs with respect to HR. Reducing eyedrop volume may thus help us to overcome several barriers to adherence to therapy including cost of medications and medication side-effects.

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RP-015

EXTENDED DURATION OF IOP LOWERING WITH BIMATOPROST IMPLANT IN A PHASE 3 EXTENSION STUDY

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Purpose

Biodegradable, intracameral bimatoprost implant slowly releases bimatoprost to lower intraocular pressure (IOP).[1] In clinical trials, the implant has provided sustained IOP lowering beyond the expected period of intraocular drug bioavailability.[1] This analysis aimed to evaluate the duration of IOP control provided by the implant in a phase 3 clinical trials study extension.

Methods

An ongoing 24-month, open-label, multicenter extension study (NCT03891446) enrolled patients with open-angle glaucoma or ocular hypertension who had completed a bimatoprost implant phase 3 clinical trial. This analysis using data available on 9 Sept 2021 included patients who received 10- or 15-µg bimatoprost implant in the study eye (on Day 1, Weeks 16, 32) in one of the 2 lead-in 20-month, randomized, phase 3 trials (ARTEMIS 1 or 2). During the study extension, patients were ineligible to receive implants, but rescue with topical drops was allowed (investigator decision). The analysis evaluated IOP and visual field mean deviation (MD) in patients who remained unrescued in the study eye for ≥2 years (y) after their last implant administration in the ARTEMIS trial.

Results

A total of 233 implant-treated patients completed ARTEMIS and enrolled in the extension study. Among 228 patients with ≥2 y follow-up after their last implant administration, 66 (29%) remained unrescued for ≥2 y; their mean (SD) IOP was 23.7 (1.9) mmHg at ARTEMIS study baseline and 17.1 (2.3) mmHg at 2 y after the last implant. Among 193 patients with ≥3 y follow-up, 44 (23%) remained untreated for ≥3 y; their mean (SD) IOP was 23.7 (1.7) mmHg at ARTEMIS study baseline and 18.1 (3.3) mmHg at 3 y after the last implant. The visual field MD in these patients showed no deterioration.

The proposed mechanism of the long duration of IOP reduction with the bimatoprost implant is related to the enhanced upregulation of matrix metalloproteinases (MMPs) that has been demonstrated in trabecular meshwork and ciliary muscle cell cultures exposed to the higher drug concentrations achieved in the eye with the implant compared with bimatoprost eye drops.[2]

Conclusions

A significant proportion of eyes treated with the bimatoprost implant had sustained IOP control without treatment and no decrease in the visual field MD for ≥2 y after their third administration in a phase 3 trial.

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RP-016

VIDEO-RECORDED ASSESSMENT IDENTIFIED NOVEL FACTORS ASSOCIATED WITH TOPICAL MEDICATION INSTILLATION FAILURE IN GLAUCOMA PATIENTS: VRAMS-QPIG STUDY

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Purpose

Eyedrop instillation skill of glaucoma patients was evaluated by Video-Recorded Assessment of MedicationSkill and Questionnaire-based evaluation of Perception in Glaucoma (VRAMS-QPiG) Study. The factors associated with eyedrop instillation failure in the study was reported.

Methods

A cross-sectional, observational study conducted at Shimane University Hospital. Sixty glaucoma patients (mean±SD age, 68.4±11.3 years; 30 males) who required ocular hypotensive medication(s). Subjects were completed ophthalmology examinations and Mini-Cog cognitive function test, and were video recorded their typical eyedrop instillation technique. Success/failure were collected by questionnaire from the subjects and by video assessment by 2 examiners. Main outcome measures were the discrepancy between self-reported and video-assessed success/failure rate of instillation, and the factors for instillation failure by multivariate logistic regression analyses.

Results

Of 48/56 (86%) self-reported success, 27/48 (56%) was judged as failure by video-assessment; as results, 32/56 (57%) was inconsistent between subjective and objective assessments. Overall, 30/56 (54%) was judged as failure by video assessment. In subject-based data model, older age (odds ratio [OR]: 0.93, 95% confidence interval [CI]: 0.87-0.99, p=0.025) and lower cognitive function score (OR: 2.7, 95% CI: 1.1-6.6, p=0.025) were the factors of failure. In eye-based data model, less myopic objective refractive error (OR:0.77, 95%CI: 0.63-0.95, p=0.016) and lower visual field foveal threshold (OR:1.1, 95%CI: 1.0-1.3, p=0.041) were the factors of failure.

Conclusions

In addition to older age, worse cognitive function, hyperopic refractive error, and decreased foveal sensitivity were the unique risk factors for instillation failure. Given that more than half of the patients were not recognized their inappropriate instillation technique, treating physicians can be effectively screening the patients who require medication guidance by checking risk factors of instillation failure rather than by the report from the patients.

RP-017

RATES OF CHANGE OF VISUAL FIELD SENSITIVITY IN PATIENTS WITH GLAUCOMA IN ASIA – A PILOT REPORT FROM THE ASIAN GLAUCOMA REGISTRY

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Purpose

The Asian Glaucoma Registry was set up with a goal to assemble data to advance the understanding of glaucoma, its progression, and management patterns in Asia. This pilot report investigated the rate of change of visual field (VF) sensitivity and determined the prevalence of fast progressors in Asian patients with glaucoma

Methods

Clinical data from a total of 260 patients (392 eyes) who had VF testing at least once a year over 5 years in the Asian Glaucoma Registry were analyzed. The Asian Glaucoma Registry represents a multicenter collaboration collecting clinical data of glaucoma patients from 13 study sites in 11 Asian countries (Hong Kong China, India, Indonesia, Japan, Malaysia, Philippines, Singapore, South Korea, Taiwan, Thailand, Vietnam). Linear mixed model was applied to evaluate the rates of change of VF mean deviation (MD). Fast progressors had a rate of VF MD loss of greater than 1 dB/year ($P<0.05$).

Results

Among 260 patients with glaucoma, 29.3% had normal tension glaucoma (NTG), 58.0% primary open angle glaucoma (POAG), 12.7% primary angle closure glaucoma (PACG). The mean (SD) age, intraocular pressure (IOP), central corneal thickness, axial length, and VF MD at the baseline visit was 51.7 (14.8) years, 18.8 (6.4) mmHg, 530 (60) µm, 25.1 (3.0)mm, and -6.63 (6.45) dB, respectively. The rate of change of VF MD was -0.27 dB/year (95% CI: -0.46 to -0.09) in eyes with NTG, -0.14 dB/year (95% CI: -0.23 to -0.05) in eyes with POAG, and 0.79 dB/year (95% CI: -0.31 to 0.47) in eyes with PACG. There was no significant difference in IOP during the follow up between eyes with POAG and NTG (0.98mmHg, 95% CI: -0.04 to 1.99 mmHg) and the prevalence of fast progressors were 3.7% and 5.7%, respectively.

Conclusions

A significant proportion of glaucoma patients in Asia had normal levels of IOP and the rate of VF sensitivity worsening was faster in patients with NTG compared with patients with POAG or PACG.

RP-018

PRESERFLO® MICROSHUNT - MIGS: COMPARISON OF EFFICIENCY, SAFETY, AND POSTOPERATIVE MANAGEMENT WITH INTRAOPERATIVE USE OF 0.02% MMC VS. 0.04% MMC

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Purpose

The PreserFlo® Microshunt (Santen) is a glaucoma implant for subconjunctival drainage from an external approach. The shunt consists of Styrene-Isobutylene-Styrene which was originally developed for vascular surgery. Here, we present our latest results on the 3-minute intraoperative use of 0.02% mitomycin C (MMC) compared with 0.04% MMC; safety and efficiency, complication rates, and post management were examined. All patients were treated at Breyer Kaymak Klabe Augenchirurgie Düsseldorf, Germany.

Methods

The Preserflo® Microshunt was implanted as a stand-alone procedure in 137 eyes of 101 patients with 0.02% MMC and in 391 eyes of 271 patients with 0.04% MMC. We monitored intraocular pressure (IOP), number of postoperative medications, visual acuity, visual field defects and endothelial cell loss. In addition, regular control of the filter zone was performed by swept-source OCT.

Results

99% (0.02% MMC) respectively 94% (0.04% MMC) of patients who underwent minimally invasive glaucoma surgery (MIGS) with the Preserflo® Microshunt have an open-angle glaucoma. Both patient groups did not differ significantly from each other. Mean age was 68±11 and 68±13 years, endothelial cell density was 2492±282 and 2402±323 cells/mm^2, visual field defect was -13±10 and -9±10 dB, 55% and 50% were phakic, and 73% and 70% had no previous surgery. 1 day, 1 week, and 1 and 12 months after MIGS the IOP were reduced from 28±9 mmHg to 10±4, 12±4, 15±7 and 14±3 mmHg respectively from 25±8 to 9±3, 11±6, 11±5 and 13±5 mmHg.One week after treatment, 3% and 4% were still hypotensive (IOP<6mmHg). The number of medications was reduced from 2.6 to 0.3 or from 2.4 to 0.4 (or below) up to one year after treatment. Both groups showed a comparable complication rate during surgery (4% and 5%, respectively). After MIGS treatment, we observed a lower number of complications in the 0.02% MMC treatment group (15% vs. 38%). The main side effects were choroidal swelling and hyphaemia. The treatment with 0.04% MMC shows a significantly better revision and needling rate. The revision rate decreases from 28% (0.02% MMC) to 9% and the needling rate from 45% to 19%.

Conclusions

Our data for the PreserFlo® MicroShunt suggest a higher success rate with intraoperative use of 0.04% versus 0.02% MMC. However, there was an increased number of adverse events. The ideal dose of MMC is likely to depend on the various risk factors and demographic characteristics of individual patients, which requires further clinical investigation.

RP-019

PERFORMANCE OF A SUPRACILIARY DRAINAGE DEVICE IN GLAUCOMA PATIENTS WITH VARIOUS STAGES OF DISEASE SEVERITY

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Purpose

To investigate the influence of disease severity at baseline in patients with medically uncontrolled, primary open-angle glaucoma on clinical outcomes 2 years after implantation with a novel, supraciliary, minimally-invasive glaucoma surgery (MIGS) drainage device, MINIject® (iSTAR Medical, Belgium).

Methods

Data from 3 prospective, multi-centre, interventional, single-arm studies were pooled. The implant is 5mm long and comprises a network of hollow spheres made of soft, flexible, medical-grade silicone. It is designed for standalone, ab-interno implantation into the supraciliary space. In each study, patients were assessed at baseline and regular intervals until 2 years post-implantation. In this post-hoc analysis, glaucoma severity at baseline was defined by visual field mean deviation (MD) as mild (MD > -6dB), moderate (-6 ≥ MD ≥ -12dB) or severe (MD< -12dB) (Hodap-Parrish-Anderson scale). Patients were categorised and outcomes compared at 2 years (Kruskal-Wallis ANOVA test).

Results

At 2-year follow-up, 66 patients were grouped into mild (n=39), moderate (n=18) and severe (n=9) glaucoma based on their visual field MD at baseline. The mean diurnal intraocular pressures (IOP) in the mild, moderate and severe groups were 15.0±4.4 mmHg, 12.8±3.6 mmHg and 15.4±6.1 mmHg respectively. This represents mean IOP reductions of 38%, 44% and 37%, respectively, from the corresponding baseline IOP values. These IOP reductions were not significantly different between the 3 groups (p=0.95). Similarly, mean medications at 2 years were reduced to 1.3±1.0, 1.1±1.0 and 1.9±2.0 (vs 2.3±1.0, 2.3±1.0 and 2.6±1.2 at baseline) in the respective groups, with no statistically significant difference between the 3 groups (p=0.58).

Conclusions

This post-hoc analysis indicates that this supraciliary drainage device, implanted in a standalone procedure, may achieve similar levels of IOP and medication reduction, regardless of the degree of glaucoma severity.

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RP-020

IMPACT OF DIFFERENT LITERATURE-BASED HYPOTONY FAILURE CRITERIA ON SUCCESS RATES OF GLAUCOMA SURGERY

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Purpose

To evaluate the impact of varying hypotony failure criteria on surgical success rates in a large cohort of patients undergoing glaucoma surgery

Methods

We identified fifty different hypotony criteria through a systematic literature review (Prospero protocol ID: CRD42017079778). We then applied the various hypotony definitions to a cohort of 1,765 eyes (1,385 patients) undergoing deep sclerectomy (DS) with or without cataract extraction between 2001 and 2020 in 2 UK centers and used them as failure criteria. Additional failure criteria were: IOP>21 mmHg or <20% IOP reduction from baseline in two consecutive postoperative visits >3 months after surgery, reoperation for glaucoma, and loss of light perception. We calculated Kaplan-Meier surgical success rates, and we tested differences in success rates as a function of the hypotony criteria with clustered Cox models. We conducted all analyses for each criterion and hypotony type (*i.e.*, numerical [intraocular pressure threshold], clinical [clinical manifestations of hypotony], mixed [combination of numerical and/or clinical criteria])

Results

Success rates greatly varied as a function of hypotony criteria used, ranging between 15.8-70.8%, 12.3-62.4%, and 11.3-57.5% at 3, 5, and 7 years, respectively (Fig 1A). In comparison to no hypotony failure criteria (Fig 1B), numerical hypotony had the greatest impact on the calculated risk of failure (HR [95% confidence interval (CI): 1.75 [1.48-1.60], p<0.001), followed by mixed hypotony (HR [95%CI): 1.56 [1.43-1.69], p<0.001) and clinical hypotony (HR [95%CI): 1.15 [1.05-1.27], p=0.003). Differences among clinical, mixed, and numerical hypotony failure rates were significant between all pairs (p=0.02 or below). Every hypotony criterion had higher failure risk than no hypotony criterion, but the magnitude of the effect varied as a function of the specific criterion used, with hazard ratios (HRs) ranging between 1.02 and 13.30 (compared to not using any hypotony criterion) (Fig 1C)

Image

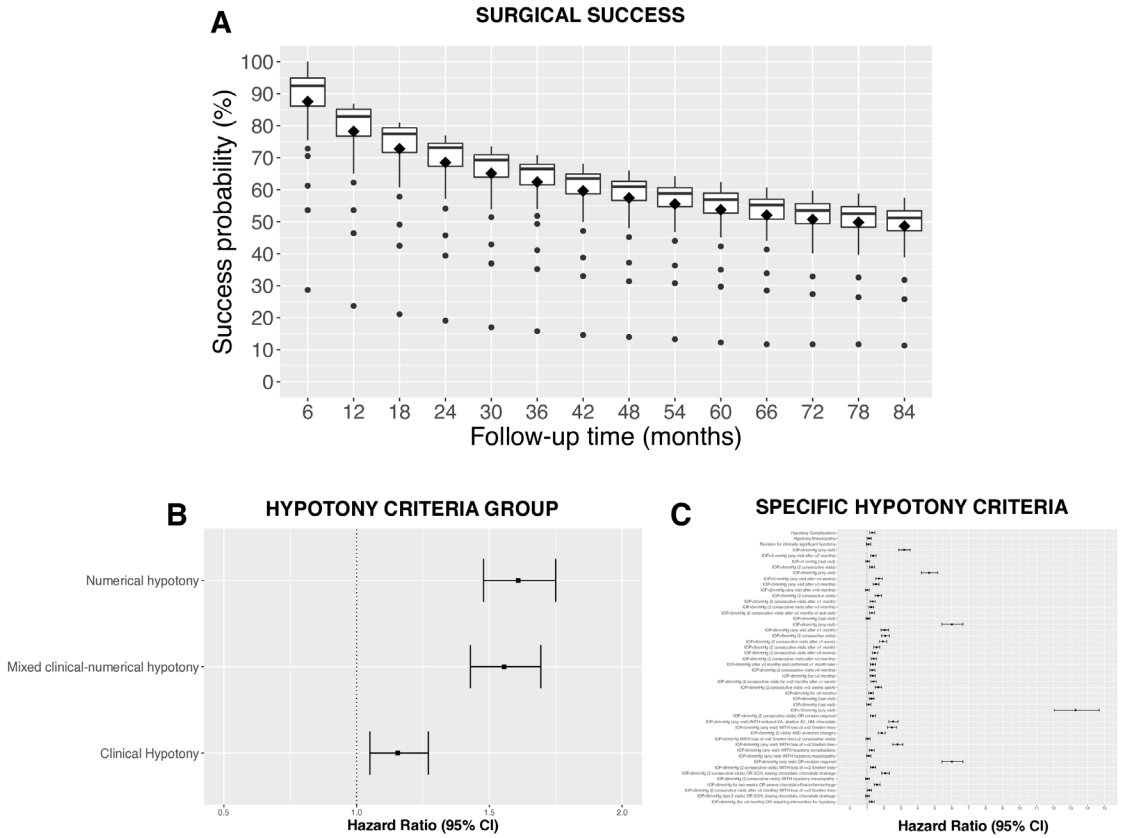


Figure 1. (A) Boxplot showing the distribution of surgical success over time in cohort of patients undergoing deep sclerectomy with the various hypotony failure criteria. Forest plot showing the risk of failure of according to class **(A)** and specific **(B)** hypotony failure criteria used. Reference is no hypotony failure criteria. Squares and bars indicate the point hazard ratio and the 95% confidence interval (CI). IOP: intraocular pressure, SCH: suprachoroidal hemorrhage.

Conclusions

Glaucoma surgery success is greatly influenced by the hypotony criteria chosen. Numerical hypotony leads to higher failure rates than clinical hypotony. Its use as a failure criterion may underestimate glaucoma surgery success rates, especially those techniques more likely to reach low IOP values. Standardizing glaucoma surgery failure criteria with a focus on clinically relevant hypotony manifestations is needed

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RP-021

A MULTI-CENTRE STUDY OF A SUPRACILIARY GLAUCOMA DRAINAGE DEVICE IN PATIENTS WITH OPEN ANGLE GLAUCOMA: 1-YEAR FOLLOW-UP RESULTS

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Purpose
To describe the safety and efficacy profile of a novel, supraciliary, minimally-invasive glaucoma surgery (MIGS) drainage system, MINIject® (iSTAR Medical, Wavre, Belgium), in patients with medically-uncontrolled open-angle glaucoma.

Methods
The STAR-IV trial is a prospective, multi-centre, interventional, single-arm study at 2 sites in India and Panama. The MINIject®glaucoma implant is a 5mm long network of hollow spheres made of soft, flexible silicone. It is implanted standalone and ab-interno into the supraciliary space to enhance outflow. The MINIject® device was implanted into the supraciliary space of 21 eyes in a stand-alone, ab-interno procedure. Intraocular pressure (IOP), medication use, and other ocular parameters were evaluated preoperatively and postoperatively through 24 months, at pre-specified timepoints. The primary endpoint of the study was IOP reduction at 6 months compared to baseline, analyzed with a paired t-test. Safety evaluation includes the nature and frequency of adverse events. Interim and preliminary study results at 12-months are reported here.

Results
Baseline mean diurnal IOP was 24.2 ±3.2 mmHg using 2.5 ±1.1 IOP-lowering medications. At 6-month follow-up, mean diurnal IOP was reduced by 10.3mmHg (-41.5%) to 14.2mmHg. In 17 patients at 12-month follow-up, mean diurnal IOP was reduced by 9.2 mmHg (-37.0%) from baseline to 15.3±4.1 mmHg at 12 months. Furthermore, mean medication use at 12-months was 1.6 ±1.2, a mean reduction of 0.9 medications from baseline. An IOP ≤18 mmHg was achieved in 70.6% of eyes at 12 months. The most common adverse events were: anterior chamber inflammation, blurred vision, and IOP increase. There was no significant loss of endothelial cell density and no eye exceeded 30% loss from baseline.

Conclusions
The MINIject implant effectively reduced IOP by 37.0% at 12 months post-operatively, while decreasing the need for medication. This study confirms the potential efficacy of standalone implantation of a MIGS implant into the supraciliary space to reduce IOP and reduce dependency on glaucoma medications up to 12-month follow-up.

RP-022

INHIBITORY EFFECT OF SUNITINIB COMBINED WITH A-TOCOTRIENOL ON THE PROLIFERATION AND ACTIVATION OF HUMAN TENON'S FIBROBLASTS *IN VITRO*

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Purpose
Sunitinib has anti-fibrotic effects in various organ fibrotic diseases. α-Tocotrienol is an antioxidant with reversible inhibit cell proliferation and anti-fibrotic effects. High concentrations of tinib drugs may have serious side effects on eye tissues. In this study, we evaluated the potential of sunitinib in combination with alpha-tocotrienol at non-toxic concentrations as an anti-fibrotic therapeutic drug combination.

Methods
Human Tenon's capsule fibroblasts (HTFs) were treated with 10ng/ml TGF-β. Then, in mitomycin C (MMC), sunitinib, α-tocotrienol, sunitinib or MMC combined with α- tocotrienol treatment group, antiproliferative, and antifibrotic effects were observed. At 12, 24,48,73 hours, observe the cell morphology to evaluate the toxicity of the drug to the cells. MTT measures the effect of HTFs proliferation and cell viability. LDH kit detects the drug toxicity. Annexin V/PI double staining was detected by flow cytometry to determine the level of apoptosis. Western Blot was used to detect apoptosis-related proteins (caspase-3, -9 and PARP) and fibrosis-related proteins (α-SMA, Col-1) expression level.

Results
MMC showed a strong anti-proliferation effect, and irreversible pro-apoptotic effect in the early stage of HTFs cell differentiation. α-tocotrienol regulates the activity of cell lysosomes and has a reversible inhibitory effect on cell proliferation. Sunitinib also has the effect of inhibiting cell proliferation. In the drug combination of α-tocotrienol and MMC, the living cells of HTFs were significantly improved. In the combination of α-tocotrienol and sunitinib, the anti-cell proliferation ability was enhanced. α-tocotrienol, sunitinib and MMC all have anti-fibrosis effects. After sunitinib treated HTFs, Western Blot showed that sunitinib activated caspase-3, -9 and PARP cleavage, and down-regulated the expression of Bcl-xL and Bax, suggesting that the apoptosis was mediated through the mitochondrial pathway. In addition, the results of Western blot experiments showed that the expression of α-SMA and Col-I decreased, suggesting that sunitinib inhibited TGF-β-induced cellular fibrosis.

Conclusions
Compared with MMC, the combination of α-tocotrienol and sunitinib can significantly inhibit the proliferation of HTFs cells at a non-toxic concentration, and effectively inhibit the formation of fibrosis.

RP-024

LONG-TERM VISUAL ACUITY OUTCOMES OF DEEP SCLERECTOMY IN PEDIATRIC GLAUCOMA

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Purpose
the primary objective was to evaluate the long-term outcome of deep sclerectomy in pediatric glaucoma in regards of visual acuity and to identify poor prognostic factors. The secondary objective was to evaluate the long-term success of deep sclerectomy in controlling intraocular pressure.

Methods
A retrospective review of all pediatric patients who underwent deep sclerectomy in King Abdulaziz University Hospital (KAUH) between 2001 and 2016. We included all patients who had a valid visual acuity testing. the preoperative figures and long-term visual acuity and intraocular pressure outcomes were analyzed.

Results
A total of 83 eyes of 68 patients were included. The mean age of participants was 11.1 years (range: 5-25 years), the mean age at surgery was 5.9 months and the mean follow-up period was 10.75 years. The majority of cases (83.1%) were primary congenital glaucoma. The visual acuity was ≥ 20/40 in 56.6%, between 20/40 and 20/200 in 18.1%, and ≤20/200 in 25.3% of the operated eyes. Factors that predict poor visual outcome (VA ≤20/200) include additional filtration surgery within one year of the initial surgery (P <0.0001), Pre-operative IOP >40 mmHg (P = 0.035), and the use of topical antiglaucoma medications after the initial surgery (P = 0.035). Complete success (IOP ≤ 21mmHg without medications) after one surgery was achieved in 53 eyes (63.86%), qualified success (IOP ≤ 21 mmHg with medications) was achieved in 8 eyes (9.6%) while 22 eyes (26.5%) failed to achieve target IOP of ≤ 21 mmHg or needed additional surgery to achieve it. Nine eyes (10.74%) had post-operative complications.

Conclusions
Deep sclerectomy is a reasonable option for pediatric glaucoma that can provide good long-term visual outcomes and IOP control with lower risk of surgical complications.

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RP-025

INTERMEDIATE SAFETY AND EFFICACY OUTCOMES OF THE NOVEL 63MM GELATIN MICROSTENT VERSUS THE CONVENTIONAL 45MM GELATIN MICROSTENT

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Purpose
To determine intermediate safety and efficacy outcomes of the 63 µm gelatin microstent (Xen63) with mitomycin C (MMC)[1] compared to the 45 µm gelatin microstent (Xen45) with MMC.[2]

Methods
Consecutive patients that underwent Xen63 implantation with MMC at a single centre, were compared to matched controls who underwent Xen45 implantation with MMC. Standalone and cases combined with phacoemulsification were included. Primary outcome was the hazard ratio of failure at 12-months of Xen45 vs. Xen63 eyes, with failure defined as 2 consecutive IOPs, (1) >17 mmHg, (2) <6 mmHg with 2 lines of vision loss, or (3) <20% reduction from baseline IOP, without (complete) or with (qualified) glaucoma medications. Secondary outcomes included IOP thresholds of 14 mmHg and 21 mmHg, postoperative IOP, medications, adverse events, interventions, and reoperations.

Results
84 eyes were included (Xen63, n=42; Xen45, n=42). The treatment groups had similar baseline characteristics. The complete success rate was higher in the Xen63 group (59.5% vs. 28.6%, p=0.009) at the primary IOP threshold of 6 to 17 mmHg but did not differ significantly for qualified success (66.7% vs. 45.2%, p=0.08). The crude HR of failure of Xen45 relative to Xen63 was 2.28 (95% confidence interval [C1], 1.21–4.32) and the adjusted HR was 7.24 (95% CI, 2.07–25.28). Xen63 eyes had significantly lower mean IOP (12.7 ±4.8 vs. 15.5 ±5.1mmHg, p=0.001) and fewer medication classes (0.6 ±1.1 vs. 1.7 ±1.6 meds, p=0.0005), with the degree of reduction in IOP and medication count being significantly greater in Xen63 eyes. There were 29 and 21 distinct interventions in Xen63 and Xen45 eyes respectively, with 11.9% of eyes undergoing needling in each group. There were 34 and 19 distinct adverse events, in Xen63 and Xen45 eyes respectively, most of which were early and transient. Nine Xen63 eyes (21.4%) and 6 Xen45 eyes (14.3%) underwent reoperation.

Conclusions
Xen63 resulted in greater surgical success rates compared to Xen45 and demonstrated superior efficacy in terms of IOP and medication reduction. This was tempered by more postoperative interventions and adverse events, although most were transient. The efficacy and safety profile of Xen63 is promising, but further evaluation is required.

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RPLB-002
COMBINED CATARACT AND STAND-ALONE SUPRACILIARY DRAINAGE DEVICE SURGERY: SHORT-TERM RESULTS

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Purpose
To evaluate the reduction of the intraocular pressure (IOP) and the number of anti-glaucomatous medications (AGM) after supraciliary drainage device surgery in patients with uncontrolled open-angle glaucoma.

Methods
This is a single-center, prospective, interventional, single-arm study conducted at the Swiss Visio clinic (Lausanne, Switzerland) between May 2022 and March 2023. Forty-nine eyes of 39 patients with primary open-angle glaucoma (POAG) or pseudoexfoliative glaucoma (PEXG) who successfully underwent MINIject® (iSTAR Medical, Wavre, Belgium) implantation were included (stand-alone MINIject: n=35; Phaco+MINIject: n=14). The primary outcome was IOP reduction at 1, 3, and 6 months. Complete success was defined as more than 20% IOP reduction from baseline, absolute IOP measurements below 21 mmHg at all time points, and no AGMs.

Results
For the standalone group, the mean baseline IOP was 24.6±9.6 mmHg (n=35). At 1, 3, and 6 months after surgery, mean IOP decreased to 11.4±6.2mmHg (n=25), 11.6±5.9 mmHg (n=18), and 14.9±5.9 mmHg (n=11), respectively, with a mean AGM decreasing from 2.6±1.3 pre operatively to 0.3±0.9 at 6 months. Baseline mean IOP for the combined surgery group was 17.7±3.6 mmHg (n=14), reduced to 13.6±3.0 mmHg (n=11),12.5±4.2 mmHg (n=8), and 10.0±3.6mmHg (n=4) at 1,3 and 6 months. The mean AGMs dropped from 2.43±0.85 to no drops. The difference in mean IOP between the two groups was not statistically significant at 6 months (P=0.08). Complete success at 6 months after surgery for both groups was obtained in 76.0% of patients. Most common early postoperative complications were hyphema in 9 eyes (18.4%) with one eye requiring anterior chamber washout, inadequate positioning in 5 eyes (10.2%) with 3 eyes necessitating implant exchange and 2 cases of intra-operative implant trimming. There were 3 eyes (6.1%) with early and self-limiting hypotony. Additional surgery was performed in 3 (6.1%) cases of surgical failure.

Conclusions
The implantation of MINIject, a new minimally invasive supraciliary glaucoma drainage device, with or without combined cataract surgery, significantly reduces IOP and IOP-lowering medications with an adequate safety profile at 6 months.

POSTER ABSTRACTS

Artificial Intelligence & Big Data

P-001

VALIDATION OF ANTERIOR SEGMENT OCT IN DETECTING ANGLE DYSGENESIS IN GLAUCOMA USING ARTIFICIAL INTELLIGENCE

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Purpose

To predict the presence of Angle Dysgenesis on Anterior Segment Optical Coherence Tomography (ADoA) using deep learning and to correlate ADoA with mutations in known glaucoma genes.

Methods

Eight hundred, high definition anterior segment optical coherence tomography (ASOCT) B-scans were included, out of which 340 images (One scan per eye) were used to build the machine learning (ML) model and 460 were used for validation of ADoA. The images used to build the ML model, included 170 scans of Primary congenital glaucoma, Juvenile onset open angle glaucoma and adult onset Primary open angle glaucoma eyes and the rest were controls. The genetic validation dataset consisted of another 393 images of patients with known mutations compared with 320 images of healthy controls.

ADoA was defined as the absence of Schlemm's canal (SC), the presence of extensive hyper-reflectivity over the region of trabecular meshwork(TM) or a hyper-reflective membrane (HM) over the region of the TM. Deep learning was used to classify a given ASOCT image as either having angle dysgenesis or not. ADoA was then specifically looked for, on ASOCT images of patients with mutations in the known genes for glaucoma.

Results

The final prediction which was a consensus-based outcome from the three optimized deep learning models had an accuracy > 95%, specificity >97% and sensitivity >96% in detecting ADoA in the internal test dataset. Amongst the patients with known gene mutations, ADoA was observed among all the patients with MYOC mutations, as it was also observed among more than 80% images of patients with CYP1B1, FOXC1 and with LTBP2 mutations, compared to only 5% of the healthy controls.(Fig 1a-d)

Conclusions

Three deep learning models were developed for a consensus-based outcome to objectively identify ADoA. The performance of the ADoA prediction models on the genetic validation dataset indicates the translational potential of image-based diagnostic alternatives.

P-002

MACHINE LEARNING APPROACHES FOR PREDICTING GLAUCOMA PROGRESSION USING MULTICENTER ELECTRONIC HEALTH RECORDS: THE SIGHT OUTCOMES RESEARCH COLLABORATIVE

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Purpose

Advances in artificial intelligence have enabled the development of predictive models for glaucoma. However, most work is single-center and uncertainty exists regarding the generalizability of such models. The purpose of this study was to build and evaluate machine learning (ML) approaches to predict glaucoma progression requiring surgery using data from a large multicenter consortium of electronic health records (EHR).

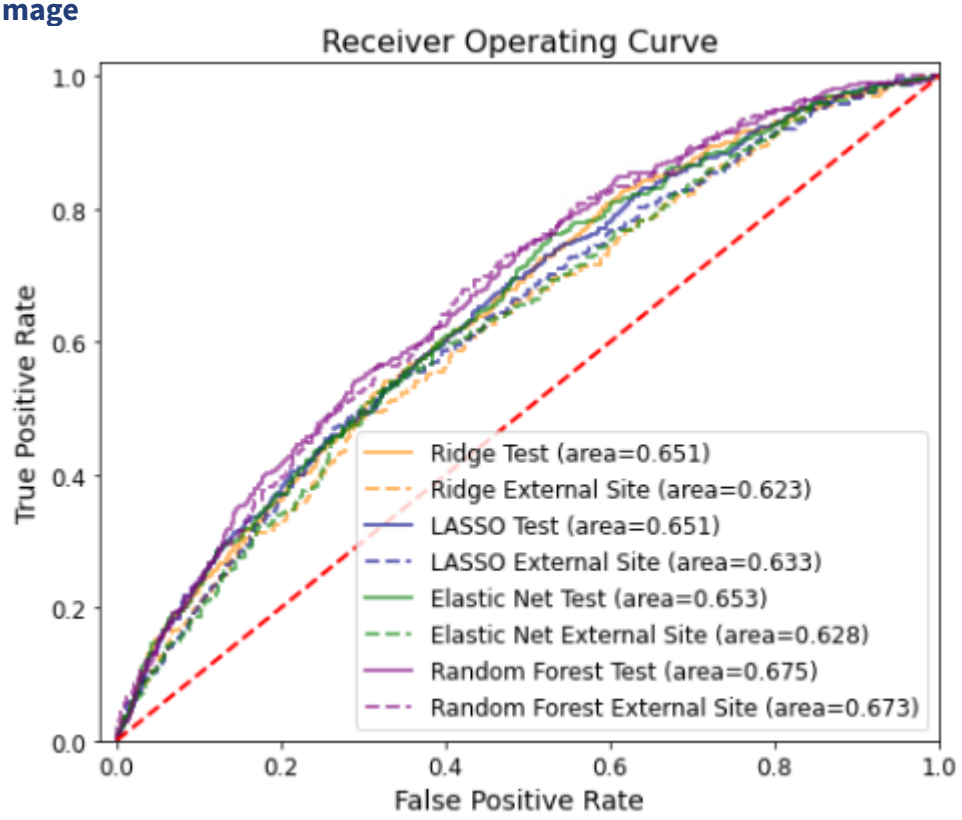
Methods

Structured EHR data from 5 academic eye centers participating in SOURCE were identified, including demographics, diagnosis codes, medications, and clinical information (intraocular pressure, visual acuity, refractive status, and central corneal thickness). We developed machine learning models to predict whether glaucoma patients (identified by ICD codes) would progress to glaucoma surgery (identified by CPT codes) using the following modeling approaches: 1) penalized logistic regression (lasso, ridge, and elastic net); 2) random forest. One site was reserved as an “external site” test set (N=2574); of the patients from the remaining sites, 3000 each were randomly selected to be in development and test sets, with the remaining 34747 reserved for model training. Evaluation metrics included area under the receiver operating characteristic curve (AUROC) on the test set and the external site.

Results

55444 (12.8%) of 43321 patients underwent glaucoma surgery. Model performance is summarized in the figure. Overall, the AUROC ranged from 0.651-0.675 on the random test set and from 0.623-0.673 on the external test site, with the random forest model performing best on both sets. There was a greater performance decrease from the random test set to the external test site for the penalized regression models than for the random forest model.

Image



Conclusions

ML models developed using EHR data can predict whether glaucoma patients will need surgery. Performance of our predictive models was similar to prior models trained on structured EHR data from a single-center. Caution should accompany deployment of predictive models to populations on sites external to the original training set. Additional research is needed to investigate the impact of protected class characteristics such as race or gender on model performance and fairness.

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P-003

THE ROLE OF ARTIFICIAL INTELLIGENCE IN PREDICTING THE PROGRESSION OF INTRAOCULAR HYPERTENSION TO GLAUCOMA

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Purpose
Construction of neural models to predict the progression of intraocular hypertension to glaucoma.

Methods
Modeling with the help of artificial intelligence tools was done with the help of the Neurosolutions commercial simulator. Thus, the number of hidden layers, the number of neurons in each layer, the different forms of the activation function, and the drive algorithms can be determined. The built databases contain information on two lots of HTIO treated and untreated patients and a control lot of patients with GPUD. As input parameters for neuronal models were selected: age of patients, age of the disease, systolic and diastolic blood pressure value, minimum and maximum intraocular pressure, PSD value. Output parameters were: conversion risk at 5 years and c / d ratio. For the three batches of patients, pre-propagation neural models (Multilayer Perceptron) were constructed with two layers of hidden neurons. The number of neurons in each layer ranged from 2 to 10. The most important stage in artificial neural network modeling is the validation step in which the input data consists of the set of data that was not used in the training step. Neural patterns built have generated output values for these data. The obtained results were then compared with the experimental values. Performance of neural models was evaluated by calculating mean square error (MSE), correlation coefficient (r2) and percentage error (Ep).

Results
For the three groups of patients, the best performance was achieved with 2 hidden layers and 10 neurons hidden in each stratum. Performance Values in the Validation Stage are between 1 × 10-6 and 9 × 10-6 for MSE, between 0.999994 and 0.999999 for r2, respectively between 0.003 and 0.26 for Ep.

In this study, artificial neural models have been developed for the use in prediction of intraocular high pressure progression to glaucoma. For both study and control groups, assuming a confidence interval of 20%, the probability of networks obtained to give the correct answers was an average of > 80%.

Conclusions
The neural models used have demonstrated the possibility of using them in prediction progression of glaucoma intraocular hypertension. Very good results were obtained at the validation stage, the probability of giving correct answers in the validation stage is 75% (ie 9 correct answers out of 12 possible). The results obtained in this study are comparable to those presented by other authors in the literature

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P-004
GLAUCOMA SCREENING MADE POCKET FRIENDLY ON YOUR SMARTPHONE!

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Purpose
To evaluate the performance of an offline, smartphone-based Artificial Intelligence (AI) system for the detection of referable glaucoma against two benchmarks: specialist diagnosis following a full glaucoma workup and consensus image grading.

Methods
Design: A prospective, cross-sectional study at a tertiary glaucoma centre in India.

Participants: A total of 293 participants consented to participate.

Main Outcome Measures: Diagnostic performance of the AI system to detect Referable Glaucoma

All the participants underwent a comprehensive glaucoma workup (Clinical assessment, SD-OCT and visual fields). Additionally, disc-centered, monoscopic images were captured using a validated portable fundus camera with an integrated, novel AI for Referable Glaucoma screening and stereoscopicimages with a desktop fundus camera. The AI system was compared against a final diagnosis provided after a thorough glaucoma workup as well as following a majority image grading assessment by three masked, fellowship-trained Glaucoma specialists (based on pre-defined criteria). Referable glaucoma was defined as those with glaucoma-related definite structural and functional change.

Results
On 243 subjects, the AI system demonstrated a sensitivity and specificity of 93.7% (95% CI:87.6 – 96.9%) and 85.6% (95% CI: 78.6 – 90.6%) respectively in the detection of referable glaucoma when compared against the final diagnosis following a full glaucoma workup. Recall for no glaucoma was 94.7% (95% CI: 87.2 – 97.9%). Amongst the false negatives, 4 were early glaucoma and 3 were moderate glaucoma. When the same set of images provided to the AI was also provided to the specialists for image grading, the AI system demonstrated a sensitivity of 100% (95% CI: 94.6 - 100%) and specificity of 71.0% (95% CI: 63.6 – 77.4%). Overall, on image grading, the specialists detected 60% (67/111) of true glaucoma cases versus a detection rate of 94% (104/111) by the AI contributing to the apparently low specificity.

Conclusions
The AI tool showed a robust performance when compared against a stringent benchmark I.e., a final diagnosis following glaucoma workup. It had minimal over-referral of normal subjects despite being challenged with fundus images alone. This tool can have a significant impact in detecting referable glaucoma cases in outreach settings.

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P-005

FEW SHOT LEARNING BASED DIAGNOSIS OF GLAUCOMA USING WIDE-FIELD OCT ANGIOGRAPHY

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Purpose

A large amount of dataset is still needed to study deep learning diagnostic algorithms. Most medical datasets lack enough images to train on, and it is time-consuming to build a dataset from which labels are generated. We used few shot learning for overcoming this problem. We evaluated the performance of few shot learning in detecting glaucoma, based on wide-field OCT angiography (OCTa) images.

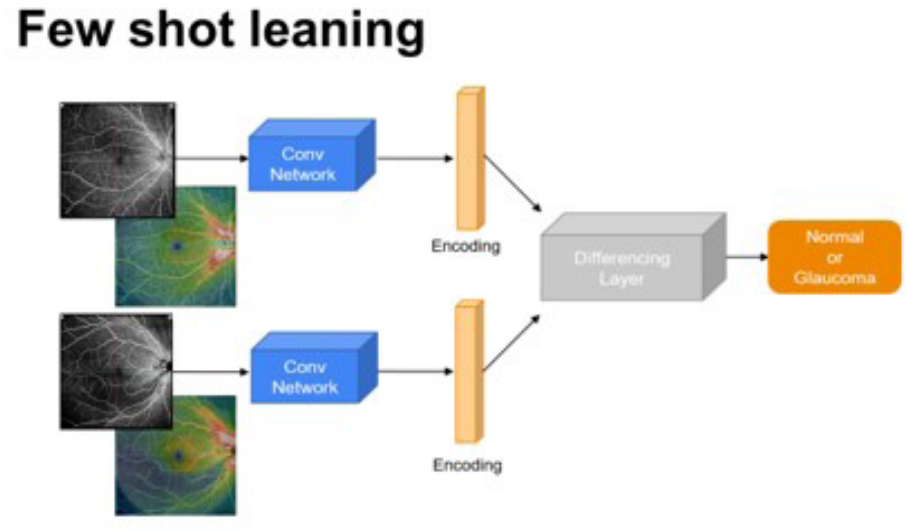
Methods

Overall, 200 eyes including 82 healthy eyes and 118 eyes with glaucoma were enrolled in this observational study. For few shot learning, 140 wide-field OCT retinal nerve fiber layer (RNFL) thickness maps (12 x 9 mm) were used as training data. Wide-field OCTa images (12 x 12 mm, superficial layer) and combination of wide-field OCT and OCTa maps (Combi-map) of 200 eyes were used as test data. The diagnostic ability of this method was compared with conventional OCT parameters of the thickness.

Results

Few shot learning achieved an area under the receiver operating characteristic curve (AUC) of 0.887 and 0.877 and an accuracy of 81.02% and 80.03% (wide-field OCTa and Combi-map, respectively). Few shot learning with wide-field OCTa maps were comparable to the traditional OCT parameter-based methods (all p>0.005).

Image



Conclusions

Using a few shot learning algorithms on wide-field OCTa images, we confirmed that diagnostic value in glaucoma could be comparable to classical OCT parameter-based methods, even a small amount of data.

P-006

A FUSION LEARNING METHOD FOR THE GLAUCOMA DIAGNOSIS BASED ON MULTIPLE SOURCES OF OPHTHALMIC DIGITAL IMAGES

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Purpose

The early screening of glaucoma is the most efficient way to reduce the rate of blindness. AI-based methods based on ophthalmic images play a potential role in glaucoma diagnosis. However, the difficulty of obtaining a computing device, multiple evidence of image sources, time-wasting, and low level of explanation are challenges for AI-based ophthalmic diagnosis. Thus, to solve this problem, this study proposed a fusion learning method for glaucoma detection.

Methods

Three steps are involved, which are image feature extraction, feature matrix fusion, and AI-based glaucoma forecasting. Unsupervised (Hierarchical Clustering, SVM, and ResNet-K Means), supervised (VGG-16 and ResNet) methods and the proposed method are compared based on Optical Coherence Tomography (OCT), Fundus Autofluorescence (FAF), regular fundus photography (RCFP) and Ultra-Widefield Fundus (UWF), respectively and comprehensively.

Results

Findings show that the proposed method presents a high performance for integrated ophthalmic image diagnosis, it is timesaving (0.09s per image) with high precision (0.95), sensitivity (0.93), specificity (0.92), and AUC (0.94). Thus, this study concluded that the proposed method is a solution to glaucoma automatic quick prediction based on multiple data sources. Practical and theoretical contributions are delivered. A reference value for medical diagnosis based on multiple digital images is contributed.

Conclusions

AI-based models present great potential for glaucoma diagnosis. This study proposed a fused AI method based on multiple resources for glaucoma detection. Processes of image feature extractions, feature fusions, and deep learning prediction models are involved. The characters and preprocess approaches of OCT, FAF, RCFP, and UWF for glaucoma detection are discussed. Six AI-based methods for glaucoma prediction are tested and compared. Findings show that the proposed method exhibits high performance for glaucoma detection, especially for colorful ophthalmic images. The strength of this method is that it could detect glaucoma with one or more sources of evidence. Clinical and theoretical contributions are delivered, and reference value for other medical disease detection based on digital images is indicated. It is recommended that more unsupervised and supervised models should be considered for the comparison. The expandability AI (EAI) mechanism should be discussed in the future. Labeled data enhancement methods based on Gan and EAI should be explored.

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P-007

CANNY EDGE ALGORITHM PERFORMANCE FOR AUTOMATIC OPTIC NERVE DISC MARGIN DETECTION IN SD-OCT

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Purpose

To assess performance of Canny Edge algorithm, implemented in commercial SD-OCT, to detect optic nerve disc margin when 3D Wide Glaucoma vertical scan pattern selected for simultaneous analysis of the peripapillary nerve fibre layer and perifoveal ganglion cell complex thickness.

Methods

In methodological study 87 eyes of 56 females and 31 males aged 14 to 94 years were selected from a commercial SD-OCT imaging data base for analysis. The optic nerve disc was segmented into 8 regions - inferior (I), inferior-nasal (IN), nasal (N), superior-nasal (SN), superior (S), superior-temporal (ST), temporal (T), inferior-temporal (IT) and per-algorithm delineation of neural disc edge ($I_{disc\ margin}$) was compared with manually modified disc margin, classified as Ground Truth ($GT_{disc\ margin}$). Based on confusion-matrix Canny Edge algorithm performance in each optic disc segmented area was classified as True Positive (TP) if a defined $I_{disc\ margin}$ overlaps $GT_{disc\ margin}$, False Positive (FP) if construed $I_{disc\ margin}$ is localized outside neuroretinal rim, and False Negative (FN), if delineated $I_{disc\ margin}$ narrows inside neuroretinal rim. Disc area (DA), vertical disc diameter (VDD), and horizontal disc diameter (HDD) values obtained by the automated algorithm and manual modification were also compared. Dice similarity coefficient (DSC) was used as an evaluation metric for the overlap sectors I and GT. Inter Class Correlation ($ICC_{1,k}$) was used to assess correlation for DA, VDD, and HDD measurements between I and GT. Data analysis was performed with MedCalc® software vers.20.106. (MedCalc Software Ltd, Ostend, Belgium; https://www.medcalc.org; 2022). The study being carried according to the tenets of the Declaration of Helsinki.

Results

The overall performance of the Canny Edge algorithm for detecting the optic disc boundary in 8 sectors was DS = 0.71. The algorithm demonstrated the best performance in sector I (DSC = 0.77) and the lowest in zone T (DSC = 0.64). ICC1,k were as follows DA = 0.88, VDD = 0.81 and HDD = 0.75.

Conclusions

Although the 3D Wide glaucoma scanning grid only performs vertical scanning, the Canny Edge algorithm performed good overall overlap of optic disc margin as well as inter-rater correlation between $I_{disc\ margin}$ and $GT_{disc\ margin}$ measurements of the DA, VDD and HDD. However, a boundries detection with a higher DSC score and ICC would be required to diagnose glaucoma.

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P-008
RELATIONSHIP BETWEEN ORAL HEALTH AND GLAUCOMA IN THE UNITED KINGDOM

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Purpose
The goal of this study was to investigate the relationship between oral health and glaucoma traits using data from UK Biobank participants.

Methods
This is a cross-sectional analysis of subjects from the UK Biobank categorized according to self-reported oral health status derived from touchscreen questionnaires. Multivariable linear and logistic regression models, adjusted for key sociodemographic, medical, anthropometric, and lifestyle factors, were used to examine associations. We assessed whether associations were modified by a multi-trait glaucoma polygenic risk score. The primary outcome was the odds of glaucoma diagnosis; secondary outcomes included differences in intraocular pressure (IOP), as well as retinal nerve fiber layer (mRNFL), and ganglion cell layer (mGCIPL) in the macular region.

Results
A total of 80,935 subjects (19.1%) reported a history of oral health conditions defined as painful or bleeding gums, toothache, tooth loss, or denture wear. Overall, 56,042, 37,562, 15,694 and 15,657 subjects were available for analysis of glaucoma, IOP, mRNFL, and mGCIPL, respectively. After adjusting for multiple covariates, the odds of glaucoma among patients with a history of oral health conditions was not significantly different from those without (odds ratio (OR): 0.98, 95% confidence interval (CI): 0.87, 1.11). Multivariable-adjusted analysis revealed that mGCIPL measurements (p=0.35) were not significantly different between the two groups. IOPs were slightly lower among those with presence of oral health conditions (-0.08 ± 0.03 mmHg, p=0.02). Specifically, IOPs were lower among subjects wearing dentures (-0.15 ± 0.05 mm Hg, p=0.004). mRNFL measurements were slightly lower among those with oral health conditions -0.17 ± 0.07 mM, p=0.009). There were no significant interactions between oral health and polygenic risk score for glaucoma or IOP for any outcome variable tested (p>0.22).

Conclusions
Current symptoms consistent with poorer oral health were not associated with an increased risk of glaucoma or elevated IOP.

P-009

MODELLING AND MITIGATING ANNOTATIONS WITH HUMAN-IN-THE-LOOP MACHINE LEARNING FOR MULTIMODAL ASSESSMENT OF ANTERIOR CHAMBER ANGLES IN GLAUCOMA PATIENTS

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Purpose

The automated measurement of angle parameters such as trabecular-iris-angle (TIA), angle opening distance (AOD), and angle recess area (ARA) in various non-invasive images modalities are quite scarce.[1-4] Also, there are no studies reported till date comprising of a multimodal artificial intelligence (AI) took box for angle assessment, and predominantly many AI tool boxes have the limitation of the black box dilemma. In this study, we intend to report an explainable AI system (overcoming the black box dilemma), composed of multilevel convolutional neural networks for automatic localization of the scleral spur, followed by subsequent measurement of various angle parameters.

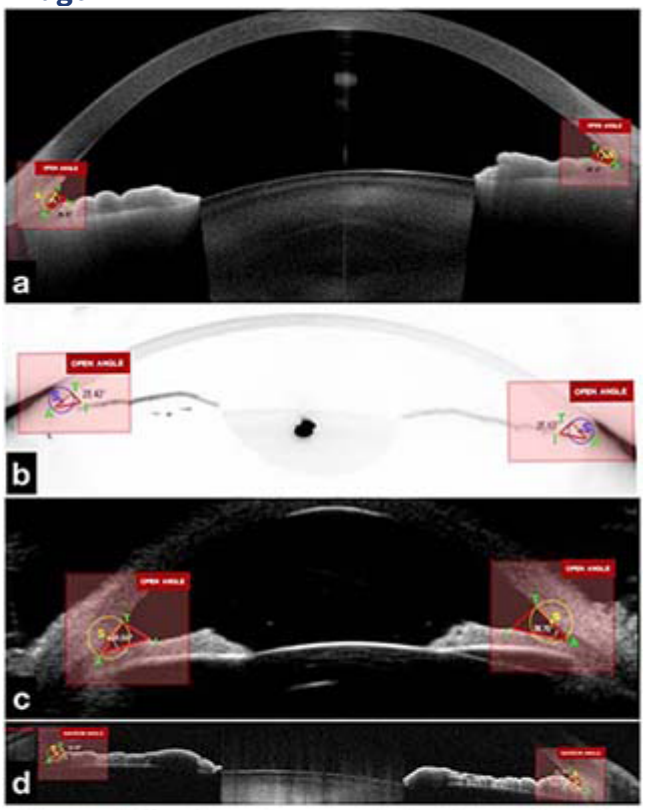
Methods

TrueColor confocal ultrasound biomicroscopy (UBM), anterior segment optical coherence tomography (AS-OCT), anterion, and scheimpflug images were used with human-in-the-loop machine learning, to overcome the black box dilemma. Three angle structures (such as the scleral spur, trabecular meshwork and trabecular-iris angle) were annotated. A total number of 400 TrueColor high-resolution confocal images from 205 glaucoma patients were collected. There were each of 100 UBM images (57 open angle, 30 narrow angle and 13 angle closure), AS-OCT images (67 open angle, 23 narrow angle and 10 angle closure), scheimpflug images (67 open angle, 23 narrow angle and 10 angle closure), and anterion images (57 open angle, 30 narrow angle and 13 angle closure).

Results

A convolutional neural network (CNN) based on the InceptionV3 network for automatic classification of angle closure and open angle was used, with localization in relation to the scleral spur, trabecular meshwork and trabecular-iris angle. The tool was able to locate scleral spur and draw customised angles based on trabecular meshwork location over UBM, AS-OCT, anterion, and scheimpflug images.

Image



Quantified and annotated angles in ANTERION® imaging, Scheimpflug imaging, ultrasound biomicroscopy and AS-OCT, respectively.

Conclusions

This study reported the automatic detection of angle structure with high accuracy with human-in-the loop machine learning, and with constant training via feedback mechanism the prediction accuracy can be increased. Furthermore, multimodal non-invasive clinical images such as AS-OCT, UBM, anterion, and scheimpflug imaging along with gonioscopic images and biometric parameters should be integrated to build a generalised, more reliable and an explainable AI diagnostics system.

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P-010

PREDICTION OF PERIMETRIC PROGRESSION IN OAG PATIENTS BASED ON HIGH-SPEED IMAGING (CORVIS ST) MEASUREMENTS USING ARTIFICIAL INTELLIGENCE (XGBOOST)

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Purpose

The aim of our research was to create an artificial intelligente (AI) model that may predict the risk of visual field (VF) progression in patients with open-angle glaucoma (OAG) using Dynamic Corneal Response (DCR) Corvis ST parameters registered before and one, three and six months after initiating monotherapy with topical prostaglandin analogues (PGs). Different AI models were tested to achieve optimal predictions as measured by their accuracy and area under the curve (AUC, referring to ROC curve). The predictive variables were analyzed to assess which are relevant for final prediction of VF progression

Methods

A dataset of 65 eyes was analyzed. The predicted variable (VF progression) was determined using the event analysis, collected over 6 years of follow-up. The AI training pipeline to predict the consolidated target consisted of an initial outlier removal process, feature selection and training using the leave-one-out (LOO) cross validation. Techniques based on decision trees using boosting such as the SGBoost (Xtreme Gradient Boosting) algorithm were used. The objective was to optimize AUC, and the results were compared for different AI algorithms.

Results

The most accurate data predictors were those registered at 1 month follow up, predicting glaucomatous progression with an accuracy of 86.2%. The main variables involved in the prediction were the length of the arc at highest concavity (B1-HC dArc length), the time from the onset of the deformation to the highest concavity (B1-HC Deflection Time), and the length of the corneal deflection at the time of highest concavity (B1-HC Deflection Length). This was consistent across different algorithms, and we also found that results did not improve including additional variables such as corneal hysteresis or IOP values.

Conclusions

The results show that glaucomatous VF progression can be predicted with relatively high accuracy using Corvis ST measurements registered one month after beginning PGs treatment. The early identification of potential “fast progressors” could have an evident clinical benefit.

P-011

VISUAL ACUITY PREDICTION IN PRIMARY CONGENITAL GLAUCOMA WITH MACHINE LEARNING MODELS

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Purpose

To analyze the presence of corneal aberrations in primary congenital glaucoma (PCG) and its visual impact with machine learning models

Methods

Observational cross sectional study. 42 patients diagnosed with PCG (group 1, G1) and 45 healthy subjects (group 2, G2) were included. All subjects underwent a complete ophthalmic examination and visual acuity was measured in Snellen scale. Corneal topographic and aberrations were measured by a topography software using Scheimpflug principle (Pentacam®) and dynamic Scheimplug analyzer (Corvis ST®). Corneal aberrations were recorded as root median square (RMS) at 6mm diameter zone and decomposed into low order aberrations (LOA) and high order aberrations (HOA).

Two machine learning classification models and two machine learning regressors models were used in order to determine the most relevant pentacam and corvis features

Results

Statistical differences were found between groups in all corneal topographic measurements, except in K2 values (p=0.162). Mean K (p=0.013), cylinder (p=<0.001), central anterior elevation (p=0.013), central posterior elevation (p=0.005) and visual acuity (p=0.005) were statistically different in both groups

Statistical differences were found between groups in all corneal aberrations measurements, except in RMS total Spheric aberration (p=0,128). RMS total LOA (p=0.004); RMS total HOA (p=<0.001) RMS total LOA and RMS total HOA were negatively correlated with best corrected visual acuity (BCVA) (r: -0.417, p=<0.001 respectively)

Two machine learning classification models were used to classify cornea features in PCG or healthy subjects. Random forest classifier had an accuracy of 70% with an area under the curve (AUC) of 68% and logistic regression had an accuracy of 76% with an AUC of 78%. The most important features both models took into account was RMS total LOA and RMS anterior coma

Two machine learning regression models were used to predict BCVA using all Pentacam and Corvis features. The support vector regressor model had a mean square error of 0.33 and random forest regressor had a mean square error of 0.32. The most important features in both models were belin ambrosio devation index (BAD), tomographic biomechanical index (TBI) and the cylinder. The least important features were all RMS of HOA

Conclusions

BAD, TBI and cylinder might explain visual acuity loss from PCG. HOA are negatively correlated with BCVA but do not have impact in visual acuity in machine learning regression models.

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P-012

USE OF MACHINE LEARNING TO PREDICT SUCCESS & EFFECTIVENESS OF SELECTIVE LASER TRABECULOPLASTY (SLT) IN OCULAR HYPERTENSION/ OPEN ANGLE GLAUCOMA

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Purpose

Selective laser trabeculoplasty (SLT) reduces intraocular pressure in 2/3rd to 3/4th of the patients of ocular hyepertension (OHT) or open angle glaucoma (OAG).

Currently there is no easy calculator for the clinicians to find out how soon the Intraocular Pressure (IOP) will decrease effectively (*i.e.* >20 % drop from baseline) after SLT and how long that effect will last.

Artificial intelligence can help to pick up the pattern among the 100+ directly and indirectly related features which may impact the outcome in a given patient

With help of machine learning (ML) our model can

1) predict Indvidual success or failure of SLT in terms of significant reduction in IOP (>20% drop in IOP from the pre laser level).

2) predict the duration in months for effectiveness of IOP lowering effect of SLT in a given patient.

Methods

Hospital electronic patient record system (Medisoft) was used to collect selective laser trabeculoplasty (SLT) data for 533 patients who had minimum 6 months to 7+ years of post laser follow ups. All these patients underrgone laser between 1st June 2012 to 31st Dec 2021 and data collected till their first date of further intervention.

Out of total1039 eyes,dataset from 800 eyes(80%) was used to train the model and the model was validated by using dataset from 200 eyes (20%).

We evaluated 31 different models each to predict success (Classificaiton moddel) as well as duration of SLT effectivness (regression model).

Results

Our classification model can predict post SLT success (>20% reduction of IOP after SLT) with 80% accuracy.

It also includes patients' prediction where SLT would be most likely ineffective.

The regression model can predict the duration of IOP lowering effect with mean average error (MAE) of 9 months.

Conclusions

This novel machine learning prediction model is expected to help clinicians

To use individualised approach to choose SLT over eye drops to lower IOP.

With help of artificial intelligence, clinicians can avoid unnecessary SLTs where success prediction is very low. This will help to make efficient use of highly skilled workforce.

Clinicians can offer personalised follow up plan with less number of visits as machine learning model can predict the onset and duration of IOP lowering effect of SLT as per individual parameters. Reduced numbers of post laser visits will decrease burden on hospital capacity challanges as well as it will be cost effective and connvenient to the patients as well as carers

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P-013

COMPARISON BETWEEN CLINICAL OBSERVATION AND ARTIFICIAL INTELLIGENCE: STAGING OF PERIPHERAL ANTERIOR CHAMBER DEPTH

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Purpose

Van Herick assessment (VHA) is a simple clinical tool for assessing the peripheral anterior chamber depth (PACD) and can be exploited as a simple screening alternative method, for identifying angle closure compared to gold-standard gonioscopy, as conducted by higly trained observers. A novel instrument able to automatically perform the Van Herick assessment, applying with deep lerning technique has been developed. Results of the comparison between clinicians assessment and measurements obtained by the means of the instrument are reported.

Methods

A new instrument able to automatically perform the VHA by using a novel optic design, and applying deep learning techniques to automatically determine the VHA grading have been developed. A comparison between the instrument and a set of clinical data was conducted in a clinical setting, in order to assess the potential clinical application of this approach. Three higly trained glaucoma specialists performed the VHA using the standard clinical approach, and the new proposed instrument was also used to evaluate clinical validity of this new approach.

Standard VHA was firstly performed applied to each patient's right eye by highly trained personnel and the corresponding VHG was assigned. This value was considered as the reference for the analysis of the CNNs performance. Immediately afterward, the subject was analyzed using our automatic instrument.

Results

Eighty adult subjects, 30 males and 50 females, with ages ranging from 25 to 70 years were recruited in a clinical setting, and informed consent was obtained from each subject. The collected dataset has the characteristics described in the Table.

The overall accuracy is in the order of 80% for all the VHA grades, showing a good accuracy even if the training dataset is still limited.

Image

Table

Characteristic	*Number of Patients*
Male	30
Female	50
Age (range)	28-70
Iris color:	***Number of eyes***
Dark brown	9
Blue	15
Brown	47
Green	9

Conclusions

The collection of a database for automatic determination via AI of the VHA degree has given promising results, although a larger database is needed for the development of a robust Neural Network. The results obtained therefore allow to proceed with the further development of the instrument and an algorithm that will facilitate the screening of PACD.

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P-014

DEEP LEARNING AS CLINICAL DECISION SUPPORT SYSTEM IN GLAUCOMA SCREENING WITH EYE FUNDUS

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Purpose

The purpose is to establish the clinical relevance of deep learning algorithms (CNNs) in glaucoma screening diagnosis by using eye fundus. Confidence intervals for three possible results were established. The first result if there was a strong correlation with glaucoma, the second result if there was a strong correlation with healthy subjects and the third result if there was either a weak correlation for glaucoma or healthy subject. If third result were positive the patient would go for optical tomography coherence (OCT).

Methods

A public database ACRIMA composed of 705 images was used and deep learning algorithms from keras tensorflow framework were used. ACRIMA was divided into 80% for training and 20% for test. Three possible results were predicted: Positive for glaucoma, positive for healthy subjects and the third result was a weak correlation for either glaucoma or healthy subject. Then different confident intervals were established for our CNN in order to find “the clinical threshold” to maximize true positive results for glaucoma and true negative for healthy subjects

Results

ACRIMA test set consisted of 233 test images,143 glaucoma images and 90 healthy images. In the model without confidence interval there were only two possible results glaucoma positive or healthy subjects. The area under de curve (AUC) resulted in 95,8% with a sensitivity of 98% and specificity of 88%. When a confidence interval of 95% was established in the same test images, the AUC was 100% with 100% sensitivity and specificity because only 64 of 233 images were classified as either glaucoma or healthy leaving 169 images for OCT.

When a confidence interval of 80% was established in the same test images, the AUC was 97%,sensitivity 99% and specificity 95% because only 170 of 233 images were used for classification as either glaucoma or healthy leaving 63 test images for OCT

When a conficence interval of 70% was established in the same test images, the AUC was 95,8%,sensitivity 99% and a specificity 92% because only 189 images were used for classification as either glaucoma or healthy leaving 44 test images for OCT

Conclusions

A lot of deep learning models with excellent AUC, sensitivity and specificity results has been published recently but none of them has the clinical threshold with confidence intervals. The clinical importance of a deep learning model not only depends on the result itself but on the confidence intervals as well

P-015

EVALUATION OF AN AUTOMATED SYSTEM THAT RUNS OFFLINE ON A SMARTPHONE-BASED FUNDUS CAMERA FOR SCREENING CHILDHOOD GLAUCOMA: PILOT STUDY

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Purpose
Glaucoma in childhood is a serious cause of blindness and is treatable. Several artificial intelligence (AI) algorithms are validated in the adult population. We aimed to assess the diagnostic ability of an AI-driven glaucoma screening tool to detect childhood glaucoma on images captured from a smartphone-based fundus camera.

Methods
This pilot study included participants 5 to 18 years visiting the glaucoma clinic of a tertiary eye hospital. One disc-centred image per eye was captured using the study device (validated, portable non-mydriatic fundus camera). The diagnostic ability of the AI tool to detect referable glaucoma (glaucoma and disc suspect) against a final diagnosis made by a specialist following a thorough glaucoma work-up (clinical assessment, HVF when possible) was evaluated.

Results
We analysed the results of 33 eyes of 17 children with a mean age of 12±3.4 years (6 to 18). 21 eyes (64%) had some form of childhood glaucoma. The AI system flagged all the no glaucoma (n=11 and one eye with ocular hypertension diagnosis) eyes correctly. Among those with the diagnosis of childhood glaucoma, 11 out of 21 (52%) eyes were graded as no glaucoma by the AI system, 2 as disc suspects (secondary glaucoma with vCup-disc-ratio >0.7) and the remaining 8 (38%) were identified correctly as referable glaucoma. These 11 eyes did not have structural changes and included the diagnosis of Primary congenital glaucoma with a healthy disc (n=9) and secondary glaucoma treated for high intraocular pressure (IOP) (n=2).

Conclusions
The pilot results of the novel AI system integrated on a portable fundus camera show that the AI can be used as a screening tool for childhood glaucoma, especially with definitive optic disc changes. Coupled with biometry, IOP measurement, and corneal parameters it can form an integral part of comprehensive screening in the early detection of childhood glaucoma. In the absence of visual field, disc images could help as objective documentation of damage in children. The portability, easy-to-use, photo documentation, and affordability of the device is an added advantage.

P-016
INTER-OBSERVER VARIABILITY OF HUMAN OPTIC DISC EVALUATION ON FUNDUS PHOTOS AND IMPLICATIONS FOR AI-RESEARCH

G Bourguignon

Purpose
To evaluate the inter-observer variability in grading of optic discs from colour fundus photos (with or without intra-ocular pressure, IOP), in order to explore the robustness of ground truth labels based solely on optic disc scoring for training of AI-algorithms for glaucoma detection.

Methods
Fundus photos were obtained from a cohort of 69 individuals during a glaucoma screening campaign in October 2022. The clinical parameters collected were age, bilateral fundus pictures (taken with a Crystalvue NFC600 camera), and IOP (measured with Nidek Tonoref III). Colour images of 138 optic nerves were analyzed separately by 5 ophthalmologists (4 glaucoma specialists and 1 ophthalmology resident) and Vertical Cup-to-Disc Ratio (VCDR) was recorded for each optic nerve. Also, the eyes were classified into 3 categories (glaucomatous, glaucoma suspect or healthy), initially without knowing the IOP and subsequently again after being unblinded for IOP. Intraclass correlation coefficients (ICC) were used to evaluate agreement in VCDR scoring on the image level. Quadratic Weighted Fleiss score was used to evaluate agreement on the categorization into the 3 categories on the patient level

Results
For the inter-rater agreement in VCDR scoring, the ICC was 0.62 (95% CI, 0.51-0.72) (moderate). For the categorization into 3 classes (healthy, suspect or glaucoma), the Quadratic Weighted Fleiss score was 0.568 (95% CI, 0.421-0.714) (moderate) when blinded for the IOP and 0.441 (95% CI, 0.292-0.59) (moderate) after revealing the IOP.

Conclusions
This study indicates a high inter-observer variability with moderate agreement in determining glaucoma-related parameters based solely on color fundus pictures, even if evaluated by glaucoma specialists. This represents a limitation to the training and validation of artificial intelligence algorithms on databases of which the ground truth has been determined based solely on fundus photos. These findings are in keeping with our previous work (1,2), where the performance of a robust glaucoma-AI model trained on a dataset with ground truth labels based on deep phenotyping including all available clinical parameters had excellent generalizability in various external databases, but with the least good performance in datasets which had ground truth labels bases on only fundus photo evaluation. These observations should remind AI researchers that the performance of AI algorithms relies on the robustness of the ground truth labels. Specifically for glaucoma, it is recommended to determine the ground truth based on not only fundus pictures but also additional metadata such as visual field examinations or Optical Coherence Tomography scans.

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P-017

DEVELOPMENT OF A DEEP LEARNING (DL) SYSTEM TO ESTIMATE THE 52-POINT RAW VISUAL FIELD (VF) DATA FROM FUNDUS PHOTOGRAPHS

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Purpose

Development of a deep learning (DL) system to estimate the 52-point raw visual field (VF) from fundus photographs

Methods

DL models were trained to use fundus photographs to estimate each of the 52-points on the Humphrey SITA 24-2 VF. The study included 11623 fundus photographs and VF pairs from 1838 participants in Singapore. The performance of the models was evaluated using the root mean square error (RMSE) and the mean absolute error (MAE) between the actual and estimated VF. The performance was compared across different DL models and type of fundus photographs used.

Results

The training dataset comprised of 9236 image pairs from 1467 individuals and testing dataset comprised of 2387 image pairs from 371 individuals. The best overall global estimation errors MAE=3.13±2.72 dB (RMSE=4.20±3.50 dB) were obtained from the PoolformerG DL model. The DL model performed better in the normal (MAE=2.64±2.23 dB, RMSE=3.54±2.88 dB) as compared to glaucoma subjects (MAE=5.87±3.47 dB, RMSE=7.86±4.27 dB). The combined photograph (disc+ macula) algorithm (MAE=3.13dB, RMSE=4.94dB) performed better as compared to the disc photo (MAE=4.41dB, RMSE=8.29 dB) and macula photo (MAE=3.67, RMSE=6.46 dB) trained algorithm.

Conclusions

DL can be used to estimate the 52 points on the 24-2 VF using fundus photographs. These findings can help develop tools for functional vision assessment in individuals who are unable to undergo VF testing.

P-018

ARCHETYPE ANALYSIS AND POTENTIAL PREDICTOR PATTERNS IN VISUAL FIELDS FOR EARLY-STAGE GLAUCOMA DETECTION

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Purpose

We investigate if baseline visual fields (VFs) with healthy mean deviations (MDs) and the VF differences to their follow-up VFs contain patterns that help to predict the onset of glaucomatous VF loss.

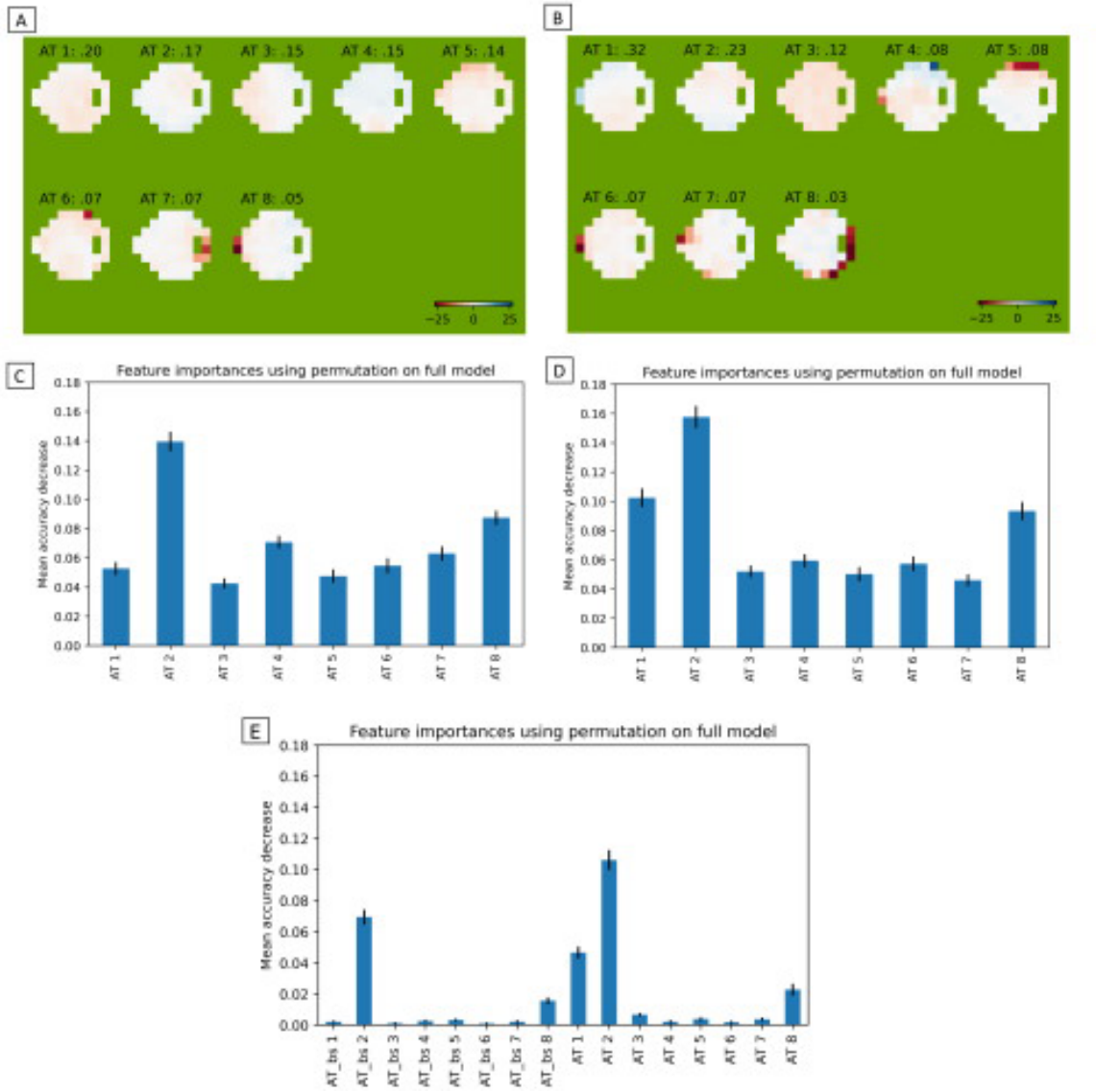
Methods

Total and mean deviations (TD, MD) of the reliable VFs (SITA Standard 24-2) were retrospectively chosen among all patients from Mass. Eye and Ear glaucoma service. Along with reliability check, patients with at least three visits who had their first (baseline) VF normal (MD in [-2.1dB:+2.1dB] and glaucoma hemifield test [GHT] normal/borderline) and their second VF within 2 years with an MD drop of at most 3dB were chosen. Onset of glaucomatous VF loss was defined as future GHT flipping to outside normal limits. We employ Archetype Analysis (AA) to identify potential representative patterns within baseline VFs (ScenBaseline) and their changes (2nd visit minus 1st visit; ScenChange). 8 VF archetypes (ATs) were calculated for these two scenarios. Afterward, random forest classifiers (RFc) are trained on early glaucoma detection (GHT flip to outside normal limits) using the decomposing coefficients in each scenario as features. The dataset was split randomly into a training (75%) and testing (25%) set. Furthermore, RFc and permutation-based feature importance analysis is performed for finding the most important ATs. Lastly, the combination of two scenarios is applied and corresponding important ATs are identified.

Results

2,033 eyes of 1793 patients fulfilled our selection criteria. Figures 1A/B show the ATs in ScenBaseline and ScenChange, respectively, and Figures 1C/D show the corresponding archetype importance. The accuracy of the trained classifiers in both scenarios for detecting early glaucoma is almost the same regarding the f1-score over the test set (67.66 vs. 66.38, Fisher's exact p-value <0.5), but combing the scenarios makes a significant improvement in the detection (73.16 vs. 67.66, p <0.001). Figure 1E shows AT importance in the combined scenario, with 5 ATs identified as particularly important.

Image



Conclusions

We demonstrate how archetypal analysis of baseline VFs and their changes occurring within two years may be useful for predicting the future onset of glaucomatous VF loss after just two visits and we found five specific ATs indicative of this.

RF

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P-019
REDDIT USERS' QUESTIONS AND CONCERNS ABOUT GLAUCOMA

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Purpose
An ophthalmologist spends an average of 11.2 minutes with each patient[1], pressuring ophthalmologists to strategically navigate patient interactions given limited clinic time and overbooked patient schedules. Patients utilize social media in search of unanswered questions regarding clinical management and leveraging support networks. Specifically, glaucoma patients are actively using Reddit to discuss their questions and concerns within the medical system. We analyzed the subreddit /r/Glaucoma utilizing latent Dirichlet allocation to determine common themes among these discussions to better inform providers about their patients' needs.

Methods
Posts published on the Reddit forum /r/Glaucoma were used for analysis. Big Query was used to collect posts from /r/Glaucoma. We collected 1,593 posts published between the years 2018 and 2019. We collected a control group of 4,779 posts from a Reddit forum not related to Glaucoma (/r/AskReddit). Using latent Dirichlet allocation (LDA) we extracted 30 topics from our data set. The LDA topic themes most associated with posts in /r/Glaucoma compared to the control group were determined. Results
LDA analysis of posts in /r/Glaucoma relative to a control group produced 8 distinct categories of posts: "Prognosis, Diagnostics, Medication, Optometry Role, Symptoms, Personal Inquiries, Research, and Financial Burden." The posts most associated with /r/Glaucoma when compared to a control group were posts belonging to the "Prognosis" category (Cohen's d=1.26) while the posts least associated with /r/Glaucoma were from the "Financial Burden" category of posts (Cohen's d=-0.12). Example experiences from members of the /r/Glaucoma forum highlight the questions and concerns of patients on the forum.

Image

Table 1: Latent Dirichlet Allocation Topics associated with */r/Glaucoma* Posts with Correlated Words Used to Highlight the Topic and Redacted Illustrative Examples

Category/Theme	Operational Definition	Cohen's D	Correlated Words	Redacted Illustrative Posts
Prognosis	Posts surrounding concerns about future course of glaucoma	1.26	Eye, drops, surgery, Years, vision, glaucoma, left, pressure, diagnosed, doctor, surgeries, Long, good, eyes, Ago, side, pressures, Laser, drop	[In response to a post regarding a patient who lost vision in an eye] I still wouldn't take it lightly. I was 18 years old when I was first diagnosed with open angle glaucoma. I pretty much lost my left eye already and I am currently legally blind and struggle with depth perception. Everyone with just one functional eye will struggle with depth perception. Good luck to you.
Financial Burden	Posts regarding financial worries related to glaucoma care	-0.12	Money, insurance, Pay, buy, work Job, give, company Expensive, free, cost, public, care Price, cheap, extra, Paying, bought, bottle, make	The lowest I can ever seem to get my eye drops is around $30 on my parent's insurance. Before we hit our deductible though it was around 300 :(Definitely check out Goodrx for coupons and different pharmacies for better prices.

References:

1. Read-Brown S, Hribar MR, Reznick LG, Lombardi LH, Parikh M, Chamberlain WD, Bailey ST, Wallace JB, Yackel TR, Chiang MF. Time Requirements for Electronic Health Record Use in an Academic Ophthalmology Center. JAMA Ophthalmol. 2017 Nov 1;135(11):1250-1257. doi: 10.1001/jamaophthalmol.2017.4187. PMID: 29049512; PMCID: PMC5710390.

Conclusions

Given limited visit times between patients and ophthalmologists, discussions regarding patient questions and concerns about glaucoma care on the social media site Reddit provide essential insights into the shared experiences patients face while managing their condition. Ophthalmologists can mitigate patient uncertainty and prevent the spread of misinformation on social forums by both providing verified physician insights on Reddit as well as incorporating Reddit discussion themes directly in their clinical practice.

References

1. Read-Brown S, Hribar MR, Reznick LG, Lombardi LH, Parikh M, Chamberlain WD, Bailey ST, Wallace JB, Yackel TR, Chiang MF. Time Requirements for Electronic Health Record Use in an Academic Ophthalmology Center. JAMA Ophthalmol. 2017 Nov 1;135(11):1250-1257. doi: 10.1001/jamaophthalmol.2017.4187. PMID: 29049512; PMCID: PMC5710390.

P-020

EARLY GLAUCOMA DETECTION BY USING STYLE TRANSFER TO PREDICT RETINAL NERVE FIBER LAYER THICKNESS DISTRIBUTION ON THE FUNDUS PHOTOGRAPH

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Purpose

We aimed to develop a deep learning (DL)ebased algorithm for early glaucoma detection based on color fundus photographs that provides information on defects in the retinal nerve fiber layer (RNFL) and its thickness from the mapping and translating relations of spectral domain OCT (SD-OCT) thickness maps.

Methods

Design: Developing and evaluating an artificial intelligence detection tool. Subjects: Pretraining paired data of color fundus photographs and SD-OCT images from 189 healthy participants and 371 patients with early glaucoma were used.

Study Methods: The variational autoencoder (VAE) network training architecture was used for training, and the correlation between the fundus photographs and RNFL thickness distribution was determined through the deep neural network. The reference standard was defined as a vertical cup-to-disc ratio of ≥ 0.7, other typical changes in glaucomatous optic neuropathy, and RNFL defects. Convergence indicates that the VAE has learned a distribution that would enable us to produce corresponding synthetic OCT scans.

Main Outcome Measures: Similarly to wide-field OCT scanning, the proposed model can extract the results of RNFL thickness analysis. The structural similarity index measure (SSIM) and peak signal-to-noise ratio (PSNR) were used to assess signal strength and the similarity in the structure of the color fundus images converted to an RNFL thickness distribution model. The differences between the model-generated images and original images were quantified.

Results

We developed and validated a novel DL-based algorithm to extract thickness information from the color space of fundus images similarly to that from OCT images and to use this information to regenerate RNFL thickness distribution images. The generated thickness map was sufficient for clinical glaucoma detection, and the generated images were similar to ground truth (PSNR: 19.31 decibels; SSIM: 0.44). The inference results were similar to the OCT-generated original images in terms of the ability to predict RNFL thickness distribution.

Conclusions

The proposed technique may aid clinicians in early glaucoma detection, especially when only color fundus photographs are available.

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1. Davis BM, Crawley L, Pahlitzsch M, et al. Glaucoma: the retina and beyond. Acta Neuropathol. 2016;132:807e826.
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P-021

REDUCING RED DISEASE IN GLAUCOMA DIAGNOSIS USING OCT REFERENCE DATABASES GENERATED BASED ON ANATOMICAL FEATURES

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Purpose

Reference databases (RDB) are typically created without considering normal anatomical variations between eyes. In this study, we investigated the feasibility of generating OCT RDB based on anatomical features and tested its use to reduce red disease while maintaining sensitivity in glaucoma diagnosis.

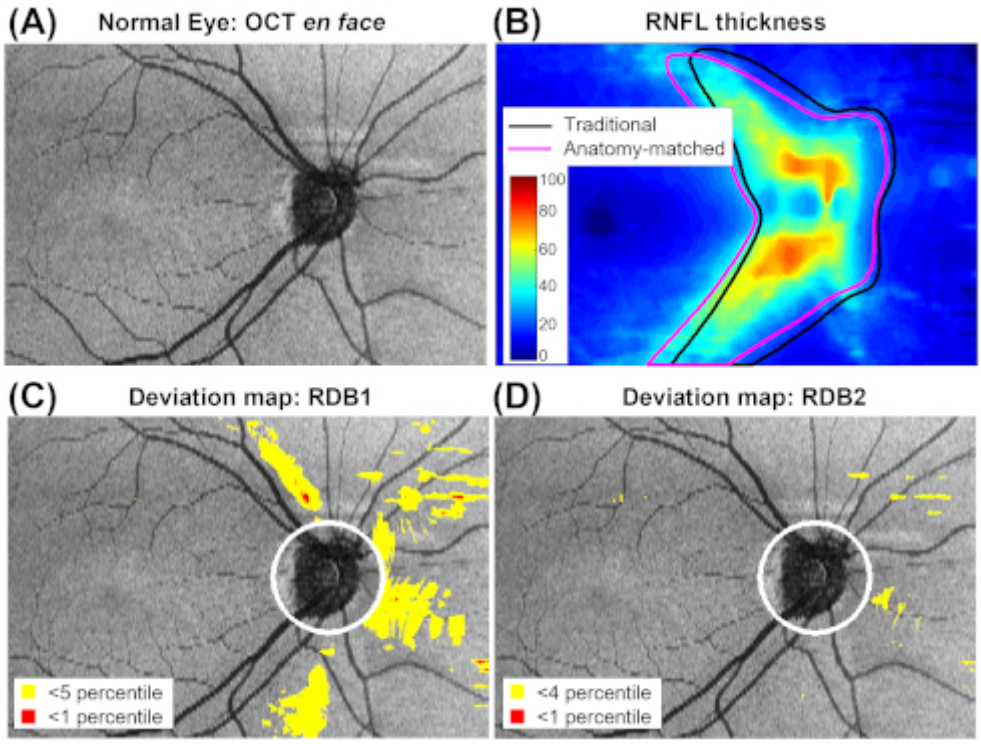
Methods

De-identified 12×9 mm OCT widefield scans were obtained from four optometry practices using Topcon Maestro2. These were used as a sampling pool for two types of RDB for the RNFL thickness (RNFLT) map. RDB1 sampled 500 scans randomly from the population, to mimic the sampling done in a typical RDB, where subjects are drawn from local populations without regard for anatomy. RDB2 was anatomy-matched for each test scan by selecting 500 scans from the sampling pool with the most similar vessel pattern features. A test dataset included glaucoma eyes from a tertiary clinic and normal eyes from the sample set reviewed using the Columbia University method[1] to confirm normality. Glaucoma eyes were used to select the percentile cutoff for RDB2 to have equivalent flagged pixels as the 5% for RDB1. The cutoff was then applied to normal eyes.

Results

Over 7800 scans (one eye per subject, one scan per eye) were used as the RDB sampling pool. 29 normal and 31 glaucoma eyes were used as test set. For glaucoma eyes, paired sample t-test showed a significant difference in flagged pixel count between 5% RDB1 and 5% RDB2 ($p < 0.0001$), where 83.9% of cases had increased flagging with RDB2. With a 4% cutoff for RDB2, there were no significant differences in flagged pixel count compared to the RDB1 5% cutoff ($p = 0.40$). The 4% cutoff was applied to the 29 healthy eyes and 72.4% of cases had reduced flagging compared to flagging at the RDB1 5% cutoff. The figure shows an example of a normal eye's (A) OCT en face and (B) RNFLT map overlaid with the 30-micron isocontours from each RDB's average RNFLT map. (C) and (D) show the deviation map using the two RDBs.

Image



Conclusions

We demonstrate feasibility of an RDB generated using a large sampling pool and an algorithm to match anatomy. Results suggest this method has the potential to increase specificity and reduce red disease while maintaining the sensitivity to glaucoma diagnosis as compared to using a typical RDB. Further study is needed to test more data, especially eyes with early stage glaucoma.

References

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P-022

CLINICAL ASSOCIATIONS OF UNSUPERVISED DEEP LEARNING-DERIVED MACULAR OCT PHENOTYPES

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Purpose

Glaucoma is a complex disease with heterogeneous structural variations and incompletely understood pathogenesis. Structural variation of the retina can be visualized with optical coherence tomography (OCT). We have previously demonstrated the utility of macular OCT phenotypes to discover novel genomic loci.[1] Here we aim to identify clinical correlates of deep learning-derived macular OCT phenotypes to assess their clinical validity.

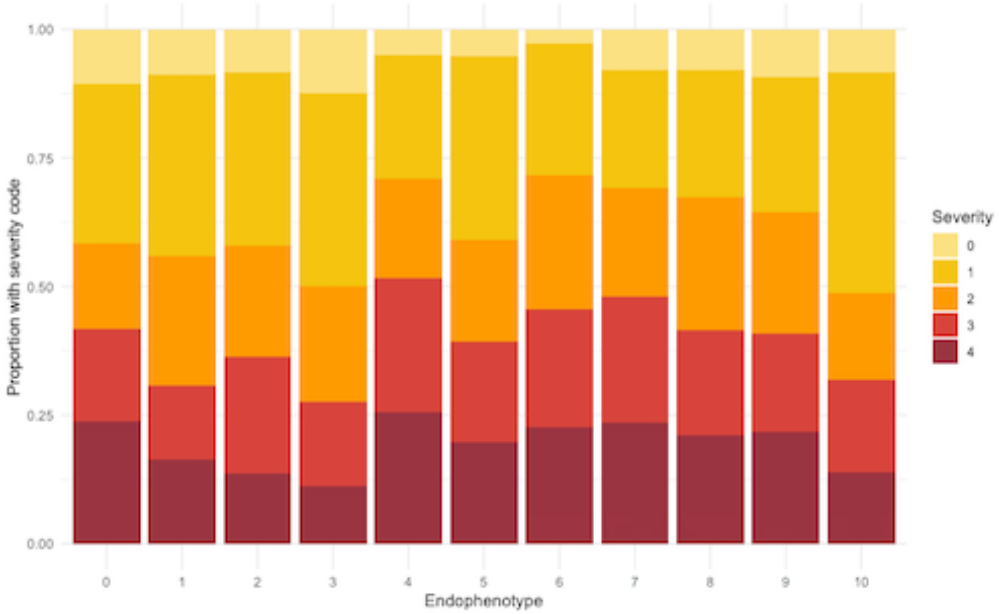
Methods

We used imaging and clinical data from the Massachusetts Eye and Ear Infirmary (MEEI) from 2012 to 2021. Ganglion cell complex (GCC) contour maps from macular OCT scans were extracted. Deep learning (DL) models were developed and trained using Momentum Contrast self-supervised learning. Dimensionality reduction using UMAP and Gaussian Mixture Model (GMM) clustering were used to group semantically similar GCC patterns into distinct groups. Clinical data, including glaucoma ICD-10 diagnosis codes, intraocular pressure (IOP), cup-to-disc ratio (CDR), spherical equivalence (SE), and visual field mean deviation (VF MD) were extracted. Distributions of clinical features were compared using two-tailed t-test or ANOVA. False discovery rate adjusted p-values<0.05 were considered significant.

Results

We identified 11 optimal macular GCC phenotypes using 7,966 OCT scans from 4,928 MEEI glaucoma patients. Among all phenotypes, P4 and 7 had the highest proportion of IOP>24mmHg (6.0%, 5.7%), CDR>0.7 (27.2%, 26.9%), and high myopia (SE<-6D, 7.3%, 7.3%), while P9 and 0 had the highest proportion of MD that worsened with time (slope<0 56.0%, 55.9%). P4 and 7 had MD significantly lower than all other phenotypes except for P9 (-6.7±7.8, -6.7±7.9, p<0.05 for all except for P9). There was no statistically significant difference in MD between P4 and P7. P10 had the least myopic eyes (SE -0.18±2.22) with SE significantly higher than all phenotypes, except for P0, 2, 5 (p<0.05 for all). All phenotypes had clinically significant differences in CDR (ANOVA p=0.045). Finally, P4 and 7 had the highest proportion of severe glaucoma diagnosis codes (ICD 10 diagnosis codes ending in 3 or 4, 23.0%, 22.3%) (Figure 1).

Image



Conclusions

Here we demonstrate that unsupervised deep learning can be used to identify OCT phenotypes which have meaningful clinical correlations, including variations in cup-to-disc ratio, VF MD, and disease severity. This work reinforces the potential utility of DL models for better understanding of glaucoma pathogenesis and prediction of disease progression.

References

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P-023
SMART AI APP TO PREDICT BEST POSSIBLE MIGS SOLUTION

U Qidwai, U Qidwai, G Ratnarajan

Purpose
The aim of this study was to use a state-of-the art hybrid Artificial Intelligence technique, Adaptive Neuro-Fuzzy Inference System (ANFIS) to determine clinical efficacy and safety prediction using a dataset of patients undergoing ICE2 (iStents+ Cataract Surgery+ Endoscopic cyclophotocoagulation), XEN® 45 and PRESERFLO™ MicroShunt, comparing the machine predicted outcome with the real world data.

Methods
A retrospective review of patients undergoing one of four MIGS procedures (iStent, ICE2, PRESERFLO™ MicroShunt and XEN® 45), with or without phacoemulsification cataract surgery at Queen Victoria Hospital, NHS Foundation Trust, East Grinstead, West Sussex was used. Baseline and follow up visits were recorded up to 2 years

For designing an App, OphnosisMIGS', predictive model, the baseline examinations only were used and a suitable model was found, a Machine Learning approach is proposed here where the data patterns are learned through extensive training using the input and output data. The technique used for this work is known as Adaptive Neuro-Fuzzy Inference system (ANFIS).

Results
In all practical scenarios, the estimated outputs represent a reasonable degree of agreement with the actual values. Hence, the actual value of the four output classes (ICE2, PRESERFLO™ MicroShunt, XEN® 45, and iStent; represented as 1, 2, 3, and 4 as categorical data) can be estimated based on the baseline data from the clinical dataset. The proposed system has been found to be 91% accurate (89% on average) with high Sensitivity (80%) and Specificity (90%), as well as low false positive rate (7%) and low miss-rate (20%).

Conclusions
The smartphone application 'Ophnosis^{MIGS}' can provide advisory information to assist ophthalmologists in deciding between MIGS devices. The tool may be helpful in enabling clinicians make faster and more comprehensive decision about glaucoma surgery. The trained model does not require a large memory and can be used on most Android phones.

P-024

EVALUATING LANDMARK AND ARTEFACT DETECTION IN OCT IMAGES WITH DEEP-LEARNING BASED OBJECT DETECTION FRAMEWORKS

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Purpose

To compare the use of deep-learning based object detection frameworks in detecting anatomical landmarks and imaging artefacts in optical coherence tomography images of the optic nerve head.

Methods

In this study, 942 images of eyes were acquired using a prototype high resolution swept source optical coherence tomography imaging system (Zeiss PlexElite). Enface images were generated from the acquired OCT images. Bounding boxes centred on the optic nerve head, regions of signal loss and image discontinuities due to eye movements were manually annotated. Object detection models from the Yolo (YOLOv5m) and Detectron2 (Faster R-CNN R50-FPN, Faster R-CNN R50-DC5 and RetinaNet R50) deep-learning object detection frameworks were developed using the labelled data, which was randomly split into training (60%), validation (20%) and test (20%) subsets. Model performance was evaluated using averaged precision and recall (AP) of the predicted object locations with respect to the ground truth labels at IoU (intersection over union) levels ranging from 0.50 to 0.95.

Results

All trained deep-learning object detection models were compared on the same test subset. For optic nerve head detection, YOLOv5m outperformed the other models, achieving an AP of 80.4. YOLOv5m also achieved better performance in detecting image discontinuities (AP = 35.4), while R50-FPN performed better in detecting regions of signal loss (AP = 23.8). Overall, YOLOv5m was able to achieve better detections in detecting the three types of image features (AP = 46.2) compared to the other object detection models.

Image



Conclusions

Deep-learning based object detection models can be developed to detect anatomical landmarks and artefacts in OCT images. Regions with reduced signal loss were relatively more challenging to detect and further studies are needed to improve the detection of these regions.

P-025

PERFORMANCE OF AN AUTOMATED, OFFLINE ARTIFICIAL INTELLIGENCE TOOL ON A SMARTPHONE-BASED FUNDUS CAMERA IN SCREENING VARIOUS STAGES OF GLAUCOMA SEVERITY

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Purpose
To report the performance of an artificial intelligence (AI) system deployed on a smartphone-based fundus camera to detect referable glaucoma of different severity grades when compared with the diagnosis made by glaucoma specialist.

Methods
A prospective study was conducted in a glaucoma clinic of a tertiary eye hospital. One disc-centered image per eye was captured using the study device (validated, portable non-mydriatic fundus camera). The diagnostic ability of the AI tool to detect referable glaucoma against a final diagnosis made by a specialist following a thorough glaucoma work-up (clinical assessment, SD-OCT, visual field test) was evaluated. The severity of glaucoma was classified based on the visual field mean deviation using Hoddap –Parrish –Anderson criteria.

Results
We included 213 participants with a mean age of 59±15 years (18, 88). The glaucoma specialist diagnosed 130 subjects as confirmed Glaucoma, 34-disc suspects and 49 as no-glaucoma. At a patient level (worse eye diagnosis), the automated AI system with fundus images alone achieved an accuracy of 89.2%, sensitivity of 89% (95%CI 83.2-93.4), specificity of 89.8% (77.8-96.6), positive predictive value of 96.7% (92.7 -98.5) and negative predictive value of 70.9% (61-79.3) for referable glaucoma. The 18 false negatives included 8-disc suspects and 10 confirmed glaucoma (3-Mild, 3-Moderate and 4-Advanced glaucoma).

The Sensitivity of AI for detecting mild (out of 23-milds, 13 as glaucoma, 7 as disc suspects), moderate (out of 31-moderates, 22 as glaucoma, 6 as disc suspects), and advanced glaucoma (out of 76 advanced cases, 71 as glaucoma and 1 as disc suspect) on fundus images alone when compared to a specialist who conducted a full glaucoma work-up was 86.9% (95%CI 66.4-97.2), 90.3% (95%CI 74.3-97.96), and 94.7% (95% 87.1-98.6) respectively.

Conclusions
The AI-based offline tool integrated on a smartphone fundus camera showed a promising performance in detecting referable glaucoma compared to a glaucoma specialist's diagnosis following a comprehensive glaucoma workup. The AI showed better accuracy in detecting advanced glaucoma followed by moderate and early glaucoma.

P-026

DEEP LEARNING TO PREDICT PERSONALIZED NEAR-NORMAL RETINAL NERVE FIBER LAYER THICKNESS

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Purpose

We aim to develop a deep learning model to predict the personalized near-normal retinal nerve fiber layer (RNFL) thickness (RNFLT) map for glaucoma patients.

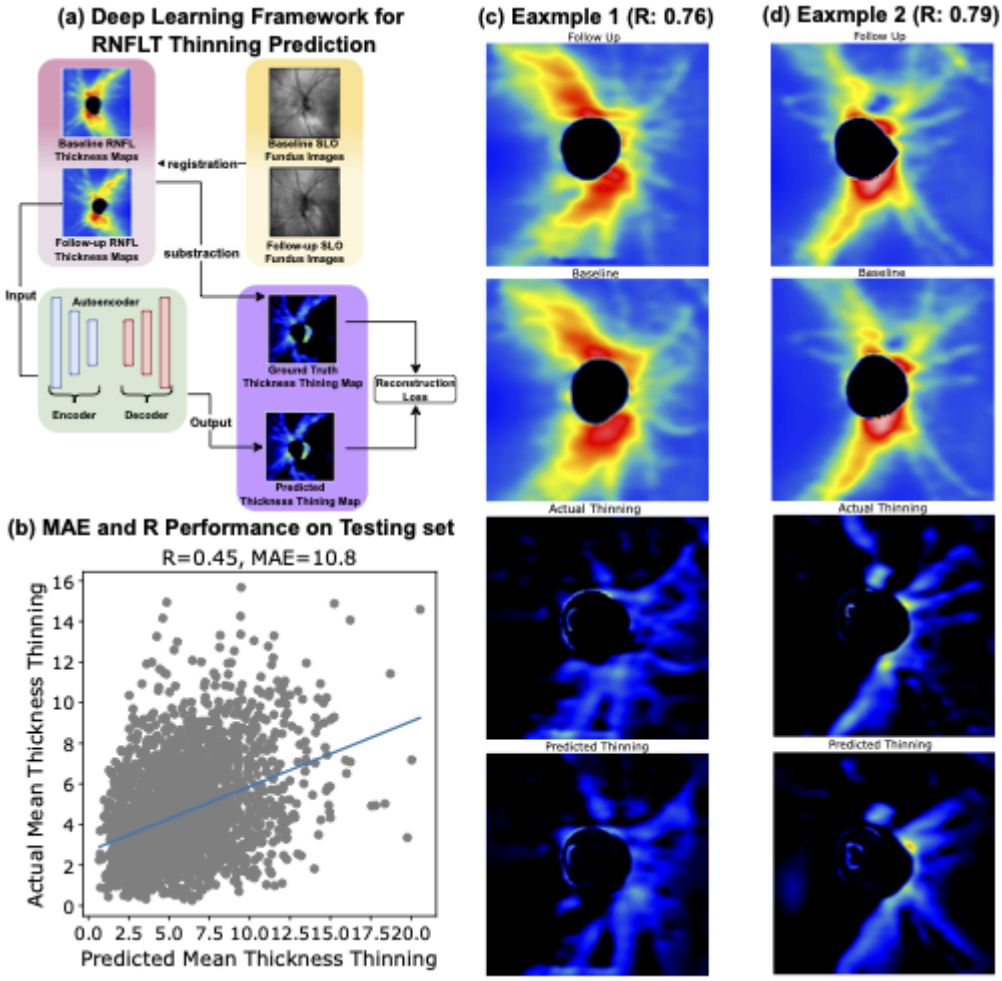
Methods

Reliable Cirrus optical coherence tomography (OCT) scans and 24-2 visual fields (VFs) were included in this study. First, we selected baseline OCT scans with 24-2 VFs tested within 30 days that were clinically normal meeting the criteria of mean deviation ≥ -1 dB, glaucoma hemifield test within normal limits and pattern standard deviation probability > 5%. Second, we selected follow-up OCT scans tested after the baseline OCT scans for each eye. Scanning laser ophthalmoscopy (SLO) funds photos were used to register follow-up RNFLT maps with corresponding baseline RNFLT maps. To avoid a trivial model to predict baseline RNFLT maps the same as the input follow-up RNFLTs as baseline and follow-up RNFLTs are highly similar, we developed a UNet-like (Figure 1 [a]) deep learning model using the follow up RNFLT map to predict the difference between baseline and follow-up RNFLT maps representing RNFL thinning. Our models were trained and tested using two-thirds and one-third of the entire dataset with patient level data separation. Performance was measured by the mean absolute error (MAE) and the Pearson correlation (R) between actual RNFL thinning map and predicted RNFL thinning map.

Results

5,314 eyes from 5,314 patients were included in our study with average age and peripapillary RNFLTs of 60.8 ± 12.6 years and 85.9 ± 12.8 microns at baseline, respectively. 10,617 and 2,520 baseline-follow-up pairs of RNFLT maps were used for training and testing, respectively. The MAE and R score for the testing set were 10.8 microns and 0.45, respectively (Figure 1 [b]). Our model is able to predict RNFL thinning maps with a moderate accuracy. The first and second columns in Figure 1 (c) and (d) show two examples of follow up RNFLT maps and actual versus predicted RNFL thinning maps. Our predicted RNFLT thinning maps were able to accurately reproduce the actual RNFL thinning map (R: 0.76 and 0.79 for all pixels).

Image



Conclusions

Our deep learning model can predict personalized near-normal RNFLT maps. Our model may help clinicians better detect RNFL defects in the early stage of glaucoma.

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P-027

SYSTEMIC FACTORS ASSOCIATED WITH 10YEAR GLAUCOMA PROGRESSION IN SOUTH KOREAN POPULATION: A SINGLE CENTER STUDY BASED ON ELECTRONIC MEDICAL RECORDS

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Purpose

To develop a model, based on initial systemic profiles in electronic medical records (EMRs), predictive of long-term rapid retinal nerve fiber layer (RNFL) thinning in patients with primary open-angle glaucoma (POAG).

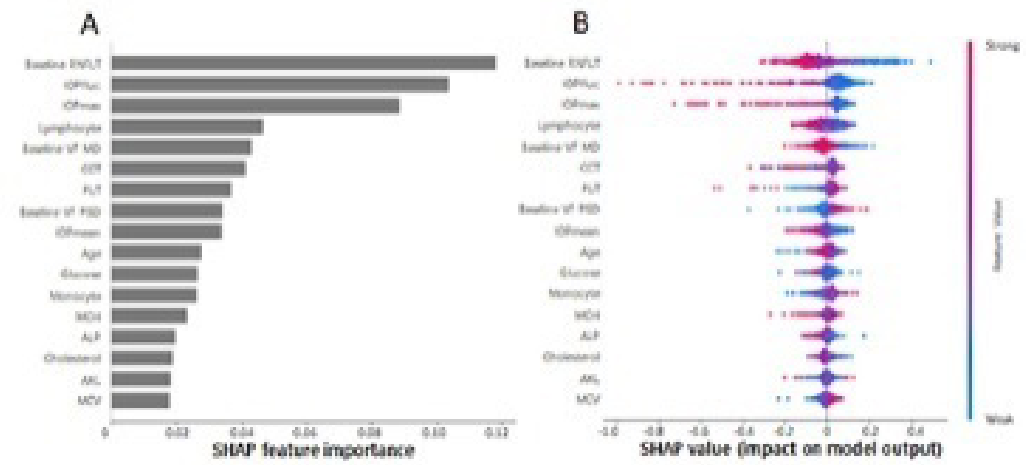
Methods

The study consisted of 505 POAG eyes with systemic data in EMRs who underwent annual evaluation of RNFL thickness for >5 years. Eyes with faster or slower RNFL thinning were stratified using a decision-tree model, based on factors influencing the rate of RNFL thinning. Systemic and ophthalmic data were incorporated into models based on random forest and permutation methods, with the models interpreted by Shapley additive explanation plots (SHAP). Features associated with the rate of progressive RNFL thinning were identified and interpreted.

Results

Based on decision tree, higher lymphocyte ratio (>34.65%) was the most important systemic variable discriminating faster or slower RNFL thinning. Higher mean corpuscular hemoglobin (>32.05 pg) and alkaline phosphatase (>88.0 IU/L) concentrations were distinguishing factors in the eyes with lymphocyte ratios > 34.65% and < 34.65%, respectively. SHAP showed that larger baseline RNFL thickness, greater fluctuation of intraocular pressure (IOP), and higher maximum IOP were the strongest ophthalmic factors associated with faster RNFL thinning over 5 years. Of the systemic variables, higher lymphocyte ratio and higher platelet counts were the strongest factors.

Image



Conclusions

Machine learning-based modeling of long-term glaucoma progression identified several systemic factors assessed by blood test, as well as previously acknowledged ophthalmic risk factors, associated with faster RNFL thinning.

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PLB-001

PERFORMANCE EVALUATION OF CHATGPT AND GOOGLE BARD FOR FREQUENTLY ASKED GLAUCOMA-RELATED QUESTIONS

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Purpose
Chatbots like OpenAI's ChatGPT and Google's Bard are computer programs that simulate human conversation, allowing users to interact with them through messaging platforms, websites, and mobile applications. They can provide patients with a personalized and interactive way of learning about glaucoma, allowing them to ask questions, receive feedback, and access resources in real time. However, the effectiveness of these chatbots in providing accurate and reliable information has not been evaluated and validated. To address this gap, this study was designed to evaluate the side-by-side responses of ChatGPT and Bard to a curated list of 15 frequently asked questions (FAQ) related to glaucoma. By comparing the responses generated, we aimed to identify any discrepancies or inconsistencies in the information provided and assess the overall accuracy and reliability of the information presented.

Methods
We used the latest ChatGPT (March 23 Version) and Bard (Update: 2023.04.21) versions. The 15 questions were curated using the FAQ sections from the BrightFocus Foundation and Glaucoma Research Foundation websites. The responses were evaluated using the QUEST tool by 2 independent reviewers. (1) This tool evaluates health information on the basis of 5C's of credibility, currency, content, construction, and clarity. Response to every question was evaluated using the QUEST tool and then results were pooled and analysed using appropriate statistical methods.

Results
On the QUEST tool, ChatGPT scored 10.4 while Bard scored 10.2 but the difference was not statistically significant (P= 0.55). The chatbots had a kappa coefficient of 0.6296 (95% CI: -0.4505 to 1.7098) and Lin's coefficient of concordance of 0.6352 (95% CI: 0.2531 to 0.8458) indicating moderate agreement between the chatbots. They scored poorly on authorship, attribution, and currency of information. However, the responses generated were unbiased and supported the initiation or building up of the patient-physician relationship.

Conclusions
This study demonstrates the limitations of chatbots as the information provided cannot be referenced or attributed to any source. However, it is interesting that the chatbots highlight the importance of early diagnosis and regular eye check-ups in glaucoma management. Talking to an eye doctor was also frequently highlighted in the chatbot responses indicating complementarity between chatbots and healthcare professionals. Chatbots offer an exciting medium to improve patient knowledge about glaucoma. However, this study highlights the need for better tools and techniques to evaluate the performance of chatbots in healthcare. Despite their limitations, chatbots can complement the role of healthcare professionals in providing information and support to patients with glaucoma. The multispeciality team is also carrying out pilot studies for evaluating the role of chatbots for other patient relevant topics like anesthesia during ocular surgery, paediatric eye diseases and ocular oncology related FAQ.

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PLB-002

AUTOMATED CLASSIFICATION OF ANGLE CLOSURE MECHANISMS BASED ON ANTERIOR SEGMENT OPTICAL COHERENCE TOMOGRAPHY IMAGES VIA DEEP LEARNING

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Purpose
To develop and validate deep learning algorithms that identify and classify angle closure (AC) mechanisms based on anterior segment optical coherence tomography (ASOCT) images.

Methods
Cross-sectional study. Participants of the Handan Eye Study aged ≥ 35 with AC were included. The predominant image-level AC mechanisms were manually labeled as pupillary block, plateau iris configuration, or thick peripheral iris roll (ground truth). Deep learning architecture was developed to simulate the identification by human experts. Validation and human-machine comparison were performed to evaluate the model and establish generalizability.

Results
11,035 ASOCT images from 2,833 AC eyes of 1,455 participants were included. 228 images from 35 AC patients of our eye center formed the separate test set. For classifying AC mechanisms, our algorithm achieved a mean area under the receiver operating characteristic curve of 0.980 on the validation set and 0.988 on the separate test set.

Conclusions
Our study demonstrates the effective classification of AC mechanisms from single ASOCT images using a deep learning algorithm.

Epidemiology, Quality of Life & Health Economics

P-028
EVALUATION OF ALLOSTATIC LOAD IN PATIENTS WITH PRIMARY OPEN ANGLE GLAUCOMA

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Purpose
Health related effects of stress can be measured and quantified using allostatic load index which is an index for physiological dysregulation (1). Stress hormones have effects on the cardiovascular and metabolic systems and corresponding implications for chronic illnesses such as cardiovascular disease and diabetes mellitus (2). However, no studies have evaluated allostatic load in patients with glaucoma. The purpose of this study is to assess allostatic load in patients with glaucoma and compare it with patients without glaucoma.

Methods
This is a case control study with 50 patients each with and without glaucoma, aged 50-70 years. Allostatic load was calculated using 13 variables that included 7 cardiovascular (Systolic blood pressure, Diastolic blood pressure, Homocysteine, Triglycerides, Total cholesterol, High Density Lipoprotein, Low Density Lipoprotein), 5 metabolic (Body Mass Index, Serum Cortisol, HbA1c, Albumin, Creatinine clearance) and 1 immune biomarker (C-Reactive Protein). For each biomarker, high-risk threshold was determined on the basis of distribution of that biomarker in the overall study sample. 1 point was assigned for each biomarker reading beyond the cut-off threshold defined as below the 25th percentile for creatinine clearance, high density lipoprotein, albumin and above the 75th percentile for all other biomarkers. The points were then summed to obtain the allostatic load score and a high risk score was defined as score 4 or above.

Results
Allostatic overload was observed in 26 patients (52%) with glaucoma and 10 patients (26%) without glaucoma ($p<0.005$). Logistic regression analysis revealed significantly increased allostatic load scores associated with advanced age (Odds ratio [OR] 1.3, $p=0.008$), poor socioeconomic status (OR 1.2, $p=0.034$) and severe visual loss (OR 1.65, $p=0.003$).

Conclusions
The study shows that more than half of POAG patients are in state of allostatic overload. When comparing glaucoma patients with age matched controls, we found significantly greater prevalence of allostatic overload in the former group, supporting its role as potential risk factor for the development of glaucoma. Stress reduction with lifestyle modification may help to reduce allostatic load and should be a part of therapy along with antiglaucoma medication (3).

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P-029
PREVALENCE OF ANGLE CLOSURE GLAUCOMA IN TAMALE, GHANA

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Purpose
Glaucoma is the second leading cause of blindness worldwide. In Africa, glaucoma is an established public health problem, and primary angle-closure glaucoma (ACG) is not commonly discussed. Recognizing angle-closure glaucoma is important because of its negative impact on visual morbidity. In response to the observation of many ACG cases at the Northern Community Eye Hospital in Tamale, Ghana, we investigated the proportion of those attending with a first diagnosis of glaucoma who had ACG.

Methods
This study is a retrospective study of 976 individuals who presented to the NCEH and were diagnosed with glaucoma between January 2021 and October 2022. Inclusion criteria included only those with a diagnosis of “primary open angle,” “acute angle closure,” “chronic angle closure,” and “secondary” glaucoma.

Results
Of the 976 patients initially identified, 588 met the inclusion criterion of a clear glaucoma subtype diagnosis. Of these 316 (53.7%) had primary open angle glaucoma, 210 (35.7%) ACG, and 62 (10.5%) secondary glaucoma. Thus, over a third of presenting glaucomas had ACG.

Conclusions
In this study, prevalence of chronic ACG was found to be higher than what has been previously reported. Furthermore, prevalence of ACG was found to be higher in this population than previously indicated, demonstrating that ACG is more common than previously believed for African populations. Due to barriers in diagnosis including distance to hospitals and clinics and poor awareness surrounding the disease, African countries could benefit from increased outreach events to medically underserved areas. Using public health campaigns to increase education on signs of glaucoma can also improve early detection and diagnosis. Most importantly, this study highlights the importance of a clear diagnostic pathway, including gonioscopy, in the assessment and treatment of glaucoma patients as well as the need for wider training on ACG diagnosis and management. These findings serve to add to data for continued glaucoma health interventions in Africa.

P-030
SMOKING AND PROGRESSIVE VESSEL DENSITY CHANGE IN GLAUCOMA

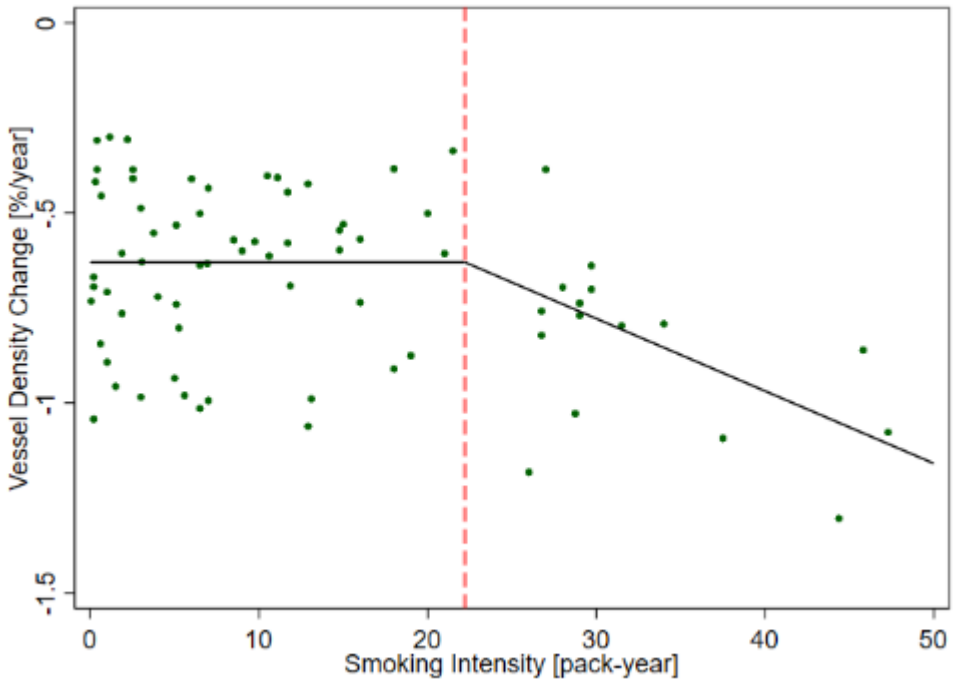
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Purpose
To investigate the relationship between smoking and smoking intensity, and the rate of optic nerve head (ONH) whole image vessel density (wiVD) loss in primary open angle glaucoma (POAG) and glaucoma suspect patients.

Methods
In this longitudinal study, POAG patients who had at least 2 years of follow-up and a minimum of 4 visits of optical coherence tomography angiography (OCTA) were selected. The smoking intensity was calculated as the pack-year at the baseline OCTA.[1,2] Univariable and multivariable linear mixed models were used to determine the effect of each parameter on the rates of wiVD loss over time. Nonlinear least-squares estimation with piecewise regression model was used to investigate the cutoff point for the relationship between wiVD loss and smoking intensity.[1]

Results
A total of 164 eyes (69 glaucoma suspect and 95 POAG) of 110 patients were included over the mean (95% CI) follow-up of 4.0 (3.9, 4.1) years. Of the 110 patients, 50 (45.5%) had reported a history of smoking. Greater smoking intensity was associated with faster wiVD loss (-0.11 (-0.23, 0.00)) %/year per 10 pack-year higher; P=0.048) after adjusted for confounding factors. The wiVD thinning became significantly faster when smoking intensity was greater than 22.2 pack-year.

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Conclusions

Smoking intensity is associated with faster rates of wiVD loss in patients with a lifetime history of smoking greater than 22.2 pack years; but has little effect in patients who smoked less than that. Evaluation of the effect of intense smoking on the rate of wiVD loss in healthy participants is needed to determine whether the loss accelerates wiVD loss that is related to aging or to glaucoma.

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P-031

ASSOCIATION OF STATIN USE AND DIAGNOSED OPEN ANGLE GLAUCOMA: A NATIONWIDE MATCHED CASE-CONTROL STUDY IN TAIWAN, 2002-2016

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Purpose
To evaluate the association between statin use and the risks of diagnosed primary open angle glaucoma (POAG).

Methods
This retrospective, case-control study included 780,786 patients who received lipid-lowering agents in 2002–2016, of which 12,424 were newly diagnosed with POAG during a ≥ 2-year follow-up period. These patients were matched 1:4 with control participants for age, sex, and comorbidities. Separate odds ratios (OR) were calculated for POAG and statin use.

Results
Statin users had significantly higher odds of POAG (adjusted OR=1.12; 95% confidence interval (CI)=1.12–1.18, P <.0001) than nonusers. The lipophilic statin users did not show higher odds of POAG compared with the hydrophilic statin users (adjusted OR=0.99, 95% CI =0.92–1.04, P =.619). Among statin users, the odds of POAG did not differ significantly between patients receiving statin therapy for >180 days vs. ≤90 days or patients receiving statin therapy for 91–180 days vs. ≤90 days (adjusted OR=1.00, P = 0.912; adjusted OR=0.95, P =0.441, respectively). The odds of POAG were not statistically different among patients receiving low-intensity, moderate-intensity, and high-intensity of statin therapy.

Conclusions
Patients receiving statin therapy had a higher POAG risk than patients not receiving statin therapy. The type of statin, the duration, and the intensity of statin use were not significantly associated with POAG risks. Further studies are required to identify the relevant factors related to POAG risks with statin.

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P-032

THE PREVALENCE AND RISK OF DEVELOPING SUBSEQUENT GLAUCOMA IN ALZHEIMER AND VICE VERSA: A TEMPORALITY-BASED META-ANALYSIS OF PREVALENCE AND COMPARISON

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Purpose

Empirical evidence supports the value of the eye as a mirror to the brain. Both glaucoma and Alzheimer's disease (AD) are considered neurodegenerative disorders with common pathogenic pathways; however, there is no clear epidemiological evidence regarding the temporality of this association. This meta-analysis tested the hypothesis that glaucoma can be indicative of AD but not vice versa.

Methods

We analyzed 244,664 glaucoma and 8,445,400 AD patients reported in 41 studies, following a systematic search of nine databases. The primary outcome included the prevalence of glaucoma and AD in each disease, respectively, while the secondary outcome included the risk as compared to healthy controls. Subgroup analyses based on the type of glaucoma and stage of AD were conducted. STATA software was used to pool the prevalence and log odds ratio (logOR) across studies, using the random- (REML method) or fixed-effects (Mantel-Haenszel method) models based on heterogeneity. The sensitivity analysis revealed no remarkable change, and no publication bias was observed.

Results

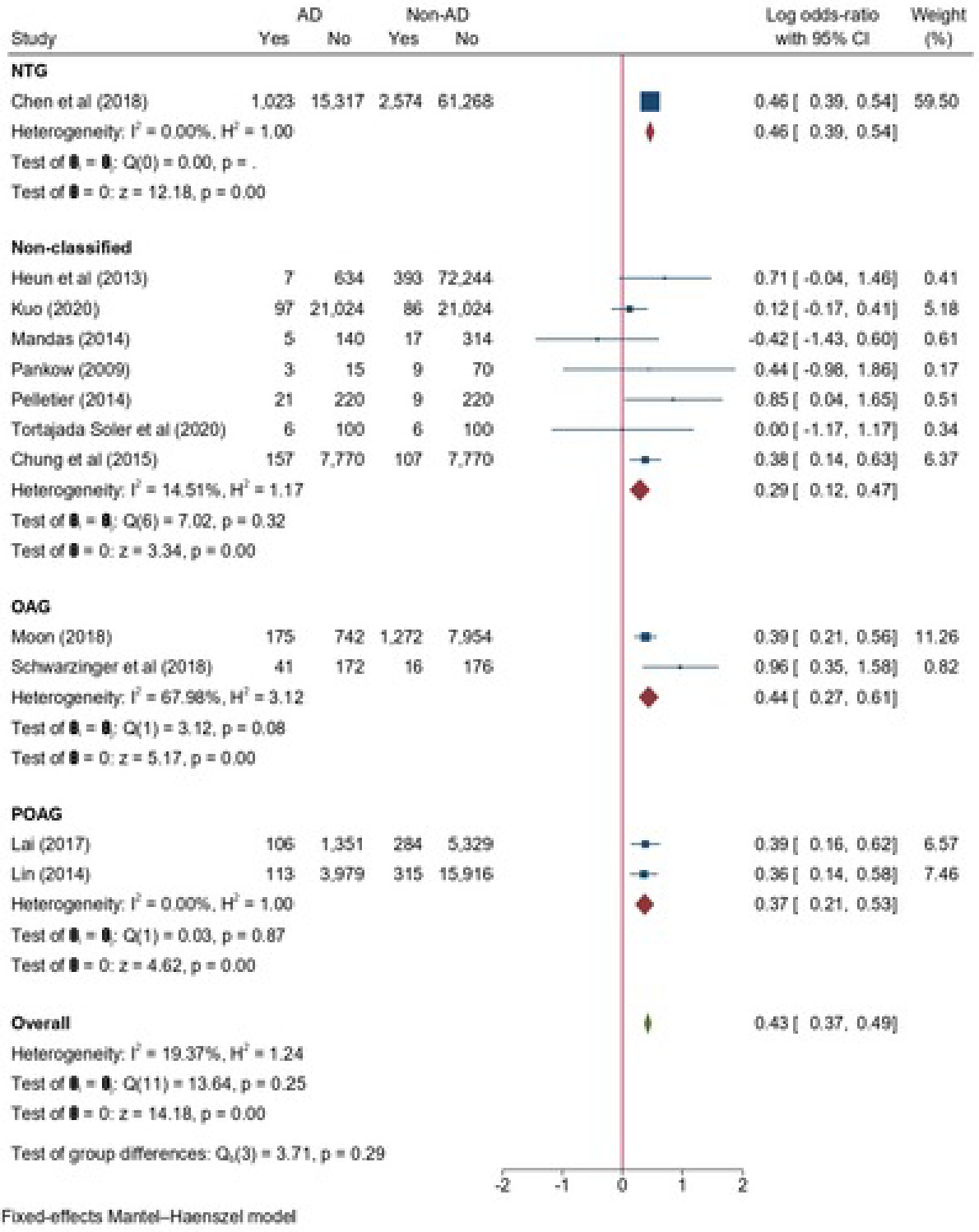
Glaucoma occurred in 6% of AD cases [95%CI: 6-7%, I^2=98.84%]. This rate differed significantly between AD non-demented [17%; 95%CI: 13-21%] and demented [10%; 95%CI: 8-12%] cases (P=0.001). Patients with primary open-angle glaucoma (POAG) had a higher rate [22%; 95%CI: 19-25%] compared to ocular hypertension (OHT) [7%; 95%CI: 1-30%] (P=0.001). Compared to healthy controls, glaucoma cases had an increased risk of AD [logOR=0.44; 95%CI: 0.38: 0.50, I^2=47.47%]. This risk was significantly higher in all AD stages (demented, non-demented) and glaucoma types (normal-tension glaucoma, POAG, OHT). Meanwhile, AD occurred in 7% of glaucoma cases [95%CI: 7-8%, I^2=99.58%]. This rate was highest in pseudoexfoliation glaucoma (PXG) [33%; 95%CI: 14-52%] and POAG [28%; 95%CI: 12-44%] as compared to other types (<10%, P=0.001). However, no change was noted regarding the stage of AD (6% in demented and non-demented cases). Compared to healthy controls, AD increased the risk for glaucoma [logOR=0.47; 95%CI: 0.19-0.76; I^2=80.27%]. This was true for patients with PXG [logOR=1.02; 95%CI: 0.43: 1.61, I^2=0%] and those with AD dementia [logOR=0.67; 95%CI: 0.26: 1.07, I^2=67.07%] only. Other types showed no significant difference.

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Conclusions

Our findings, of high certainty, support our hypothesis of increased prevalence and risk of glaucoma in AD. Conversely, the prevalence and risk of AD are highest in patients with PXG.

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P-033
SLEEP QUALITY ASSESSMENT IN GLAUCOMA PATIENTS USING THE PITTSBURGH SLEEP QUALITY INDEX

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Purpose
To evaluate the quality of sleep in glaucoma patients using the Pittsburgh sleep quality index

Methods
This prospective cross-sectional study was conducted in a tertiary eye care center in India over 6 months. All subjects were glaucoma patients with characteristic optic disc and field changes. The Pittsburgh sleep quality index questionnaire was collected by a trained field investigator. All patients underwent complete ophthalmologic evaluation. Patients with any known ocular and systemic diseases causing sleep disturbance were excluded. The seven components of sleep quality were compared with normals and across the severity of glaucoma, as judged by better-eye mean deviation on Humphrey visual field testing.

Results
A total number of 112 glaucoma patients (51 female and 61 male) and 112 normal controls (65 female and 47 male) were included in the study. The mean age in the glaucoma and controls was 59.9 ±11.5, 50.6±7.5, respectively. A total of 35 of 112 glaucoma patients (31.3%) had a total score of more than 5, indicating poor sleep quality as compared to 19 of 112 (16.9%) of normal controls ($p<0.001$). Significant differences were observed between glaucoma patients and normal people with respect to subjective sleep quality ($P<0.001$), sleep latency ($P<0.016$), and sleep duration ($p<0.038$). Habitual sleep efficiency which describes sleep efficiency on a regular basis, showed no difference as compared to normals, and no correlation with glaucoma severity. Likewise, no group differences or associations with severity were noted for sleep disturbances, use of sleeping medications, or daytime dysfunction ($p>0.05$).

Conclusions
Our findings confirm prior studies suggesting that the quality of sleep is poor in glaucoma patients. Subjective sleep quality, Sleep latency, and sleep duration appeared to be most affected by glaucoma.

P-034

THE EFFECT OF BODY MASS INDEX REDUCTION ON INTRAOCULAR PRESSURE IN A LARGE PROSPECTIVE COHORT OF APPARENTLY HEALTHY INDIVIDUALS IN ISRAEL

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Purpose
To investigate the effect of change in body mass index (BMI) on intraocular pressure (IOP) in a large cohort of apparently healthy volunteers who underwent an annual comprehensive screening examinations.

Methods
This study included individuals who were enrolled in the Tel Aviv Medical Center Inflammation Survey (TAMCIS) and had IOP and BMI measurements at their baseline and follow up visits. Relationships between BMI and IOP and the effect of change in BMI on IOP were investigated.

Results
A total of 7,782 individuals had at least one IOP measurement at their baseline visit, and 2,985 individuals had >=2 visits recorded. The mean (SD) IOP (right eye) was 14.6 (2.5) mm Hg and mean (SD) BMI was 26.4 (4.1) kg/m^2. IOP positively correlated with BMI levels (r=0.16, p<0.0001). For individuals with morbid obesity (BMI≥35 kg/m^2) and >=2 visits, a change in BMI between the baseline and first follow-up visits correlated positively with a change in the IOP (r=0.23, p=0.029). Subgroup analysis of subjects who had a reduction of at least 2 BMI units showed a stronger positive correlation between change in BMI and change in IOP (r=0.29, p<0.0001). For this subgroup, a reduction of 2.86 kg/m^2 of BMI was associated with a reduction of 1 mmHg in IOP.

Conclusions
BMI loss correlated with reduction in IOP, and this correlation was more pronounced among morbidly obese individuals. Reducing BMI to normal levels may have a positive effect on IOP, especially in morbid obesity.

P-036

ASSOCIATION BETWEEN ALCOHOL CONSUMPTION PATTERNS AND GLAUCOMA: A LARGE SCALE CASE-CONTROL STUDY IN JAPAN

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Purpose

To elucidate the association between alcohol consumption patterns and glaucoma.

Methods

This case-control study evaluated 3207 cases with glaucoma and 3207 matched controls. Patients over 40 years of age were included from 1,693,611 patients admitted to 34 hospitals in Japan. Detailed alcohol consumption patterns (drinking frequency, average daily drinks, and total lifetime drinks) were obtained, as well as various confounding factors, including smoking history and lifestyle-related comorbidities. Conditional logistic regression models calculated odds ratios (ORs) and 95% confidence intervals (CIs) for glaucoma prevalence. The linear trend for the association between alcohol consumption patterns was tested. We performed a sensitivity analysis for men and women.

Results

Drinking frequency showed an association with glaucoma for “a few days/week” (OR, 1.19; 95% CI, 1.03–1.38) and “almost every day/week” (1.40; 1.18–1.66). Average daily drinks showed an association for “>0–2 drinks/day” (1.16; 1.03–1.32). Total lifetime drinks showed an association for “>60–90 drink-year” (1.23; 1.01–1.49) and “>90 drink-year” (1.23; 1.05–1.44). P-values for trend were <.0001, 0.09, and 0.003, respectively for drinking frequency, average daily drinks, and total lifetime drinks, revealing a positive dose-response association with glaucoma prevalence. Among men, drinking frequency of “a few days/week” and “almost every day/week,” average daily drinks of “>0–2 drinks/day” and “>2–4 drinks/day,” and total lifetime drinks of “>60–90 drink-year” and “>90 drink-year” had an association with glaucoma. Conversely, among women, neither drinking frequency, average daily drinks, nor total lifetime drinks were associated.

Conclusions

Our study examined detailed alcohol consumption patterns and revealed a positive association between drinking habits and glaucoma prevalence with respect to both frequency and quantity of alcohol consumption. We believe the current study is a crucial step toward elucidating the epidemiology and pathogenesis of glaucoma.

P-038

RISK OF ANGLE CLOSURE GLAUCOMA WITH BISPHOSPHONATE USE IN PATIENTS WITH OSTEOPOROSIS

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Purpose

Bisphosphonates (BPs) such as alendronate, risedronate and zoledronic acid, are first line agents commonly used in the management of osteoporosis. Over the last decade, there have been two case reports that have suggested a possible link between BPs and angle closure glaucoma (ACG). In the absence of any large epidemiologic studies however, this relationship remains debatable. The aim of this study was to determine the association between BPs and ACG in patients with osteoporosis.

Methods

This was a retrospective cohort study with a case control analysis using the PharMetrics Plus Database (IQVIA, USA) database as the main data source for the study. This database captures health claims for over 150 million unique patients, with fully adjudicated pharmacy and medical claims, and represents all geographic areas of the United States. All medical diagnoses were captured through ICD-9 and ICD-10 codes which allowed for the identification of patients with osteoporosis as well as different subtypes of glaucoma.

208,111 patients with osteoporosis (defined as having at least one prescription for osteoporosis) between 2008 to 2018 were followed to the first diagnosis of ACG as defined by an ICD-9/10 code. ACG cases required also at least one prescription for bisphosphonate every 3 months in the year prior to the index date. The date of the first event of ACG was designated as the index date. For each case, four controls were selected and matched to cases by age and follow-up time. A conditional logistic regression model was used to adjust for confounders of ACG and to calculate incidence rate ratios (IRRs) for different formulations of bisphosphonates.

Results

Patients who used bisphosphonates were at a higher risk for ACG compared than non-users. (adjusted IRR = 1.78, 95%CI [1.05-3.01]). In particular, those who used risedronate were more likely to develop ACG compared to patients who used other formulations of bisphosphonates (adjusted IRRs= 2.12, 95%CI [1.05-3.01]).

Conclusions

Patients with osteoporosis who used BPs were at a higher risk for ACG compared to those who did not, and those who on risedronate were more likely to develop ACG compared to patients who used other types of bisphosphonates. Further studies are needed to confirm the associations observed and elucidate whether different dosages or duration of BPs impart a greater risk for ACG.

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P-039

"QUALITY OF LIFE IN GLAUCOMA PATIENTS: COMPARISON OF MEDICAL THERAPY, TRABECULECTOMY AND GLAUCOMA DRAINAGE DEVICE"

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Purpose

To compare the quality of life in patients with glaucoma on medical therapy and after trabeculectomy and glaucoma drainage device (GDD) using vision, glaucoma and surgery specific questionnaires.

Methods

This cross-sectional study enrolled 30 patients of moderate to severe glaucoma, each in medical, trabeculectomy and GDD group. National Eye Institute Visual Function Questionnaire 25 (NEIVFQ-25), Glaucoma Quality of Life (GQL-15), and Surgery Specific Questionnaire (SSQ) were administered and cumulative scores were compared.

Results

The mean age of the participants was 58.95 ± 13.6 years with a male preponderance (73.3%, n = 66). The mean scores (SD) in medical group, trabeculectomy and GDD using NEIVFQ-25 were 68.97 (6.98), 72.83 (7.81), 75.20 (8.77) respectively, using GQL-15 20.63 (6.00), 26.23 (9.12) and 28.43 (7.74) respectively, while for the SSQ, were 74.33 (8.75) and 72.10 (5.92) in trabeculectomy and GDD group respectively. NEIVFQ-25 showed a better QoL in GDD group compared to medical group while GQL-15 showed a better QoL in the medical group and comparable QoL in trabeculectomy and GDD. Both these QoL scores correlated to the LogMAR visual acuity. SSQ scores did not show a significant difference in the QoL across both surgical groups.

Conclusions

NEIVFQ-25 questionnaire scores provided a holistic measure of QoL. GQL-15 assessed the activity limitation and visual disability of the patients but did not take into account the general health, psychological factors influencing the QoL. We did not find a significant difference between trabeculectomy and GDD using the SSQ. For QoL assessment in medically or surgically treated glaucoma, vision specific and disease specific questionnaires should always be used in conjunction.

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P-040

DRUG UTILIZATION, ADHERENCE AND PREDICTORS OF DRUG-CHANGES AND DISCONTINUATION OF GLAUCOMA DRUG THERAPIES

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Purpose

The aims of this study were to describe the use and adherence to different topical glaucoma medications in an incident cohort of patients with glaucoma, and to assess the predictors of changes and discontinuation of anti-glaucoma drug therapies.

Methods

Healthcare in Italy is publicly funded for all residents by the National Health System (NHS), irrespective of social class or employment, and each resident has a General Practitioner (GP). Data for the present work were obtained from the Healthcare Administrative Database of the Lombardy Region, which uses them for reimbursment purposes. Access to this database are allowed within the Progetto EPIFARM, a pharmaco-epidemiological collaborative project between the Istituto di Ricerche Farmacologiche Mario Negri IRCCS and the Welfare Directorate of the Lombardy Region. The pharmacy prescription database lists the medication name and anatomic therapeutic chemical (ATC) classification code, quantity and date of all drug dispensed. The diagnoses, uniformly coded according to the 9th International Code of Diseases (ICD-9-CM) and standardized in all Italian hospitals, are directly compiled by the hospital specialists at discharge of the patients. All data can be linked, since a single individual anonymized identification code is used by all databases for each citizen.

Results

10,515 subjects with glaucoma were included in the analyses (mean age of 70.2 (± 9.7), 5,776 (54.8%) were women).The cohort of incident glaucoma cases is comprised of subjects aged 50 years or older, resident in Lombardy Region and exposed to at least three consecutive prescriptions of one active anti-glaucoma drug during 2010 (from January 1 to December 31, 2010). Data for follow-up were available until December 2018. Only 4,307 (41.0 %) subjects were considered adherent (at least the for the 80% of the duration of their follow-up) to antiglaucoma drug therapy. In general, 7716 subjects (73.4%) modified or discontinued the starting drug for glaucoma. The median time to the first change was 666 (167-2030) days. The most frequent deviation from the glaucoma drug therapy was a non-definitive discontinuation of at least 6 months (31.1% of total events), followed by the addition of a new class of treatment (23.6%).

Conclusions

Our investigation provides evidence that the variability of the adherence to the prescribed drugs may stem from several factors including age, multimorbidity, the elevated number of medications to take and insufficient knowledge about the disease.

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P-041

EXPLORING LATE PRESENTATION OF GLAUCOMA AND PATIENT MOTIVATIONS IN HONG KONG

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Purpose
Glaucoma is the commonest cause of irreversible blindness worldwide. Typically asymptomatic until advanced, its risk of blindness from late presentation is higher than other eye diseases. This study aims to investigate the risk factors for late presentation of primary glaucoma patients and explore the motivations for patients attending eye check-ups.

Methods
We undertook a hospital-based case-control study of a random sample of glaucoma patients from a hospital in Hong Kong. Structured questionnaires and existing information from the electronic patient record were used, and the odds of presenting late were analysed by logistic regression.

Results
Of 210 recruited participants, 83 (39.5%) presented with advanced glaucoma unilaterally or bilaterally. The mean age of participants was 61.1±11.9 years, with 110 males (52.4%). Univariate analysis revealed that male sex and primary angle-closure glaucoma (PACG) have 3.06 (CI_{95}:1.71-5.48; P<0.001) and 2.47 (CI_{95}:1.11-5.49; P=0.03) times higher odds of late presentation, respectively. Multivariate analysis revealed late presenters were 3.54 (CI_{95}:1.35-9.35; P=0.01) times more likely to have PACG than primary open-angle glaucoma (POAG). Patients with elevated baseline intraocular pressure (IOP) also had 1.06 times higher odds of presenting with advanced glaucoma (CI_{95}:1.02-1.11; P=0.002). Linear regression revealed that PACG patients present with 7.12 mmHg higher IOP than POAG patients (CI_{95}:4.23-10.0; P<0.001). Around one-third (31.9%) of participants discovered that they have glaucoma from their routine eye check-ups, within which almost one-third (29.9%) is discovered from diabetes retinopathy screening tests. More than half participants (52.4%) had no channels outside the medical setting, and among those who are aware of glaucoma, the internet is the commonest channel for them to receive information (33.0%).

Conclusions
A high proportion of glaucoma patients present late in Hong Kong. PACG patients present with higher IOP and, along with male gender, are more likely to have advanced disease than POAG patients. There is also a general lack of glaucoma knowledge among patients, and the internet, printed media and television may be some useful channels to disseminate information and raise awareness.

*Part of the results of this study is previously published in Eye. (Lai ACK, Buchan JC, Chan JC, Nolan W. Determinants of late presentation of glaucoma in Hong Kong. Eye (Lond). 2022 Sep 13. doi: 10.1038/s41433-022-02235-8. Epub ahead of print. PMID: 36100709.)

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P-042

QUALITY OF LIFE IN PEOPLE LIVING WITH PRIMARY OPEN-ANGLE GLAUCOMA: A NEGLECTED BUT WORRYING SITUATION IN A CAMEROONIAN ENVIRONMENT

J Ndongo

Purpose

The aim of this work was to show how POAG and its management alters the quality of life of affected patients in a Cameroonian environment

Methods

We conducted a prospective cross-sectional survey of patients with glaucoma in two health facilities located in the West and littoral Cameroon region respectively. Patients with Primary Open Angle Glaucoma (POAG) without other unimprovable visual condition were recruited. We used the GlauQol-17 questionnaire (distributed by Mapi Resaerch Trsuts from Baush &Laumb Chauvin (France)) to assess the quality of life of study subjects. The variables analyzed were: age, sex, level of study, stage of POAG, dimensions of GlauQol-17 affected by POAG, quality of life score according to GlauQol-17.

Results

The study populations was made of 80 patients with a male-to-female ratio of 1.5. The mean age was 5.9 ± 2 years. Sixty percent of the respondents had a high school education or higher. Moderate or severe forms of POAG were present in 60% of respondents. Anxiety (70% of subjects), decline in professional performance (40%), difficulty in driving a car (50%), low level of information on the pathology (50%) were the main quality of life impairments observed. Ninety percent of the respondents have a poor Glaucol-17 anxiety score, mainly linked to IOP level, fear of becoming blind. The same percentage is found among those who find the treatment restrictive in their daily life. There was no health insurance coverage for 70% of them and 30% could not fill their prescription because of poverty.

Conclusions

POAG has a significant pejorative impact on the quality of life of affected patients. Taking into account the impact of glaucoma on the patient's quality of life still has to be integrated in our daily practice. The GlauQol-17 questionnaire remains a valuable tool and represents an important source of information for better patient follow-up.

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P-043

INCREASED RISK OF OPEN-ANGLE GLAUCOMA IN NON-SMOKING WOMEN WITH OBSTRUCTIVE PATTERN OF SPIROMETRIC TESTS

C Kim

Purpose

To investigate differences in the prevalence of open-angle glaucoma (OAG) between different pulmonary function types.

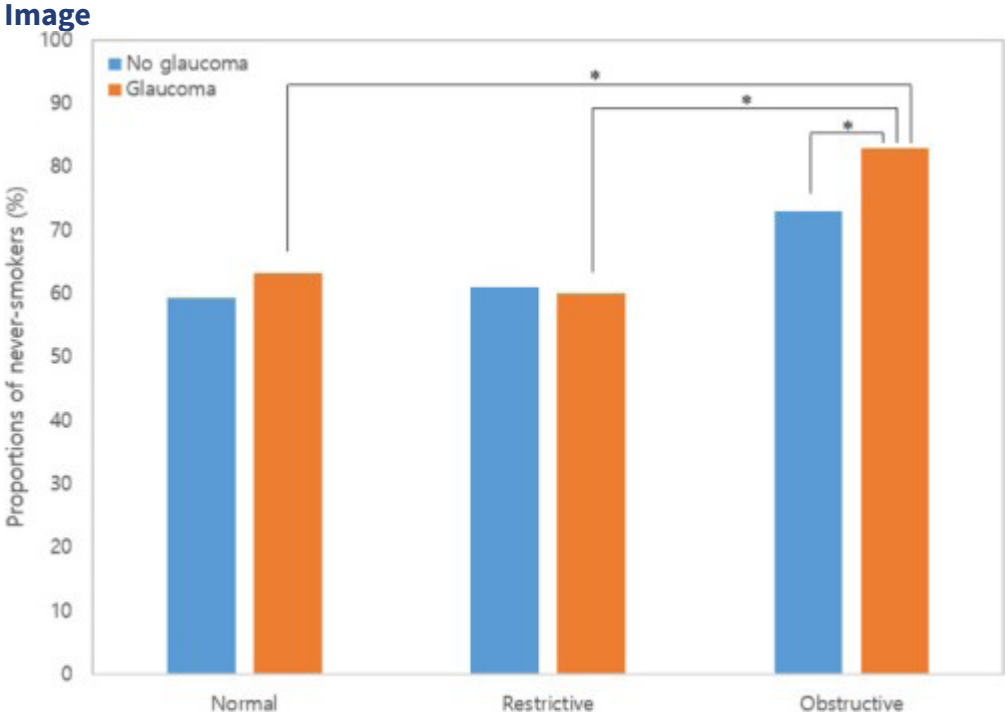
Methods

A population-based, cross-sectional analysis was conducted using Korean National Health and Nutrition Examination Surveys from 2008 to 2011. A total of 8941 subjects ≥40 years of age were analyzed. Chronic obstructive pulmonary disease (COPD) was defined as the ratio between first second of forced expiration (FEV1) and forced vital capacity (FVC) below 70%. The prevalence of glaucoma, as defined by the International Society of Geographical and Epidemiological Ophthalmology, was the main outcome.

Results

OAG was more prevalent in women with COPD (8.0% vs. 4.8% normal, P=0.001) compared to women with normal pulmonary function. Intraocular pressure (IOP) of women with COPD were 13.3 (0.2) mmHg (13.9 (0.1) mmHg for normal function, P=0.182). Never-smokers were more prevalent in women with COPD and glaucoma (92.9% vs. 52.4% normal function; P<0.001). COPD was found to increase the risk of glaucoma in women (OR 2.077, P=0.017) and even further in non-smoking women (OR 2.711, P=0.003).

Image



Conclusions

Women with COPD showed a higher glaucoma prevalence despite similar IOP in comparison to women with normal pulmonary function. Non-smoking COPD is significantly associated with open-angle glaucoma in women.

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P-044

EVALUATING THE EFFECTIVENESS OF COMBINED CATARACT AND MINIMALLY INVASIVE GLAUCOMA SURGERIES ON GLAUCOMA-SPECIFIC QUALITY OF LIFE

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Purpose
The impact of combined phacoemulsification and minimally invasive glaucoma surgery (PHACO-MIGS) on glaucoma-specific quality of life (GS-QoL) in patients with open angle glaucoma (POAG) is unknown. We report on preliminary findings related to changes in 12 novel domains of GS-QoL following PHACO-MIGS in patients with mild-moderate glaucoma.

Methods
In this clinical cohort study, patients who were recommended to undergo PHACO-MIGS (iStent inject/Hydrus Microstent) in one eye, were recruited from the Singapore National Eye Centre. GS-QoL were assessed using the GlauCAT™, an adaptive and online questionnaire that tailors the questions (items) to the respondent's level of QoL at every point in the testing process. Twelve GlauCAT™ domains were administered pre-surgery and 6 months post-surgery by a trained interviewer, which included Visual Symptoms (VS), Ocular Comfort Symptoms (OS), Emotional (EM), Activity Limitation (AL), Driving (DV), Lighting (LT), Mobility (MB), Treatment Convenience (TCV), Concerns (CN), Social (SC), General Convenience (GCV) and Economic (EC). Linear mixed models were utilized to determine the within group changes in each of the 12 GS-QoL domains, adjusted for changes in visual acuity (VA). Effect sizes (ES) were calculated to estimate the strength of the treatment effect (small: <0.3; medium: 0.3 to <0.5; large: ≥0.5).

Results
A total of 54 patients (target N=100) were included in the present analyses (mean age [SD]: 70.6 [7.06] years; 34.1% female). The 6-month mean (SD) improvements in presenting VA (better-eye) and intraocular pressure were 0.10 (0.16) LogMAR and 1.6 (4.37) mmHg, respectively (both P<0.05). Four GlauCAT™ domains showed significant percentile improvements post-surgery: VS (12.98%, P<0.001; ES: 0.67), OS (7.53%, p<0.001; ES: 0.61), CN (7.49%, P=0.002; ES: 0.45), and GCV (7.45%, P<0.001; ES: 0.57), which remained even after adjusting for post-surgery improvements in VA. Absolute improvements were also noted in 7 of the remaining 8 GlauCAT™ domains although they did not reach statistical significance (p>0.05).

Conclusions
Our results, for the first time, show that PHACO-MIGS was associated with substantial improvements in several GS-QoL domains using a novel, cloud-based and AI-operationalized instrument, independent of VA-related improvements. Future analyses, using the complete dataset, may help to confirm the preliminary evidence of the patient-centred effectiveness of this procedure in those with mild-moderate glaucoma.

P-046

SURVIVAL OF PATIENTS WITH NEOVASCULAR GLAUCOMA AFTER MICROPULSE TRANSSCLERAL LASER THERAPY (MP-TLT)

F Rojas Hernandez, C Gonzalez Arocha, G Diez Cattini

Purpose

To determine survival in patients with neovascular glaucoma after MP-TLT. Assess if serum glucose, serum creatinine, intraocular pressure and visual acuity prior to MP-TLT influence survival rate in patients.

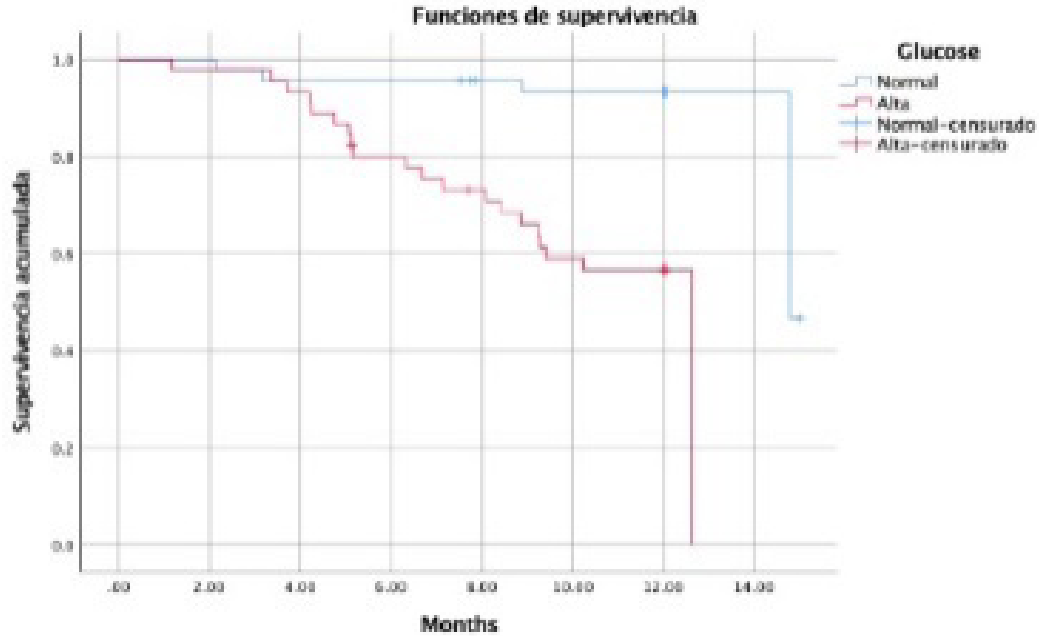
Methods

It is a cohort study with internal comparisons, longitudinal, retrospective, observational and descriptive. Patients diagnosed with neovascular glaucoma who underwent MP-TLT from 2019 to 2022 with a 15-month follow-up from the procedure were included. The sample calculation was performed based on a normal distribution using a t test. Frequencies and percentages were reported for categorical variables, while numerical variables were reported with measures of central tendency. Estimation of survival probabilities with Kaplan-Meier analysis. Log-rank test to compare the difference between the groups. A P<0.05 will be taken as a significant value.

Results

A total of 91 patients were included, of which 73.60% are alive and 26.37% died. Complications related to type 2 diabetes were the main cause of death. Diabetic retinopathy was the most frequent cause of neovascular glaucoma in 82% of the patients, followed by central vein occlusion with 13.18%. A total of 50% of the patients have a survival mean time of 14.7 months. It was found that elevated fasting serum glucose and serum creatinine levels prior to MP-TLT had a lower survival (9.92 months and 12.6 months respectively) compared to those with normal levels. Patients with intraocular pressure above 30 mmHg prior to MP-TLT showed a reduction in survival of 2.46 months when compared to values below that figure, and these results were statistically significant (P<0.05). No significant differences were found in terms of visual acuity.

Image



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Conclusions

MicroPulse transscleral laser therapy (MP-TLT) as a treatment for neovascular glaucoma, has been used when intraocular pressure control medical treatment is no longer sufficient or when vision is severely impaired, this treatment takes place as a necessary measure to counteract irreversible ophthalmological complications. In that sense, alterations in systemic circulation biomarkers can occur. In our study elevated fasting serum glucose, elevated serum creatinine and intraocular pressure greater than 30 mmHg, are considered indicators that influence lower survival in patients with neovascular glaucoma.

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P-047

NATIONWIDE PREVALENCE OF CONTRAINDICATED PRESCRIPTION OF BRIMONIDINE TARTARATE FOR KOREAN CHILDREN

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Purpose

Brimonidine tartrate (BT) is used as eye drops to lower intraocular pressure (IOP) in patients with glaucoma. Even though BT potentially passes through the blood-brain barrier in young children and central nervous system (CNS) toxicity (*i.e.*, bradycardia, hypotonia, respiratory failure, and coma) has been reported, it has been negligently used in the treatment of young children for its beneficial ocular hypotensive effect. The purpose of this study was to investigate the nationwide prevalence of contraindicated BT prescription for children in South Korea.

Methods

This retrospective observational study included childhood-glaucoma patients from the Korean Health Insurance Review and Assessment Service (HIRA)-Pediatric Patient Sample (PPS) cohort for the years 2016 – 2018 (n = 2930533; 10% random sample of all patients < 20 years old in South Korea). Patients who were identified and treated for glaucoma using diagnostic codes for glaucoma and prescription codes for ocular hypotensive eye drops, respectively, during study period, were included in the prevalence estimate.

Results

Of the 2930533 children, the prevalence of treated glaucoma was 0.06% (1 612 patients). Of those 1612 children with treated glaucoma, 581 (36.04%) were prescribed BT as eye drops. Among those children 0 to 4 years of age with treated glaucoma, the prevalence of contraindicated BT prescription increased significantly from 4.48% in 2016 to 6.67% in 2017, and then sharply to 15.56% in 2018. Among children 5 to 9 years of age with treated glaucoma, the rates increased from 20.00% in 2016 to 33.33% in 2017, and then to 41.43% in 2018.

Conclusions

This study found an unexpectedly high frequency of pediatric BT prescription in a one-third of Korean childhood-glaucoma population under the age of 20. Also, prescription frequency increased with age and time, with a considerable number of BT prescriptions for very young children. In conclusion, we found an overall BT prescription prevalence of 36.04% in Korean children with treated glaucoma and determined that it was following an increasing trend. We caution clinicians to keep in mind the possibility of CNS toxicity resulting from BT use in children.

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P-048

ADMINISTERING THE GLAUCOMA COMPUTERIZED ADAPTIVE TEST (GLAUCAT) IN A GLAUCOMA CLINIC

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Purpose
The Glaucoma Computerized Adaptive Test (GlauCAT) is the first cloud-based patient-reported outcome measure (PROM) for glaucoma-related quality of life (QoL). Here, we conducted a pilot test for GlauCAT to evaluate the optimal method of administration in a clinical setting.

Methods
Adult patients with a primary ocular diagnosis of glaucoma were recruited from the Wilmer Eye Institute Glaucoma Center of Excellence. Patients were randomized into one of three test administration groups: in-office interviewer administered test, in-office self-administered test, and at-home email link test. GlauCAT is a cloud-based test which consists of 342 items from an item bank divided into twelve domains. Computerized adaptive testing (CAT) presents targeted questions based on patients' responses, minimizing measurement error and testing time without loss of precision and reliability. Chi-squared test was used to compare the demographic characteristics between the three groups and evaluate the optimal method for GlauCAT administration based on completion rate. One-way ANOVA was used to compare the age between the three groups. Wilcoxon Rank Sum Test was used to further compare the domain specific responses between the interviewer and self- administered groups.

Results
A total of 157 patients consented to the study. Forty-four patients were randomized to in-office interviewer administered, 54 to in-office self-administered, and 59 to at-home testing. No significant differences in sex, race, education, employment status, and age were found between the groups. Significant differences ($p<0.001$) in the completion rate were observed. Thirty-nine out of 44 (88.64%) in-office interviewer administered tests, 52 out of 54 (96.30%) of in-office self-administered tests, and 35 out of 59 (59.32%) at-home tests were completed, respectively. Further, comparison of the domain specific responses showed no significant differences between the interviewer and self- administered groups.

Conclusions
Although participants often preferred completing the survey at home, the low rates of completion suggest that this is not the most effective method to collect data. GlauCAT can be effectively administered in a clinical setting with or without an interviewer. Further, since there were no differences in responses between the interviewer and self- administered groups, the most feasible approach in the clinical setting may be self-administered testing.

P-049

BUILDING BACK BETTER: IMPROVED PATIENT PATHWAY FOR NEW GLAUCOMA PATIENT REFERRALS TO HOSPITAL EYE SERVICES IN THE UK

C Campbell, H Whyte, K Lewis

Purpose

The covid pandemic left an unprecedented backlog of patients waiting a glaucoma assessment within hospital eye services (HES) in the United Kingdom National Health Service (NHS). In Salisbury we restructured our glaucoma clinics to deal with the backlog by changing from standard face-to-face doctor-based clinic appointments for all new patients to imaging based virtual clinics with the support of phone clinics to initiate treatment, when indicated, and then evaluation of treatment effect in a in face-to-face clinic thereafter. The aims of this study were to evaluate if the new patient pathway reduced the time from community referral to hospital review and treatment initiation, as well as prioritise those most at risk.

Methods

We used our Electronic Patient Record, (Medisoft Ltd), to identify all routine new glaucoma patients between September 2021 to September 2022. Exclusion criteria included emergency/urgent new presentations. Time from referral to first visit and start of definitive treatment was analysed. Patient feedback using a structured questionnaire on the patient pathway was obtained. We compared these results to a control group of patients from prior to the pandemic to initiation of the new virtual glaucoma pathway.

Results

Patient waiting times from referral to review in hospital eye service have halved with the new patient pathway when compared to pre-pandemic. Rapid exclusion of non-glaucomatous patient referrals has reduced demand on clinician time. Initiation of treatment was also faster, with more patients being offer the option of laser treatment earlier in the course of their disease. The study also helped to identify and prioritise patients most at risk of sight loss, as well as initiate and evaluate treatment effect sooner. Preliminary patient feedback on the new patient pathway has been positive.

Conclusions

The new patient pathway has helped mitigate the backlog of glaucoma patients, reduce waiting times and the number of face-to-face appointments, allow for faster initial treatment, as well as provide an improved patient experience.

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P-050

MYOPIA CORRELATION WITH OPEN-ANGLE GLAUCOMA: A SYSTEMATIC REVIEW AND META-ANALYSIS

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Purpose
To determine myopia as a risk factor for POAG with a systematic approach quantitatively combining the results of all available studies. Scrutiny for POAG related myopia is of high importance considering prediction that by 2050 there will be 4758 million people with myopia (49.8%) globally.

Methods
A meta-analysis using PRISMA systematic guidelines involving studies searched from Pubmed and Cochrane Library since 1987 until June 2021. The main data extraction was myopia with meta-analysis performed using the random-effects model to produce an odds ratio (OR) with 95% confidence interval (CI). The outcome was OAG. Data was analyzed using Review Manager 5.4 software.

Results
Seventeen studies with 59854 subjects were analyzed. Between any myopia and POAG based on the risk the pooled OR of association was 1.66 (95% CI, 1.28–2.15). This meta-analysis showed association between low myopia (up to -3.0 D) with glaucoma 1.56 (95% CI, 1.19-2.05) and between moderate-high myopia (< -3.0 D) and glaucoma 2.18 (95% CI, 1.70-2.79). There was considerable heterogeneity among all myopia ($p < 0.00001$) , low myopia ($p < 0.00001$) and high myopia ($p = 0.004$).

Conclusions
Myopic individuals have increased risk of developing POAG. Future screening system for early detection of POAG development from Myopia remains a staple to be considered.

P-053

RISK OF ANGLE CLOSURE GLAUCOMA IN ATTENTION-DEFICIT / HYPERACTIVITY DISORDER PATIENTS USING METHYLPHENIDATE, AMPHETAMINES, OR ATOMOXETINE

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Purpose
Attention deficit hyperactivity disorder drugs methylphenidate, amphetamines, and atomoxetine are one of the most prescribed in North America. Due to their sympathomimetic action, these drugs are contraindicated in patients with history of angle closure glaucoma (ACG). This study aims to determine the risk of ACG among users of these agents.

Methods
This was a retrospective cohort study with a case control analysis using the PharMetrics Plus Database (IQVIA, USA). All medical diagnoses were captured through ICD-9 and ICD-10 codes. We created a cohort of new users of methylphenidate, atomoxetine or amphetamine/dextroamphetamine combination. Cohort members were followed to the first diagnosis of primary open angle glaucoma (POAG) or ACG. For each case, four age-matched controls were selected. A conditional logistic regression model was used to adjust for confounders and to calculate incidence rate ratios (IRRs). The covariates adjusted for were age, gender, follow-up, hypermetropia, diabetes, myopia, and topiramate use.

Results
A total of 240,257 new users were identified; 6.59% were atomoxetine users, 44.54% were amphetamine users, 33.82% were methylphenidate users, and 15.04% were combination users. The mean age was 45.0 ± 19.4 and 55% of the cohort was female. Current users of any of the aforementioned drugs were at higher risk for POAG compared to non-users (adjusted IRR = 1.22, 95%CI [1.06-1.41]) and significantly higher risk for developing ACG (adjusted IRR = 1.72, 95%CI [1.11-2.67]). The adjusted IRRs for the development of ACG were 2.55 (95%CI [1.20-5.43]), 2.27 (95%CI [1.42-3.63]), and 1.49 (95%CI [0.93-4.08]) for atomoxetine, amphetamines/dextroamphetamine, and methylphenidate; respectively.

Conclusions
Use of atomoxetine or amphetamines was associated with higher risk for ACG. Further studies are needed to confirm the associations observed and elucidate whether dosage or duration of these medications impart a greater risk for ACG.

P-054

GLAUCOMA VIRTUAL MONITORING CLINIC – DEVELOPMENT AND IMPLEMENTATION IN A PORTUGUESE PUBLIC HOSPITAL

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Purpose
A virtual clinic is a new model of glaucoma care in which the ophthalmologist is removed from the face-to-face patient consultation. Virtual glaucoma services are intended to improve both patients' experiences and clinics' capacity. In this study, we describe the development of a glaucoma virtual monitoring clinic within a public hospital of the Portuguese national healthcare service and describe its implementation outcomes.

Methods
A prospective, service evaluation study was performed including patients referred for an in-house glaucoma monitoring service structured as an asynchronous virtual clinic at the Department of Ophthalmology, Centro Hospitalar Vila Nova de Gaia/Espinho, Portugal. Consecutive patients with stable disease and low risk of glaucoma progression were considered for enrollment. Feasibility of development of the glaucoma virtual clinic (GVC), improvement of patient journey times, and patients' experiences at the service were studied.

Results
A total of 177 patients attended the GVC during its first year of activity. The most prevalent diagnosis were primary open-angle glaucoma (50.3%) and ocular hypertension (26.0%). The journey time at the GVC had an average reduction of 37.8% when compared to the conventional clinic (56 minutes vs 90 minutes, respectively). Most patients (88.7%) attending the GVC were subsequently scheduled for a follow-up visit at an adequate monitoring interval. Twenty patients were referred for an anticipated face-to-face appointment. Evaluation of patients' experiences showed high levels of satisfaction with the service. Patient–doctor relationship, previous experience of care within the hospital, level of information about the disease status, and knowledge about the GVC were found to be important factors for acceptance of this model of care. Greater efficiency and less waiting times at the appointment were pointed by patients as strengths of the GVC.

Conclusions
Virtual monitoring services are a clinically efficient, alternative model for glaucoma care within the hospital setting. In this study, we reported a decrease of patient journey time, a low rate of referral back to face-to-face appointments, and high levels of patient acceptance and satisfaction in the virtual glaucoma monitoring clinic.

P-055
COMPARISON OF EFFECT OF SURGICAL AND MEDICAL MANAGEMENT OF GLAUCOMA ON QUALITY OF LIFE

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Purpose
Glaucoma is a chronic and progressive illness, warrants lifelong treatment. Treatment of glaucoma along with disease itself affects quality of life of patient. So, to evaluate and to compare effect of surgical and medical treatment modalities on quality of life, this study was undertaken.

Methods
This was a prospective, non-randomized, comparative study on 86 glaucoma patients. We recruited 45 Patients undergoing glaucoma surgery (trabeculectomy with mmc) and 41 patients of matched demographic profile and glaucoma stage, who were on antiglaucoma medications only. Most of our patients had advanced glaucoma (medical group-73%, surgical group-80%). Patient with systemic illness, secondary glaucoma and ocular disease except cataract were excluded. General health related quality of life and vision specific quality of life were assessed with validated questionnaires, WHO-BREF and NEI-VFQ 25 respectively. These questionnaire were filled at recruitment and after 6 months follow-up and scores were compared. We also compared clinical and demographic profiles with scores.

Results
Our study revealed that NEI-VFQ-25 scores of both groups were similar at baseline. Overall NEI-VFQ-25 score was significantly higher in surgically treated glaucoma patients at 6 months follow-up (independent t-test, P=0.05) in comparison to medical group. The sub-scales that were significantly influenced by surgical intervention were near activity, mental health and dependency sub-scales. The study also revealed the overall WHOQOL-BREF scores were also significantly higher in surgically treated patients at 6 months follow-up (independent t-test, P=0.023). The domains that were most influenced by surgical treatment were physical health, psychological and environmental, respectively.

Comparison of baseline and 6 months follow up of both QOL instruments showed that NEI-VFQ25 was worsened significantly in both surgical & medical treatment groups. WHO-BREF was worsened significantly in medical therapy group only, surgical group didn't show any significant change.

Conclusions
According to our results, surgical treatment is associated with less worsening of quality of life in comparison to medical treatment in advanced glaucoma. Limitations:As sample size was small and follow up duration was short, so longer follow up and studies with larger sample size may be needed to validate the results.

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P-056

CLINICAL AND EPIDEMIOLOGICAL PROFILE OF CHILDREN TREATED AT A TERTIARY CARE CENTER FOR CHILDHOOD GLAUCOMA IN A DEVELOPING COUNTRY

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Purpose

The present work seeks to analyze and classify the clinical and epidemiological profile of patients under 8 years of age seen at a Glaucoma reference clinic using the Childhood Glaucoma Research Network Classification (CGRNC)

Methods

We conducted a retrospective study with analysis of medical records of patients under 8 years old seen at the Glaucoma center of Santa Casa de Belo Horizonte, Brazil, from May to December 2022. The diagnosis was classified using the CGRNC. Normality of the data was analyzed using Kolmogorov-Smirnov test. Descriptive statistics included mean and standard deviation for normally distributed variables and median with interquartile range (IQR) for non-normally distributed variables. Categorical variables were summarized as percentages. Regarding clinical data we evaluated: intraocular pressure (IOP) during examination under general anesthesia using a hand-held Perkins tonometer, axial length (AL), pachymetry, and cup-disc ratio.

Results

212 patients under 18 years old were seen in the study period, and 42 were enrolled. Twenty patients (47.6%) were referred as glaucoma suspects and 22 patients had the diagnosis of childhood glaucoma. The most prevalent subtype of glaucoma was primary congenital glaucoma (91%). The remaining cases (9%) were diagnosed with glaucoma associated with non-acquired systemic diseases, all of whom had Sturge Weber syndrome. Among patients with childhood glaucoma, 63.6%(n=14) were male, the mean age at diagnosis was 3.36 months (SD=±4.0), and 63.6% had bilateral ocular involvement. 19 Right eyes (OD) and 15 left eyes (OS) with glaucoma were analyzed and all of them had been managed surgically with trabeculotomy being the most common procedure performed. The mean number of surgeries was 1.2 (SD=±0.8) in the OD and 1.4 (SD=±1.4) in the OS. 54.5% of patients with childhood glaucoma were on eye drops in the OD and 40.9% in the OS. Glaucomatous eyes had a mean IOP of 13,14 mmHg (SD=±5,4) and the 40 eyes of the glaucoma suspect group had a mean IOP of 9 mmHg (SD=±3,1). The median cup-disc ratio found in glaucomatous eyes was 0.59 (SD=±0,2) and the mean pachymetry was 598.9 microns (SD=±149.6). 64,7% of those eyes had the AL above the 95 percentile with a median of 22,68 mm (IQR: 21,8 - 24,6)

Conclusions

The analysis of the clinical-epidemiological profile of patients with childhood glaucoma is important, and the standardization of the classification using the CGRNC aids follow-up and facilitates communication among medical specialists.

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P-057

COST-UTILITY OF SLT TREATMENT COMPARED WITH MEDICAL TREATMENT AND SURGERY IN PATIENTS WITH PRIMARY OPEN-ANGLE GLAUCOMA

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Purpose

To evaluate the cost/utility of medical treatment and surgery, compared to selective laser trabeculoplasty as a treatment strategy for Primary Open Angle Glaucoma, within the perspective of the Colombian Health System.

Methods

Using a Markov model with a 20-year time horizon, with a cohort of 10,000 patients. Direct costs were obtained through the micro-costing technique and quality-adjusted life years (QALYs) were used as the main outcome and effectiveness values to calculate the incremental cost-effectiveness ratio. Deterministic and probabilistic sensitivity analyzes were performed to assess uncertainty.

Results

Treatment of a patient with primary open-angle glaucoma using the laser incurred an expected cost of $11,400,978,01 and the QALYs gained were 11.37. Compared with laser, treatment with edications and surgery generated more expected costs ($15,039,304,16 and $12,927,732,73, respectively) and generated fewer QALYs (11.30 and 11.33, respectively). The treatment option with surgery and medical treatment was strongly dominated in all scenarios. The results are very sensitive to the probabilities of transitioning from the severe state of glaucoma to blindness.

Conclusions

With a willingness to pay of 1 GDP per capita, the selective laser trabeculoplasty option is a cost-effective option for the treatment of glaucoma in the Colombian Health System. The other alternatives are strongly dominated.

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P-058

LATE-ONSET GLAUCOMA IN PATIENTS RECEIVING VITRECTOMY: A NATIONWIDE POPULATION-BASED COHORT STUDY

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Purpose
To investigate the incidence and risk of late-onset glaucoma in patients with a history of macular pucker/hole and underwent single vitrectomy.

Methods
A case–control (1:5) study was conducted using the National Health Insurance Research Database (NHIRD) in Taiwan. There were 11,785 patients with single vitrectomy in the study group and 58,925 non-vitrectomy subjects matched by age, sex, and ocular/systemic comorbidities in the comparison group. The incidence of newly diagnosed glaucoma after the vitrectomy was analyzed based on the diagnostic code for glaucoma. For vitrectomized patients, the index date was 60 days after the vitrectomy. For non-vitrectomized individuals, the index date nested with the paired vitrectomized patients.

Results
Patients with a history of vitrectomy had a higher risk of late-onset glaucoma (adjusted hazard ratio (aHR): 1.870; 95% confidence interval (CI): 1.747–2.001) than patients without vitrectomy. The incidence rate of late-onset glaucoma was 10.75 per 10,000 person months in the vitrectomized group, which was higher than that in the non-vitrectomized group (6.25 per 10,000 person months). Patients with vitrectomy exhibited a significantly higher risk of open-angle glaucoma (aHR: 1.795; 95% CI: 1.605–2.009) and normal-tension glaucoma (aHR: 1.473; 95% CI: 1.021–2.124). In contrast, there was no significant risk of developing angle-closure glaucoma in vitrectomized patients.

Conclusions
Our data suggest that patients with a history of vitrectomy are more susceptible to late-onset glaucoma. Regular ophthalmic examinations may be useful in vitrectomized patients to identify high-risk individuals with glaucoma, and preventive measures can be applied to avoid permanent vision loss as soon as glaucomatous optic neuropathy is identified.

P-059

ASSOCIATION BETWEEN ACUTE MYOCARDIAL INFARCTION AND THE RISK OF GLAUCOMA DEVELOPMENT: A 12-YEAR NATIONWIDE COHORT STUDY

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Purpose

To investigate the risk of glaucoma development in patients with acute myocardial infarction (AMI) using Korean National Health Insurance Service data.

Methods

The present study used a National Sample Cohort consisting of approximately one million random subjects who were tracked from 2002 to 2013 (12 years). Newly diagnosed glaucoma and AMI were included based on the Korean Classification of Disease codes. The AMI group consisted of patients who received an initial AMI diagnosis between January 2003 and December 2007 as an index period (n = 10,281). The control group (n = 50,392) was selected using a 1:5 propensity-score matching for social and demographic factors. Each subject was followed up until 2013. Multivariate Cox proportional hazard regression analysis was performed to compare the risk of glaucoma development between the AMI group and the control group.

Results

The rate of glaucoma development was 3.50% in the AMI group and 2.85% in the control group ($P < 0.0001$). AMI increased the risk of glaucoma development [hazard ratio = 1.39; 95% confidence interval (CI): 1.23 to 1.57] after adjusting for age, sex, comorbidities, residence, household income, and year of enrollment. In multivariable Cox regression analysis, patients with comorbidity of hypertension and diabetes mellitus and those aged ≥ 50 years showed significantly higher risk of glaucoma development (all $P < 0.0018$).

Conclusions

AMI was significantly associated with the development of glaucoma after adjusting for potential confounding factors. Physicians may need to monitor patients with A-fib carefully for possible glaucoma development.

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P-060
IMPROVING GLAUCOMA PATIENT TREATMENT COMPLIANCE WITH A NEW UPRIGHT EYEDROP DELIVERY DEVICE

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Purpose
The adherence to glaucoma medication is known to be poor and has been reported to be as low as 20%. This results in suboptimal treatment efficiency and is accompanied by high risk of irreversible vision loss. Poor instillation skill has been identified as a treatment barrier that is not improved by instillation aids. A new upright eyedrop delivery device designed to facilitate precise dosing and accurate delivery was developed. The goal of the present usability test study was to characterize the acceptability of the patients to perform the new therapeutic gesture and evaluate their satisfaction and rate their experience with the upright delivery device.

Methods
We enrolled 16 patients and presented them a new upright ocular delivery device alongside with the use instruction. Following a 2-min demonstration on the correct use of the new device, the patients were asked to read the use instruction and test the device. A questionnaire and a 5-point Likert scale survey evaluated their understanding of the use instructions, and their appreciation of the new therapeutic gesture. Patients' feedback on the strength/weakness, advantages over the traditional eye drop delivery droppers was also recorded.

Results
15 of 16 (93.8%) patients would prefer the new upright delivery device over the traditional eye droppers. The new therapeutic gesture was rated as easy to perform with the new device being very easy (75.0%), easy (18.8%) to use for 15 of 16 patients. For 12 of 16 (75.1%) patients the new device cannot induce misuse mistakes, while only three patients (18.8%), and one (6.3%) were of an opposite or had no opinion, respectively. The patients were particularly satisfied that the risk of product spillage is also reduced with this new ocular drug delivery device, and that the risk of touching the cornea is greatly reduced.

Conclusions
This usability test demonstrated that this patient-centric-designed upright delivery device was easy to use, and its associated new therapeutic gesture was well accepted. This new device improves patients' accuracy and ability to correctly deliver the right dose of treatment while reducing product spillage. By improving patients' ocular administration experience and satisfaction, resulting in an improved treatment adherence, this new device has the potential to better protect glaucoma patients' vision and improve their quality-of-life.

P-061
EYE TRACKER READING PATTERNS IN GLAUCOMA PATIENTS VS. CONTROL PATIENTS

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Purpose
To evaluate reading performance patterns (through saccades, fixation and visual field) in glaucoma patients vs. control group using the eye tracker. In addition, to determine the influence of cognitive level and contrast sensitivity.

Methods
This is a prospective case control study including 116 patients (64 glaucoma and 52 control). Demographic, systemic and ophthalmologic information was obtained. All patients had at least 0.5 logMAR best corrected visual acuity (BCVA) on the left eye. Cognition was assessed through MoCA (Montreal Cognitive Assessment) and contrast sensitivity through Freiburg Visual Acuity & Contrast Test. Eye Tracker data were extracted using the Tobii Studio appurtenance software. Participants went through a reading performance test on MNRead translated and validated in Portuguese. 3 parameters were evaluated: 1. Reading duration (total time of fixation/characters), 2. Fixation (fixation/characters), 3. Mean fixation duration (total time of fixation/number of fixation).

Results
Glaucoma group had mean age of 65.9 (±14.13) and control group, 62.30 years (±10.26) (p=0.13). 38 (73.08%) and 41 (64.06%) patients had first degree in the control and glaucoma group, respectively. BCVA in the left eye was 0.04 (±0.09) and 0.18 (±0.16) logMAR in the control and glaucoma group, respectively (p=0.00). MD of the left eye in the glaucoma group was -10.67 (±8.64) dB. MoCA score was 21.67 (±3.35) and 21.53 (±4.09) in control and glaucoma group, respectively (p=0.84). Contrast sensitivity test was 1.84 (±0.15) and 1.56 (±0.33) logCS in control and glaucoma group, respectively (p=0.00).There was a significant positive correlation among contrast and MD (p=0.001). And there was a significant positive correlation among contrast and BCVA (p=0.000). There was no correlation with MoCA and contrast (p=0,145), and MoCA and BCVA (0.681).

Image

	Glaucoma (n=64)	Control (n=52)	P value
Age (years)	65.90 ± 14.13	62.30 ± 10.26	p=0.13
Female	35 (54.7%)	31 (59.6%)	p=0.60
White:black:yellow:pardo:indigenous	16:15:01:31:01	23:04:02:23:00	Not applicable
First degree	38 (73.1%)	41 (64.1%)	p=0.30
BCVA left eye (logMAR)	0.18 ± 0.16	0.04 ± 0.09	p=0.00
MD (dB)	-10.67 ± 8.64	Not applicable	Not applicable
MoCA (score out of 30)	21.53 ± 4.09	21.67 ± 3.35	p=0.84
Contrast (logCS)	1.56 ± 0.33	1.84 ± 0.15	p=0.00

Conclusions

In advanced stages glaucoma, when there's a lower MD and lower BCVA, there's also a decrease in contrast vision, which could explain, in some part, the improvement of reading speed with higher contrast slides, already shown in previous studies. Although, eye tracker data is not yet analyzed, with this study's MoCA results not statistically significant among groups, reading speed would not be influenced by participant's cognition level.

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P-062

IMPACT OF COVID-19 PANDEMICS IN PATIENTS SUBMITTED TO GLAUCOMA SURGERY: A 3-YEAR COMPARATIVE REPORT OF A PORTUGUESE OPHTHALMOLOGY DEPARTMENT

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Purpose

COVID-19 pandemics forced the reorganization of healthcare systems in order to provide care for ill patients infected with the novel coronavirus. Ophthalmology departments had to reduce elective procedures with mobilization of resources for non-ophthalmological purposes.

This study aims to describe the glaucoma surgical volume and patient characteristics during the pandemic year and to compare with the pre-pandemic and post-pandemic period.

Methods

A retrospective study was conducted at Hospital Pedro Hispano, Portugal, collecting glaucoma surgery characteristics and patient demographics from a 3-year period, between 18 March 2019 and 17 March 2022. Demographic data such as age, gender, glaucoma type, glaucoma surgical procedure and type of anesthesia, glaucoma staging and pre procedure intraocular pressure (IOP), in mmHg, was collected and analyzed. The primary outcomes included MD (mean deviation) and IOP measured pre procedure. Number and type of procedure were considered as secondary outcomes. Patients submitted to surgery between 18 March 2020 to 17 March 2021, we considered from the "pandemic" period, and were compared with the homologous period in 2019/2020, considered "pre-pandemic" and, in 2021/2022, considered "post-pandemic".

Results

The number of total glaucoma surgeries performed during the pandemic period was similar (n=79) to the pre-pandemic period, where 78 glaucoma surgeries were performed.

During the first quarter of the pandemic period there was a reduction of 36% in glaucoma surgeries performed in comparison with the same period in the previous year.

The mean pre procedure IOP in the pandemic period was 23.8 mmHg, a variation of +0.1 from the pre-pandemic group (p=0.475) and +0.8 was the variation from the post-pandemic group to the pandemic group (p=0.638).

Regarding the glaucoma staging, the mean MD in patients who underwent glaucoma surgery in the pandemic period was -14.1 dB, with a variation of -0.2 from the pre-pandemic group (p= 0.796), -0.4 was the variation from the post-pandemic group comparing with the pandemic group (p=0.813).

Conclusions

There was no significative difference in the mean pre procedure IOP and MD of patients that were submitted to glaucoma surgery during the pandemic period in comparison with those submitted to the same type of surgery during the pre-pandemic or post-pandemic period. The number of surgeries performed at our center during the pandemic period was similar to the number performed in pre-pandemic homologous period.

P-063

GLAUCOMA SUSPECT FINDINGS IN THE MANHATTAN VISION SCREENING AND FOLLOW-UP STUDY (NYC-SIGHT)

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Purpose

To describe glaucoma suspect findings from the Manhattan Vision Screening and Follow-up Study, which aims to investigate whether innovative community-based eye health screening using telemedicine can improve early detection and management of glaucoma and other eye diseases among high-risk populations in New York City.

Methods

A 5-year prospective, cluster-randomized clinical trial. Eligible individuals (>40 years) were recruited from affordable housing buildings and senior centers in New York City. Participants underwent eye health screening (visual acuity (Snellen), intraocular pressure measurements (IOP), and fundus photography) in community settings. Fundus images were remotely graded by both glaucoma and retina specialists and those with abnormal images were referred to ophthalmology; those who failed the vision screening (visual acuity 20/40 or worse, IOP 23-29 mmHg, or had an unreadable image) were examined by the study optometrist in the community setting. Multivariate logistic regression analysis determined factors associated with odds of referral to ophthalmology for glaucoma suspect from both the telemedicine image reading results and the optometrist eye exam findings.

Results

A total of 708 participants completed the eye health screening from 3/1/21 to 5/31/22; 189 were referred to ophthalmology for suspected glaucoma (26.7%) (138 participants had an abnormal disc image and 51 participants were referred by the optometrist). Mean age of glaucoma suspects: 68.5 years (SD ±11.7), female (60.3.1%), African American (57.1%), and Hispanic (37%). Mean IOP in the worst eye was significantly higher in those referred for suspected glaucoma compared to those not referred (16.1 mmHg vs. 14.4 mmHg) ($p<0.05$). Multivariate logistic regression analysis showed that participants who had self-identified with pre-existing glaucoma [OR=6.048, 95% CI=(3.560-10.274), p=0.000], had an IOP >23 mmHg at the eye health screening [OR=3.210, 95% CI=(1.407-7.323), p=0.006] or needed assistance with transportation [OR=2.081, 95% CI=(1.136-3.815), p=0.018] had higher odds of suspected glaucoma requiring follow-up.

Conclusions

This community-based study targeted high-risk populations improved access to eye care, and detected a significant amount of glaucoma suspects requiring referral to ophthalmology

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P-064

A QUESTIONNAIRE-BASED RISK ASSESSMENT FOR IDENTIFYING GLAUCOMA IN PRIMARY CARE OFFICES

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Purpose

To evaluate the performance of a questionnaire-based glaucoma risk assessment at a community-based eye health screening. The risk assessment was proposed for use in primary care offices to identify individuals who required referral to ophthalmology for glaucoma evaluation.

Methods

This cross-sectional study was part of the Manhattan Vision Screening and Follow-up Study (NYC-SIGHT), which is a 5-year, prospective, cluster-randomized controlled trial to detect glaucoma and other eye diseases in an urban, community-based setting.[1] The NYC-SIGHT study data were used to evaluate the 3-question risk assessment Quigley recently proposed in an editorial.[2] Participants were asked the following questions: 1) Have you had a dilated eye examination in the last two years? 2) Do you have a family member with glaucoma or blindness? 3) Were you told in the past you have glaucoma or are currently on IOP-lowering medications? Responses to questions 1 as “No”, 2 as “Yes”, or 3 as “Yes,” were considered to prompt further evaluation. The main outcome measures were the sensitivity, specificity, positive predictive value (PPV), and negative predictive value (NPV) of the risk assessment, with the reference standards being glaucomatous findings on optometric exam, IOP ≥23 mmHg or abnormal disc photo from the screening, all of which were indications for glaucoma referral in NYC-SIGHT.

Results

Risk assessment outcomes of the 708 study participants are shown in Table 1. The population was primarily older adults (mean age 68.6 years) who were of Hispanic/Latino (42%) ethnicity or Black race (51.8%). High sensitivity (76%-92%) and NPV (70%-98%) and moderate specificity (27%-63%) and PPV (20%-54%) were found using these 3 questions. Sensitivity and PPV were highest when the optometric exam was the reference standard (92%, 54%, respectively). Specificity and NPV were highest when IOP ≥23 mmHg was the reference standard (72%, 98%, respectively).

Image

Table 1: Manhattan Vision Screening and Follow-Up Study: Baseline Demographics, Social Determinants of Health and Risk Assessment Questionnaire Outcomes

Variable	Total Participants (n = 708)	Screened In Based on Risk Assessment (n = 509)	Screened Out Based on Risk Assessment (n = 199)
Mean age ± SD (range)	68.6±11.9 (40-99)	67.3±12.2 (41-99)	71.7±10.7 (45-98)
Age categories, n (%)			
40-59 years	170 (24.0)	52.3±5.9	53.9±5.9
60-79 years	416 (58.8)	69.6±5.5	71.3±5.5
≥80 years	122 (17.2)	85.5±4.6	85.3±4.3
Sex, n (%)			
Female	461 (65.1)	332 (65.2)	129 (64.8)
Male	247 (34.9)	177 (34.8)	70 (35.2)
Ethnicity/race, n (%)			
Hispanic/Latino	297 (42.0)	207 (40.7)	90 (45.2)
Black, non-Hispanic	367 (51.8)	269 (52.8)	98 (49.2)
Other (multiracial, white, Asian, American Indian)	44 (6.2)	33 (6.5)	11 (5.5)
Education level, n (%)			
Less than high school	214 (30.2)	151 (29.7)	63 (32.7)
High school	232 (32.8)	160 (31.4)	72 (36.2)
Some college, college graduate, or graduate degree	262 (37.0)	110 (21.6)	27 (13.6)
Employment status, n (%)			
Employed (full-time, part-time, or self-employed)	141 (19.9)	110 (21.6)	31 (5.0)
Unemployed	74 (10.5)	58 (11.4)	16 (8.0)
Retired	412 (58.2)	279 (54.8)	133 (66.8)
Disabled/Unable to work	81 (11.4)	62 (12.2)	19 (9.5)
Has health insurance, n (%)	675 (95.3)	481 (94.5)	194 (97.5)
Health insurance type, n (%)			
Medicare	405 (57.2)	266 (55.4)	139 (71.6)
Medicaid	389 (54.9)	276 (57.5)	113 (58.2)
Private or supplemental	209 (29.5)	92 (19.2)	26 (13.4)
Primary language, n (%)			
English	427 (60.3)	310 (60.9)	114 (57.3%)
Spanish	263 (37.1)	180 (35.4)	80 (40.2)
Other (French/Creole/Arabic/ Bengali/Russian)	18 (2.5)	19 (3.7)	5 (2.5)
Has own eye doctor (Access to eye care), n (%)	214 (30.2)	131 (25.7)	83 (41.7)

Evaluation of Questionnaire-Based Risk Assessment to Reference Standards				
Reference Standard	**Sensitivity**	**Specificity**	**PPV**	**NPV**
Optometric Exam	92%	63%	54%	94%
IOP ≥23 mmHg	81%	72%	20%	98%
Abnormal Disc Photo	76%	27%	34%	70%

PPV: Positive Predictive Value
NPV: Negative Predictive Value

Conclusions

In a community-based setting, the question-based risk assessment had high sensitivity and NPV and moderate specificity and PPV for identifying individuals who need referral to ophthalmology for glaucoma evaluation. This simple 3-question risk assessment may be a useful screening tool and could serve as an alternative to diagnostic testing for identifying individuals in a primary care setting who require a formal glaucoma evaluation.

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P-065

PROGNOSTIC FACTORS FOR PREDICTING PROGRESSION OF PRIMARY OPEN ANGLE GLAUCOMA IN ADULTS: A COCHRANE PROGNOSTIC REVIEW

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Purpose
Glaucoma is an asymptomatic condition until it progresses to an advanced stage. One major concern in glaucoma management decision making is the likelihood of the disease progressing to an advanced stage. This Cochrane prognostic review will focus on identifying prognostic factors for progression of glaucoma among the adults (>18 years) with primary open angle glaucoma (POAG) or pseudo-exfoliation glaucoma (PXFG) ascertained by visual field (VF) for functional loss and/or ocular coherence tomography (OCT) for structural changes.

Methods
The protocol of the systematic review was prospectively registered at Cochrane. We developed a comprehensive search strategy and searched MEDLINE, Embase, Cochrane CENTRAL, ClinicalTrials.gov and WHO ICTRP for eligible studies. We included any interventional or observational cohort studies that have assessed prognostic risk factors and excluded any study with less than 2-years of follow-up and glaucoma types other than POAG or PXFG. We reviewed titles and abstracts of studies identified by the electronic data base search, by two independent reviewers (MPP and QD). We will use the items of CHecklist for critical Appraisal and data extraction for systematic Reviews of prediction Modelling Studies (CHARMS-PF) to guide data extraction and Quality in Prognosis Studies (QUIPS) tool to assess the risk of bias of included studies. We will conduct a meta-analysis in clinically relevant groups using a random-effects approach and subgroup analysis depending on the quantity and quality of data available. This systematic review protocol was published in Cochrane Library.

Results
We identified 12,105 titles and abstracts through electronic data base seaches and data extraction is being done at present. We will present the results of data analysis, meta-analysis and risk of bias assessment at the congress.

Conclusions
Understanding prognostic factors is useful for clinicians and patients to estimate the risk of disease progression. However, at present it is difficult to interpret all available information. To our knowledge, there are currently no systematic reviews specifically on prognostic factors for the progression of glaucoma. A Cochrane Prognostic Review on this topic would be invaluable for decision makers, health care professionals, service providers, and policy makers, as well as for service users and their families.

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P-066
FACTORS ASSOCIATED WITH SELF-PERCEPTION AS A BURDEN IN GLAUCOMA PATIENTS

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Purpose
To identify the association between demographic and clinical characteristics with Self-Perception as a Burden in patients with glaucoma

Methods
This cross-sectional study included 180 patients over 18 years of age with any type and severity of glaucoma diagnosis attending a tertiary care ophthalmology center who answered the 25-item Self-Perceived Burden Scale (SPBS). Self-Perception as a burden was defined as not significant with a score of <40 points, mild with 40-49 points, moderate with 50-59 points, and severe with >60 points. Association between the score of the SPBS and sex, age, systemic comorbidities, occupation, visual acuity, disease severity, and number of medications were analyzed. The normality of the variables evaluated with the Kolmogorov Smirnov test with a significance of 0.05. Descriptive statistics were performed, presenting the variables with summary measures of central tendency and dispersion for quantitative variables, as well as absolute and relative frequencies for qualitative variables. For comparisons, the K-Wallis and M-Whitney U tests and Spearman's correlation were used, with a significance level of 0.05. The statistical package Stata® version 15.1 was used for the statistical analysis. The main outcomes were prevalence of Self-Perception as a burden in glaucoma patients, and its association with demographic and clinical characteristics.

Results
We included 180 patients with a mean age of 60.9 years, , 58.3% were female, and 65% had a systemic comorbidity. Mean SPBS score was 49.76 ± 29.23 points, 41% of patients obtained a severe score. We found a positive correlation between higher number of hypotensive eye drops and higher SPBS score (p=0.0282). Patients with severe disuade obtained statistically significant higher scores (p=<0.001). There was no significant correlation between age group or visual acuity, and SPBS score (p=0.8065, p=0.9320, respectively). There was no significant correlation with the presence of systemic comorbidities and SPBS score (p=0.2938).

Conclusions
Self perception as a burden score is high among patients with glaucoma. In our study, higher scores have a statistically significant correlation with higher number of glaucoma drops and more severe glaucoma diseñase. High SPBS scores have been associated to anxiety, depression, and lower quality of life in other studies. This should be addressed to offer comprehensive management and interventions for glaucoma patients.

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P-067

MODELING THE QUALITY OF LIFE EVALUATION IN GLAUCOMA: A PATIENT-CENTERED APPROACH

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Purpose
The available questionnaires used to measure Quality of life (QoL) are generally standardized for several eye diseases and not sufficiently completed to correctly evaluate glaucoma patients.

The overall aim of this project is to develop a patient centered instrument to assess QoL in glaucoma patients. The aim of the phase I study is to identify most common descriptors of QoL in glaucoma patients and explore their relationship with sociodemographic and clinical characteristics.

Methods
Patients in the whole range of visual field defect were consecutively enrolled. Detailed history regarding the disease and sociodemographic data were collected.

Patients underwent a semi-structured interview with open questions and encouraged to speak freely about their perceptions. The frequencies of the descriptors were analyzed at group level, graphically summarized by a word cloud, and at individual level, by analyzing the percentages of patients reporting each descriptor. Descriptors were classified in perception and knowledge of the disease, daily activity, treatment burden.

Results
Sixty patients participated in the study. The mean age was 69.1±10.3 (Range: 49-83) years and the mean defect was -7.7±8.7 dB (Range: -26.6-0.16). The mean number of drops was 2.2±0.9 (Range: 1-4). The most frequent perception descriptors were blindness (34.2%) and fear (25.7%) reported by 17 (28.3%) and 15 (25%) of the patients, respectively. Of those patients 64.7% had family history of glaucoma.

Need for eye drops and eye pressure were the most acknowledged aspects about their disease (22.8% and 21.2%) compared to visual field (11.4%) and optic nerve damage (14.2%). They were reported by 17 (28.3%) patients.

The treatment burden was most frequently related to the ocular side effects of the drops. Burning sensation and discomfort (both 14.2%) were reported by 17 (28.3%) and 16 (26.6%) of the patients. Moreover, 61.5% of the patients reporting these descriptors were treated with ≥3 drops.

Driving was the most impaired daily activity (25.7%), reported by 30 (50%) of patients.

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Image



Conclusions

This study shows that when glaucoma patients are let to express their perspective on QoL, they report to experience fear and concern about the risk of blindness; moreover, side effects of therapy and driving limitation are the greatest burden in their lives. These results represent the first step toward the creation of a glaucoma specific QoL questionnaire that considers the patient perspective on glaucoma.

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P-068

THE ASSOCIATION OF CAROTID ARTERY STENOSIS AND OPEN ANGLE GLAUCOMA: A POPULATION-BASED STUDY

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Purpose
Glaucoma is characterized by progressive optic neuropathy that leads to visual field loss and blindness. Although its etiology is not fully understood, literature suggests that insufficient ocular blood supply may cause glaucomatous optic nerve damage. Patients with carotid artery stenosis (CAS) show retrobulbar hemodynamic change; however, the role of CAS in the pathogenesis of glaucoma remains debatable and there is ongoing discussion over the association between glaucoma and CAS. Therefore, this study aims to investigate the relationship between CAS and open angle glaucoma (OAG).

Methods
A retrospective cohort study was conducted using the Chang Gung Research Database (CGRD). A total of 19,590 patients with CAS were included in the analysis. The patients without CAS were selected from the CGRD as the control group. The severity of CAS was classified based on carotid doppler and flow velocity, and the patients were classified into mild (<50%), moderate (50-69%), and severe (≥70%) groups. The incidence rate of OAG and the time of diagnosis were compared between groups. A Cox proportional hazards model was used to calculate the hazard ratio (HR) for OAG in the CAS cohort and the surgical effect of CAS on patients with OAG.

Results
Of the 19,590 patients, 17,238 had mild CAS, 1,895 had moderate stenosis, and 457 had severe stenosis. Compared with the control cohort, the CAS cohort had a significantly higher proportion of several comorbidities including hypertension, diabetes, hyperlipidemia, coronary artery disease and stroke. We found that the adjusted HR for OAG in the CAS cohort was 1.15 (95% CI, 1.01-1.32, P = 0.04) in the moderate CAS group; however, the adjusted HR lost its significance in the competing risk analysis model. The Kaplan-Meier analysis revealed that the patients with moderate CAS had earlier onset of OAG than did the comparison group during the follow-up period (P = 0.01). The risk of developing OAG in the subgroup of CAS with surgical treatment was significantly lower than that in the comparison group (HR 0.6, 95% CI, 0.39-0.91, P = 0.01).

Conclusions
Although the incidence rate of OAG in each group with different degree of carotid artery stenosis showed no significantly difference, our cohort study revealed that surgical treatment for carotid artery stenosis reduced the risk of OAG. Therefore, to facilitate early diagnosis and prompt proper treatment, we recommend early referral of patients with CAS to ophthalmologists for OAG follow up.

P-069

VISION-RELATED QUALITY OF LIFE FOLLOWING COMBINED CATARACT AND MINIMALLY INVASIVE GLAUCOMA SURGERY OR CATARACT SURGERY ALONE IN GLAUCOMA PATIENTS

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Purpose
To examine glaucoma patients after undergoing combined cataract and minimally invasive glaucoma surgery (MIGS), microhook ab interno trabeculotomy and goniotomy with the Kahook Dual Blade (KDB), or cataract surgery alone and then evaluate their vision-related quality of life (VR-QOL) following the procedure.

Methods
A total of 75 eyes of 75 consecutive glaucoma patients in this prospective cohort study underwent phacoemulsification (Phaco) or phaco and MIGS (Phaco-TLO) between October 2019 and March 2022. In all cases, the National Eye Institute Visual Function Questionnaire (VFQ-25) was used to evaluate the 20 eyes in the Phaco group and the 55 eyes in the Phaco-TLO group before and at 2 months after surgery. A Wilcoxon signed-rank test was used to compare the pre- and postoperative results.

Results
There was a significant increase in the visual acuity (logMAR) at 2 months postoperatively (Phaco group; 0.34 ± 0.10 to -0.07 ± 0.1, P < 0.0001, Phaco-TLO group; 0.37 ± 0.43 to 0.09 ± 0.32, P < 0.0001). Although there was a significant decrease in the intraocular pressure (IOP) at 2 months postoperatively in the Phaco-TLO group (16.1 ± 5.4 mmHg to 12.6 ± 2.8 mmHg, P < 0.0001), the IOP was similar between the before and after surgery values in the Phaco group (12.5 ± 2.8 mmHg to 11.6 ± 2.9 mmHg, P = 0.41). The median (25-75th percentile) total VFQ scores in the Phaco group before and at 2 months after surgery were 71.1 (62.4-80.6) and 79.4 (69.0-84.0), respectively. (P = 0.006).The median (25-75th percentile) total VFQ scores in the Phaco-TLO group before and at 2 months after surgery were 69.8 (55.3-78.6) and 74.7 (65.1-83.3), respectively. (P = 0.005).

Conclusions
Glaucoma patients who underwent not only cataract surgery alone but also combined cataract surgery and MIGS exhibited significant improvement in the VR-QOL.

P-070
INTRA-OCULAR PRESSURE CHANGE WITH AGE IN EARLY ADULT LIFE

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Purpose
The distribution of IOP in younger adults has been little studied. We used cross-sectional and longitudinal data to evaluate the distribution of IOP in young adults and whether this changed through early adulthood.

Methods
Participants were recruited from eight Australian epidemiological studies: Western Australian Eye Protection Study, Kidskin Study, Norfolk Island Eye Study, Twins Eye Studies in Tasmania, Brisbane and Western Australia, Glaucoma Inheritance Study in Tasmania, and The Raine Study. All participants had an eye examination during which their IOP was measured. The right eyes of participants aged 18–30 years and of European descent were included in the cross-sectional analysis. Additionally, a separate group of participants from the Raine Study had baseline (around 20 years old) and follow-up IOP (around 28 years old) measured, and both eyes were analysed longitudinally with linear mixed-effect models to account for repeated measures. Longitudinal analysis was adjusted for time of IOP measurement, axial length and central corneal thickness.

Results
Cross-sectional data was available from 1447 participants. Overall mean IOP was 15.4±3.4 mmHg. Variation in IOP was -0.13 mmHg per year (95%CI= 0.05–0.21), p< 0.001. 30 participants had a family history of glaucoma. Those with a family history of glaucoma had higher IOP by 2.7mmHg (95%CI= 1.3–4.3) than the rest of the cohorts.

Longitudinal data was available for 617 Raine Study participants. The mean IOP at baseline (20 years) and follow-up (28 years) were 15.4±3.2 and 14.1±3.4 mmHg, respectively. IOP decreased by 0.15 mmHg per year (95%CI= 0.12–0.19), p< 0.001.

Conclusions
We show a similar slight decrease in IOP through the third decade of life of > 1mm Hg. Whilst not of concern at an individual level, some mechanism appears to be influencing IOP in early adult life. This small difference may need to be taken into account with any trials involving young adults when a change of IOP is an outcome measure. Our finding contrasts with other studies of older adults, where increasing IOP was noted with increasing age.

P-072

PRESENTATION PATTERN AND VISUAL IMPAIRMENT AT PRIMARY PHACOTRABECULECTOMY IN ADVANCED PRIMARY OPEN ANGLE AND ANGLE CLOSURE GLAUCOMAS IN CENTRAL INDIA

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Purpose

Factors influencing delayed presentation and its impact on blindness and visual impairment at primary phaco-trabeculectomy for advanced primary glaucomas in central India.

Methods

Retrospective case series. Subjects undergoing primary combined phaco-trabeculectomy from March 2015 to December 2021 included. Glaucoma defined as per ISGEO criteria. Advanced glaucoma was defined as Mean Deviation > -12dB as based on HAP (Hodapp-Anderson-Parrish) criteria in Humphrey Visual Fields (HVF) if available peri-operatively. If visual fields were not possible an advanced glaucomatous disc damage with decreased visual acuity <6/60 considered diagnostic of advanced glaucoma. Visual Impairment (VI) defined as per WHO for best corrected distance acuity in better eye [Moderate VI (< 6/18–6/60), Severe VI (<6/60–3/60), Moderate-Severe VI (<6/18-3/60), Blindness (<3/60)]. Exclusions were secondary glaucomas, co-morbid retinopathies contributing to decreased acuity or any prior intraocular surgery in either eye (except cataract surgery in contralateral eye). Age, gender, proximity to hospital, type of glaucoma (POAG, PACG) considered as risk factors. P<0.05 considered significant.

Results

Total 119 subjects with mean age 61.7±9.1 years included. Males: Females (%)=55: 45; 27(23%) had Moderate-Severe VI and 13(11%) were Blind at presentation. PACG diagnosed in 82 subjects (69%) with 11(13%) blind. POAG diagnosed in 37 subjects (31%) with 2(5%) blind. Nearly half (49%) were newly diagnosed to have glaucoma at presentation for surgery. Mean Cup-disc ratio was 0.87±0.07 and Mean Deviation (MD) in HVF was -25.01±5.8 dB in operated eye. Overall 21% females were blind and an additional equal number (21%) showed moderate-severe visual impairment compared to 3% and 26% in males respectively (p=0.026). Patients from four surrounding districts (outer zones) with greater distance to base hospital were relatively younger and with higher blindness rates. Of the 23 contralateral eyes with pseudophakia, 20 (87%) had advanced glaucoma of which 9(39%) were blind. Majority of these were operated in cataract surgical camps.

Conclusions

High prevalence of glaucoma related blindness and visual impairment at primary surgery. Females with greater distance to hospital disproportionally affected suggest socio-economic factors affecting late presentation. Lack of comprehensive eye examination and appropriate management at time of cataract surgical camps needs reevaluation.

P-073

THE EPIDEMIOLOGY OF FIELD OF VISION DISORDERS STUDY - EFOVID - CREATION OF A POPULATION BASED DATABASE

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Purpose

Abnormalities in a patient's visual field can result from various causes, including glaucoma. These causes have different classical patterns, and different progression trajectories.

Visual field testing using dedicated machines such as the Humphrey Visual Field Analyzer (HVFA) is performed to assess and track functional changes or visual field loss. HVFA machines are the most commonly used machines in Australian practice currently, and have been for several decades.

The use of retrospective visual field databases is a novel undertaking, and there are few studies published at present utilising this data on a large scale. With a large potential database existing on HVFA machines across the country, this project aimed to access this information to enable epidemiological research into the field of vision defects.

Methods

Retrospective, longitudinal, population study of visual field data from all people who have attended an ophthalmology service and had a Humphrey Visual Field test, in Western Australia, between 1988 and 2019.

Data was exported from these machines into a single research database. From there, the individual tests were extracted, cleaned and standardised using batch computer scripts, custom written for this purpose.

Results

600,000+ tests for 60,000+ patients, from 15 practices in metropolitan Perth, as well as the Lions Eye Institute and all tertiary hospitals in Western Australia.

Raw test data includes patient demographic fields as well as point sensitivity readings and test parameters such as test type, false negatives and positives. Calculated fields include reliability scores.

Raw sensitivity values were available for all tests, and additional descriptors were available for most tests (97.20-100% of tests) with the exception of retired data variables.

On average there at 5.5 tests per serson, with a minimum of 1 and maximum of 85.

The average patient age at the time of their test was 65.75 years.

Conclusions

A large population visual fields database has been created, that is relatively complete, containing raw sensitivity values for all tests, as well as the reliability indicators for all tests.

Demographic data is also present in the majority of tests, making it fit-for-purpose for linked data studies investigating co-morbidities and injuries and their relationship with visual fields.

The MD and VFI results extracted suggests more than half of the tests being close to the normal reference values utilized by the HFA, which provides a useful age matched control group.

P-074

ASSOCIATION OF GLAUCOMA AND OCULAR HYPERTENSION IN PARS PLANITIS. A RETROSPECTIVE STUDY

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Purpose

To analyze the prevalence of glaucoma and steroid induced ocular hypertension in patients with Pars Planitis, as well as to describe its main clinical characteristics and treatment.

Methods

A retrospective and descriptive study was carried out in patients with electronic clinical records of patients with Pars Planitis who attended the glaucoma and uvea service of the Ophthalmology Institute, ¨Conde de Valenciana¨ from July 2021 to August 2022. For the descriptive analysis it was expressed in means, standard deviation and percentages. All analyses were performed with GraphPad Prism 9 (La Jolla, CA). The values of p 0.05 were statistically significant.

Results

We included 72 patients who met inclusion criteria. Mean age at diagnosis was 9.95 ±6.8 years. 40.8% were women, and 59.1% were men. The prevalence of steroid induced ocular hypertension (SIOH) was 16.6% and 18.05% for secondary glaucoma (SG), of which 76.9% was uveitic glaucoma, 15.3% steroid-induced and 7.6% associated with vitreoretinal diseases. Visual acuity was compared between patients with SG and SIOH, obtaining a mean of 1,210±0.95logMAR and 0.5933 ±0.64 logMAR respectively, with a significantly statistical difference (Figure 1A). The intraocular pressure between these two groups had a significant difference (p=0.0259), with a mean in SIOH of 14.0±2.8mmHg, and in SG of 17.31±6.31mmHg (Figure 1B). Seventy-two per cent of patients with SIOH or SG had peripheral anterior synechia (PAS). Paraocular administration or steroid implants were observed in 75% with SIOH and in 46. 5% with SG. Only patients with SG (77%) required surgical treatment, with Ahmed's valve implant being the most performed procedure (69.2%) and second, the trabeculectomy (15. 3%).

Image

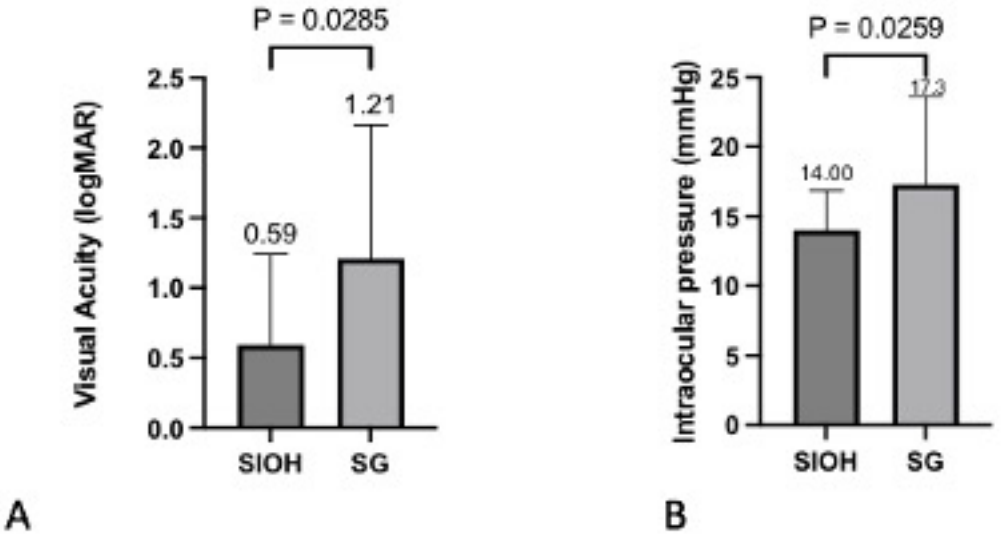


Figure 1A and 1B. A) Visual acuity analysis between patients with SIOH and SG. B)Comparison of intraocular pressure between SIOH and SG. Mann-Whitney Test.

Conclusions

This study, carried out in a Mexican reference center, is the first to demonstrate the epidemiological data and clinical characteristics in patients with Pars Planitis and SIOH or SG. This disease is potentially causing blindness due to complications, such as SG, with a range of disorders whose end result is damage to the optic nerve, high intraocular pressure being an important risk factor for its development.It is essential to perform a complete ophthalmological assessment, in addition to offering multidisciplinary management.

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P-075

IOP LEVELS AND ANGLE-CLOSURE PREDISPOSITION IN PATIENTS TREATED WITH DIFFERENT NEURO-PSYCHOTROPIC MEDICATIONS IN AZERBAIJAN

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Purpose

This study assesses intraocular pressure (IOP) levels and anterior chamber angle width (ACAW) in patients treated with different neuro-psychotropic medications (NPM) in Azerbaijan.

Methods

Prospective analysis of the clinical data of 62 patients (124 eyes) with different neurological disorders treated with such NPM, as topiramate (26 patients - first study group); tricyclic and atypical antidepressants, selective serotonin reuptake inhibitors, serotonin and norepinephrine reuptake inhibitors (24 patients - second study group); and other agents (benzodiazepines and antipsychotics - 12 patients – third study group) was performed. Study outcomes were IOP levels, anterior chamber angle width and the incidence of angle closure and angle closure glaucoma.

Results

The mean age of the patients in three study groups was 36.4±12.2 years, 35.9±12.3 years and 36.2±13.4 years, respectively; 45.2% men and 54.8% women. The most common neurological indications for NPM use were neuropathic pain, migraine, epilepsy and depression; the mean duration of this treatment in three groups was 8.8±2.6 (1-12) months, 7.5±3.1 (1-12) months, and 3.5±1.7 (1-6) months, respectively. IOP levels were < 15 mmHg in 40.3% eyes, in 33.9% eyes - ≥ 15 mmHg ≤ 18 mmHg, and in 25.8% eyes - > 18 mmHg. The mean IOP and ACAW in three groups were 18.1±6.7 (11-42) mmHg and 25.7±10.1° (0°-45°), 15.9±3.3 (11-26) mmHg and 28.6±6.2° (8°-42°), 14.6±3.7 (10-24) mmHg and 30.8±7.8° (10°-42°), respectively. The IOP level was statistically significantly higher ($p<0.05$) and the anterior chamber angle was statistically significantly narrower ($p<0.05$) in the patients treated with topiramate than in all patients in the other two groups, while in the first and second groups the ACAW was statistically significantly smaller in patients with longer treatment duration ($p<0.01$). Angle closure and angle closure glaucoma were diagnosed in 4.8% and in 3.2% of all cases and were successfully treated with YAG-laser iridotomy and topical IOP-lowering drops in 80% of revealed cases. Cataract extraction with surgical iridectomy followed by trabeculectomy was performed in one hyperopic patient due to an uncontrolled high IOP despite maximal topical therapy and discontinuation of topiramate.

Conclusions

This study shows a necessity of regularly monitoring of IOP in patients treated with different neuro-psychotropic medications, especially in those received topiramate. The longer the duration of the treatment, the higher the predisposition to angle closure.

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P-076

POSNER-SCHLOSSMAN SYNDROME RELAPSE FOLLOWING INACTIVATED COVID-19 VACCINATION IN CHINA

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Purpose
To present the characteristics of Posner-Schlossman syndrome (PSS) relapse following inactivated COVID-19 vaccination.

Methods
From 2020 to 2022, 12 out of 106 PSS patients undergoing relapses after inoculating any dose of inactivated COVID-19 vaccines (Sinopharm) were enrolled; information on the vaccines, date of vaccination and systemic adverse events were reviewed; ophthalmic examinations were performed.

Results
The recurrence rate after vaccination was 11.32% (12/106,95% CI: 5.29%-17.35%) among 106 PSS patients we surveyed. All the 12 patients were inoculated with inactivated COVID-19 vaccines developed by Sinopharm, China. The mean time of relapse was 5.27±3.72 days (range: 1-13 days, median: 4 days). Higher intraocular pressure (IOP) and more keratic precipitates (KPs) were seen in the relapse following vaccination (33.55±12.99 mmHg, 91.67% had KPs compared to 25.38±3.80 mmHg, 33.33% had KPs in previous relapse, P=0.009). Patients were treated with corticosteroids, IOP-lowering drugs, 2% ganciclovir eye drops and systemic immunosuppressive agents (if needed). Daily regimen and release course were noted. The mean release course was 30.71±34.74 days for the relapse following vaccination and 7.33±6.51 days for previous relapses. The attack frequency before and after vaccination was 3.56±2.07 and 9.11±7.34 times per year (P=0.044). Higher daily doses of corticosteroids, IOP-lowering drugs and ganciclovir were needed to maintain stable course, though the difference did not reach statistical significance.

Conclusions
More frequent relapses and harder control of IOP were found in PSS relapse following COVID-19 vaccination. Ophthalmologists need to be aware of the group vulnerability and take precautions, though the pathogenesis is still under investigation.

P-077
PREVALENCE AND RISK FACTORS OF GLAUCOMA IN SRI LANKA

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Purpose
Glaucoma is a leading cause of visual impairment and blindness among the rapidly ageing population in Sri Lanka. There is paucity of evidence at national level on prevalence and risk factors of glaucoma in this local context, to develop and implement preventive and curative eye care strategies.

Methods
Multistage stratified cluster random sampling was used to select a nationally representative sample of 3299 out of 3750 persons aged >= 40 years. Data were collected using a validated study instrument consisted of four sections, *i.e.*, socio demographic data, past medical history, past ocular history, and ascertainment of presence of glaucoma based on ICO guidelines. All participants were examined for visual acuity, tonometry, pachymetry, slit lamp and indirect fundoscopy. All were subjected to fundus photography. Those who were detected to have IOP >21 mmHg and C/D ratio >= 0.6 underwent automated visual field analysis. Glaucoma diagnosed confirmed according to ICO guidelines.

Results
A total participants were examined [mean age 58.4 (SD 9.6), 57.9% female] and 82.7% were rural dwellers. 33.4% of the participants aware and undergone any form of glaucoma screening prior to the survey. 1/4th had normal vision of 6/6 (right eye 24.7%, left eye 24.8%). High IOP (> 21 mmHg) was observed in 3.3% in right eyes and 5.9% in left eyes. Majority of the participants had open angle with Van Herrick grades of 3 and 4 (88.1% right eye, 87.9% left eye). At eye level analysis, prevalence of glaucoma in right eye was 3.2% while that of left eye was 3.8%. Age and comorbidities standardized prevalence of glaucoma in this population was 5.1%% (95% CI 3.9-5.4%). Commonest secondary glaucoma was Pseudo Exfoliative syndrome. NPDR (28.5%) was the commonest retinal comorbidly with Glaucoma

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Conclusions

This is the first ever national survey and reports prevalence of glaucoma in Sri Lanka is 5%, little higher compared to the peers in South Asia. Majority had primary open angle type glaucoma which is an asymptomatic disease. The results of the National Glaucoma Survey with evidence demonstrates early detection is needed to implement health care strategies to prevent blindness and to improve the quality of life in the elderly population. Hence more innovative public health plans and expansion of clinical services in the curative sector are required to control Glaucoma blindness in Sri Lanka.

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P-078

MANAGEMENT OF GLAUCOMA PATIENTS IN WARTIME REALITY. TOUGH TIMES CREATE SMART DECISIONS

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Purpose

To evaluate all problems both patients with glaucoma and health care system in wartime reality. Also to modify our treatment paradigm based on received data.

Methods

After beginning the war our territory was divided at three parts: 1- under occupation, 2- with active combat operation and 3- distant from contact zone of armies.

Both needs of glaucoma patients and health care system in each parts were analysed.

According to majority of glaucoma guidelines the first line of treatment is hypotensive eye-drops, next - laser methods, then - MIGS or incisional surgical approach and the last - Tube shunts drainage devices. We try to modify our treatment paradigm to war reality.

Results

In zones of occupation and active combat operation the totally absence of ophthalmology care and eyedrops availability were observed that's leads to rapid progression of glaucoma. After de-occupation majority of patients need to undergo directly to surgery treatment. Also rising of severe eye injuries with delayed care were noticed, that required Tube shunts drainage surgery as a first line therapy.

In distant from contact zone rapid increasing of patients and lack of opportunities to give quality ophthalmology care (escape of medical staff abroad, blackout, absence of public transport, air alarms etc) were observed. Also we found low patients compliance to conservative treatment due to absence of eyedrops, stress, switch all attention to survive, job and money loss.

We changed our strategy and recommended laser treatment (selective laser trabeculoplasty) as first choice. Even we theoretically can't achieved target IOP we performed it because reduction of every mmHg is important in reducing the risk of progression.

Conclusions

War time reality changed our strategy to performed selective laser trabeculoplasty as first line therapy to reduct IOP as much as we can to reduce the risk of glaucoma progression and save patients sight and visual field to after war quality and complete health care.

P-079

SYSTEMATIC REVIEW OF INSTRUMENTS FOR THE ASSESSMENT OF PATIENT-REPORTED OUTCOMES AND QUALITY OF LIFE IN CHILDREN AND ADOLESCENTS WITH GLAUCOMA

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Purpose
To assess patient-reported outcome measurement (PROM) instruments in children and adolescents with childhood glaucoma.

Methods
A systematic review was conducted. The protocol of the review was registered with PROSPERO - International prospective register of systematic reviews (CRD42022353936). MEDLINE (via PubMed), The Cochrane Library, Web of Science and PsychInfo were searched for any type of studies reporting the use of patient-reported outcome measures (PROM) in childhood glaucoma. The search was restricted to publications of the past ten years in English, German or Spanish language. Screening of titles and abstracts was done by two masked investigators. A third investigator decided in case of disagreements.

The methodological quality of the questionnaires will be assessed using the Consensus-based Standards for the Selection of Health Measurement Instruments (COSMIN) criteria.

Results
Of 2901 publications retrieved with the search strategy, 13 relevant articles were identified. Instruments used were the 25-item National Eye Institute Visual Function Questionnaire (NEI VFQ-25), the Cardiff Visual Ability Questionnaire for Children (CVAQC), the Impact of Vision Impairment for Children (IVI-C) questionnaire, the Children's Visual Function Questionnaire (CVFQ), the LV Prasad Functional Vision Questionnaire–II (LVP-FVQ-II), the 26-item World Health Organization Quality of Life-BREF (WHOQOL-BREF) questionnaire, the 5-item Satisfaction with Life Scale (SWLS) questionnaire, the 15-item Glaucoma Quality of Life (GQL-15) questionnaire, and the 27-item Kidscreen questionnaire. The instruments addressed functional visual ability (FVA), vision-related quality of life (VR-QoL), health-related QoL (HR-QoL, life satisfaction (LS), glaucoma specific visual disability and overall QoL.

Conclusions
A relatively small number of studies have reported quality of life and PROMs in children with glaucoma. Various instruments evaluating diverse patient-reported outcomes have been used on childhood glaucoma patients.

P-080
INTERNATIONAL REPRESENTATION ON FILM: THE WORLD GLAUCOMA CONGRESS

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Purpose
The World Glaucoma Congress (WGC) is an opportunity for international experts to exchange ideas regarding eliminating glaucoma-related disability through both research presentations and a film festival of works directly or indirectly related to glaucoma. Sponsored by the World Glaucoma Association with 91 member glaucoma societies from around the globe, the WGC film festival is a unique medium for depicting global challenges and triumphs in ophthalmology. However, despite recent focus in ophthalmology on diversity and inclusion, there is a paucity of data regarding the relative inclusion of different countries in the WGC film festival. Thus, the purpose of this study is to identify all participating countries and their relative representation at the WGC film festival.

Methods
All WGC abstract books from 2009-2019 were obtained from the WGC website. Film code, primary author, and country of origin of Film Festival participants were recorded. Films from each WGC were stratified by country and number of accepted submissions per country were totaled.

Results
From 2009-2019, 153 films were accepted from 26 countries, with an average of 9 countries represented each year. The greatest percentage (46%) of countries were in Asia, followed by Europe with 23%. India was the most represented country, participating every year of the Congress, with a total of 92 films accepted (60% of all films since the inception of the festival). The next most represented countries were the United States and Spain, with 6 films accepted from each. The least represented continent was Africa, with only one film featured from Egypt in 2013.

Conclusions
Although the WGC film festival represents an unprecedented opportunity to showcase international ideas regarding glaucoma and to raise awareness about the state of glaucoma care globally, there is still work to be done to maximize inclusion, particularly from countries in Africa and the Americas. Despite accounting for 37% of the member societies in the World Glaucoma Association, works from Africa and the Americas were the least represented in the festival. Future directions should examine outreach strategies to determine how ophthalmologists are being engaged and steps forward in expanding representation and diversity on the global ophthalmology stage.

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P-081
MANAGEMENT AND GLAUCOMA PRÉVALENCE IN SUB-SAHARA AFRICA: A LOOK ON THE GUINEAN CASE

D Sonassa

Purpose
Glaucoma is a group of optic neuropathies characterized by degeneration of the RGCs and FNR layers resulting in changes in the ONT and characterized by an increase in IOP. Without treatment, this condition can lead to permanent visual field impairment and even blindness. The overall objective of this study was to evaluate the prevalence of glaucoma in CADESO patients and to describe it's management.

Methods
This was a prospective descriptive cross-sectional study lasting 03 months from October 20, 2021 to January 19, 2022. All patients diagnosed with glaucoma and willing to participate in our study were included.

Results
Out of a total of 3418 patients who consulted at CADESO, we collected 269 cases of glaucoma with a prevalence of 7.9% with a predominance of women (58.4%) ; the most affected age group was 60 to 69 years (32%) with an average of 57.29 ± 17.06 years. The main treatments prescribed to the diagnosed patients were medication (90.7%), laser SLT (8.6%) and trabeculectomy (6%). The most represented therapeutic classes were BB (75.1%), AP (37.6%) and IAC (25.7%). Timolol was the most prescribed molecule (72.5%), followed by latanoprost (24.5%). BB monotherapy (37.2%), dual therapy with AP+BB (13.8%) and BB+IAC (13%) were the most commonly used.

Conclusions
The popularization of diagnostic and therapeutic means through information, sensitization and subsidies would make it possible to prevent/treat glaucoma and it's complications as early as possible.

P-082

A SIMPLE AND EASILY ACCESSIBLE PATIENT REPORTED OUTCOME MEASURE (PROM) INSTRUMENT TO GAUGE SATISFACTION OF A SURGICAL GLAUCOMA SERVICE

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Purpose
Health systems are increasingly recognising and incentivising 'value' in health outcomes, often based upon considering outcomes achieved per capita spent across a full cycle of patient care. PROMs are used to provide health-related information pertaining to quality of life and symptom burden since they provide patient specific insights into disease progression and treatment efficacy. PROMs add a further dimension to help manage expectations, guide service development and provide valuable feedback from the perspective of service users. We focused on designing a simple PROM tool and using it in a patient survey to evaluate satisfaction of the Surgical Glaucoma Service (SGS) under the care of a single Glaucoma Surgeon at Ashford and St Peter's Hospitals NHS Foundation Trust (UK).

Methods
Suitable patients were selected under the care of Mr Faisal Idrees' SGS from 01/03/20-01/08/22. The PROM used in the survey consisted of 4 questions focussing on the following domains on the satisfaction with: (1) Glaucoma Consultant Mr Faisal Idrees, (2) Nursing staff and other health care professions part of the SGS, (3) administrative staff and services, and (4) global satisfaction of the SGS alignment with Trust values. A Visual Analogue Scale (VAS) was constructed to collect patient responses. This consisted of a 100mm horizontal line demarcated at 10mm intervals with lower and upper extreme ends anchored pictorially to a 'sad face' and 'happy face' respectively. Respondents placed a vertical line on the scale which aligned to their level of satisfaction. The placement of that mark from the lower end of the scale was measured in millimetres and analysed quantitatively. A free text box was included for additional comments. The survey was posted to patients with a cover letter and pre-paid envelope. A total of 13 days was allowed for responses and the resultant data tabulated.

Results
A 62.5% response rate was obtained with 70/112 questionnaires being returned within the 13 day time-frame. Of the 70 respondents, 74.3% left additional comments. 3 responses were excluded due to incorrect completion of the VAS. High degree of satisfaction was found in all domains with the lowest score in domain (3).

Conclusions
This study showed that a simple 4 item PROM using a VAS was well received by patients and could give valuable information on the patient satisfaction with the SGS. A high response was achieved despite a short time-frame for return of postal questionnaires. This can be adapted for other practices.

P-083

INCIDENCE OF GLAUCOMA FOLLOWING CATARACT SURGERY IN PEDIATRIC POPULATION A REFERENCE CENTER IN MEXICO

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Purpose

To collect data from clinical records of eyes with aphakia and pseudophakia in children; who later developed glaucoma as a complication of cataract surgery, and thus to determine its incidence, since there is no statistical information on this topic in the pediatric population in Mexico.

Methods

The medical records of patients diagnosed with Glaucoma associated with aphakia and pseudophakia were reviewed in children under 18 years of age, from January 2008 to June 2018, at the Institute of Ophthalmology "Fundación Conde de Valenciana". All eyes with this diagnosis were included, eyes without clinical evidence of glaucoma or suspected glaucoma prior to cataract surgery and eyes who underwent cataract surgery caused by different etiologies. Eyes diagnosed with congenital glaucoma, developmental glaucoma, glaucoma associated with anterior segment anomalies or other etiology prior to cataract surgery were excluded.

Results

2983 records were reviewed, 285 cataract operated eyes in total, 62 of these in aphakia and 223 in pseudophakia. 55 patients met the inclusion criteria, with a total of 71 eyes. An absolute incidence of 24.9% was obtained, 79% for glaucoma associated with aphakia and 9.8% in eyes with pseudophakia. The average age was 7 years 8 months, 49 eyes with aphakia presented glaucoma (69.01%) and 22 eyes with pseudophakia (30.9%). There is a relative risk of presenting glaucoma by aphakia of 4.94 compared to pseudophakia, which is statistically significant.

Conclusions

This study shows that aphakia has a higher risk for the development of glaucoma compared to pseudophakia, in the same way there is a higher risk and it is more severe in those children who develop it at a younger age. The Institute of Ophthalmology "Fundación Conde de Valenciana" is a national reference center which would explain the high incidence and not precisely due to the surgeries performed in our hospital but because most of the subjects found were referred from other hospitals.

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P-084

PRESERVED GLAUCOMA MEDICATIONS : IMPACT ON OCULAR SURFACE AND PATIENTS QUALITY OF LIFE

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Purpose

Chronic topical treatment of glaucoma can lead to ocular surface disease (OSD). The purpose of this study was to assess the prevalence of OSD in glaucoma patients undergoing preserved topical treatment by quantifying symptoms and objective ocular surface parameters and to evaluate its impact on the patient's quality of life using the OSD index.

Methods

A total of 240 eyes of 120 patients with open-angle glaucoma or ocular hypertension on preserved topical medication were recruited over 12 months. In each patient, we recorded, the duration of treatement, the intraocular pressure-lowering eyedrops used, the number of medications used, and daily and cumulative preservative concentrations (PC). Main outcome measures were fluorescein corneal staining score (Oxford scale), noninvasive tear film breakup time (NI-TBUT) ,shiermer testing, and OSD symptom questionnaire index (OSDI)

Results

Within our sample, 67.5% of the patients were over the age of 60. The average duration of glaucoma was 5 years (IQR= [3-9 years]). 36.5% of patients were on monotherapy compared to 63.5% on combined treatment. 83.3% of patients were on BAK (benzalkonium) compared to 10.8% on polyquaternum. Ocular surface evaluation showed the importance of tear film alterations with a pathological TBUT (less than 10 seconds) in 89.2% of cases (n=107) and conjunctival hyperemia in 74.2% of cases (n=89). The schirmer test was pathological (less than 10 mm) in 29.2% of cases (n=35). Corneal staining was observed (oxford score >=1) in 84% of the patients. it was statistically related to the number of instillations of preservative per day and to the cumulative dose of preservative. Similarly, the oxford score was significantly related to the OSDI score which was pathological (>13) in 87% of patients with corneal staining >=1

Conclusions

Topical antiglaucoma medications with their preservatives can induce severe changes to the ocular surface and periorbital area. This correlates significantly with the duration and number of perserved treatments. Early identification of the damage and removal of the offending agent can not only help reverse the changes but also improve the patients quality of life.

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P-085

PREVALENCE OF GLAUCOMA AND CHARACTERISTICS OF OCULAR MANIFESTATION OF PATIENTS WITH THE NEVUS OF OTA: A LASER FLARE-CELL PHOTOMETRIC EXAMINATION

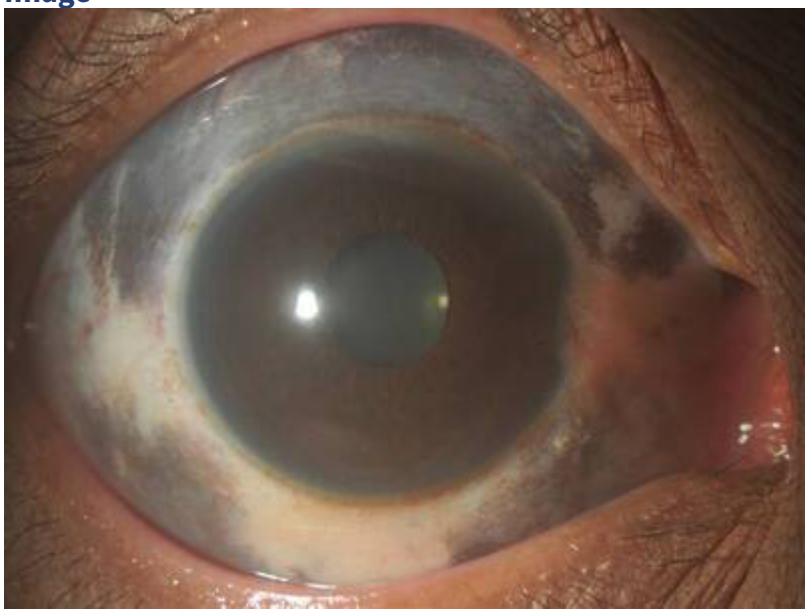
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Purpose
To study prevalence of glaucoma/ocular hypertension (OHT) and characteristics of ocular manifestation in Thai patients with Nevus of Ota.

Methods
This was a cross-sectional study of patients with Nevus of Ota presented at Faculty of Medicine, Siriraj Hospital, Bangkok, Thailand, from 2010 to 2022. The first part was a retrospective study to determine the prevalence of glaucoma/OHT by analyzing demographic data and ophthalmologic examination including gender, age at diagnosis of nevus of Ota, follow-up duration, characteristics of ocular involvement, gonioscopy, maximum intraocular pressure (IOP) in mmHg, cup-disc ratio, retinal nerve fiber layer analysis by optical coherence tomography and visual field testing.The second part was a prospective comparative study to evaluate the association between laser flare-cell photometer results and the risk of developing glaucoma/OHT in patients with Nevus of Ota. Anterior segment photography was also performed to determine the percentage of hyperpigmented sclera.

Results
There were 328 eyes of 164 patients with a mean age of 15.0(15.6) years at diagnosis of nevus of Ota (1 month - 68.5 years). One hundred (61%) were under 18 years of age. One hundred and twenty-one (73.8%) were female and 43 (26.2%) were male. The mean follow-up time was 2.6(4.2) years (0 - 20.3 years). Oculodermal melanosis was observed in 102 eyes (31.1%). We found 2 eyes (0.6%) with glaucoma and 7 eyes (2.1%) with OHT. There was a significant difference between the mean value of maximum IOP in eyes with oculodermal melanosis (16.9(4.6) mmHg, N=98) compared to normal eyes (15.2(3.5) mmHg, N=208) (p = 0.01). The mean of cells in the anterior chamber after pharmacologic mydriasis was significantly higher in glaucoma/OHT group (7.1(9.2) cells/0.5mm^3, N=3) than in the control group with Nevus of Ota alone (0.6(0.9) cells/0.5mm^3, N=47) (p=0.01). There was no significant difference between the mean of cells before mydriasis, and the mean of flare in anterior chamber before and after mydriasis (p=0.19, 0.43, 0.34 respectively). A positive correlation was observed between the percentage of hyperpigmented sclera and maximum IOP (correlation coefficient=0.22, N=10).

Image



Conclusions

The prevalence of glaucoma and OHT in patients with Nevus of Ota in this study was 0.6% and 2.1%, respectively. The mean of cells in the anterior chamber after pharmacologic mydriasis and the area of hyperpigmented sclera can be one of the predictors of glaucoma/OHT in patients with Nevus of Ota.

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P-086
GLAUCOMA AND ASSOCIATED SYSTEMIC DISEASES

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Purpose
To evaluate the associated systemic diseases in Primary glaucoma patients and use of systemic drugs interacting with ocular hypotensive drugs in these patients.

Methods
This cross-sectional observational study included 155 cases of glaucoma- 80 (51%) had Primary Open Angle Glaucoma (POAG) and 75 (49%) had Primary Angle Closure Glaucoma (PACG).Secondary causes were excluded.Age,sex, diagnosis and antiglaucoma medications used were recorded. All subjects underwent a comprehensive ophthalmic examination including visual acuity, IOP and stereoscopic evaluation of the optic disc with 90 D lens.Their systemic condition and medications being used were noted.

Results
The study included 84 males(54.2%) and 71 females(45.8%).Mean age of POAG and PACG subjects was 51±10.49 years and 56.74±12.17 years respectively. Among all glaucoma patients,41 (26.5%) had Diabetes Mellitus(DM),40 (25.8%) had hypertension and 20 (12.9%) had both. Among POAG patients,26 (32.5%) had hypertension and 27 (33.8 %) had DM. Among PACG patients,14 (18.6%) had hypertension and 14 (18.6%) had DM. Among all glaucoma patients with hypertension,25 (62.5%) used topical beta blockers,18 (45%) used topical alpha agonists and 8 (20%) used concomitant topical beta blockers and alpha agonist therapy.

Among PACG patients,6 (9.2%) were on drugs that can precipitate angle closure which included- Tiotropium, Thiazide, Amitriptyline, Salbutamol and Pregabalin. Among PACG patients with hypertension,5(41.6%) were on Amlodipine while 6(50%) were on Telmisartan. Mean IOP was 1.5 mm Hg less in the group using ACE Inhibitor as compared to group using Calcium Channel Blocker (CCB). Among PACG patients with DM,83.33% were on Metformin. Among POAG patients with hypertension,13 (50%) were on ACE Inhibitor,while 5 (19.2%) were on CCB, and 6 (23.1%) were on combination of both.3 (11.5%) patients of POAG were on systemic beta blockers and 2 were on both systemic and topical beta blocker.19 (70.3%) of POAG patients with DM were on Metformin. Over half of the hypertensive glaucoma patients had increased BP (> 140/90) on examination, indicating poor control.

Conclusions
There was significant prevalence of systemic diseases like Diabetes and hypertension in patients of primary Glaucoma.Over 50 % of glaucoma patients with hypertension did not have adequate BP control.Drugs for hypertension had interactions with glaucoma drugs and could impact IOP. Management of Glaucoma patients requires a holistic approach with focus on associated systemic disease.

P-087
ASSESSMENT OF QUALITY OF LIFE IN GLAUCOMA WITH RESPECT TO SEVERITY OF DISEASE

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Purpose
To assess quality of life in relation with severity of glaucoma conducted in a tertiary care center in North Kerala.

Methods
A prospective cross- sectional study was conducted in the age group 40-80 years. Subjects with normal visual acuity and without comorbidity were selected as the comparison group. A validated Glaucoma quality of life questionnaire (GQOL) and a general questionnaire that collected information on the activities of daily living was administered to patients with diagnosis of primary open angle and angle closure glaucoma whose BCVA > 6/60 in the affected eye and to the controls of the group. The responses were evaluated using appropriate statistical tests.

Results
A cross-sectional study which included a sample size of 148 cases and 150 controls of which 66 subjects were PACG, 82 subjects were POAG. The mean age group of the normal subjects (57± 10.15) was lower than subjects with glaucoma (62.47 ± 9.29). The GQOL scores in normal was 18.86 ± 4.46 in normal and 27.5 ± 12.82 in glaucoma patients. There was significant rise in GQOL scores of mild (22.86), moderate (25.65), severe glaucoma (31.45) (ANOVA- 0.00427). The domains that were more affected was the peripheral vision (10.64) and dark adaptation and glare (11.68) when compared to controls. It was not associated with severity of visual field loss in the better eye (one- way ANOVA, p=0.11). Taking glaucoma into consideration, the GQOL did not differ significantly in PACG (28.17± 13.88) and POAG (26.962 ± 11.95).

Conclusions
Glaucoma significantly reduces QoL in patients and every effort should be made to preserve visual function as it could impact the daily living and cause higher prevalence of depression and anxiety among glaucoma patients.

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P-088

DIETARY NITRATE AND IRON INTAKE IN A HIGH-RISK PRIMARY OPEN ANGLE GLAUCOMA POPULATION

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Purpose

Africa has the highest rate of primary open angle glaucoma (POAG) in the world, often resulting in blindness. Dietary nitrate and iron intake have been associated with POAG risk in previous studies, which were all performed in European or American populations. We investigated these relationships in a high-risk population in Ghana, the country with the highest POAG prevalence in Africa, to explore if similar associations exist.

Methods

Consecutive patients visiting the eye clinic of the Komfo Anokye Teaching Hospital (KATH) were included in this study. POAG was classified according to the ISGEO criteria. Participants without POAG had to be at least 45 years of age, have an IOP < 21 mmHg, a vertical cup disc ratio (VCDR) < 0.5 and no family history of glaucoma. Dietary intake was determined using a semi-quantitative food frequency questionnaire (SFFQ), which was adapted to the Ghanaian diet. Food items high in nitrate were ranked based on their median nitrate content from literature. Dietary iron intake was calculated using the West African Food Composite Table by the Food and Agriculture Organization of the United Nations. Analyses were performed using multivariable logistic and linear regression while correcting for age, sex, educational level and total energy intake.

Results

We included 198 POAG cases and 281 unaffected controls in this study. Compared with the lowest quartile, the odds ratio (OR) for the highest quartile of nitrate consumption was 0.88 (95% CI, 0.51-1.52; P = 0.88). For iron consumption, the OR for the highest quartile compared to the lowest was 0.57 (95% CI, 0.22-1.42; P = 0.23). We did not find any associations with IOP.

Conclusions

Although a trend was visible, dietary nitrate and iron intake were not significantly associated with POAG or IOP. Aside from the relatively small sample size, a possible explanation may be that people of African descent have such a high a-priori risk for glaucoma that a relatively small effect of diet on glaucoma risk could not easily be detected.

P-089

PRIMARY CONGENITAL GLAUCOMA: AN EXPERIENCE AT BIRATNAGAR EYE HOSPITAL

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Purpose

This study was undertaken to study the demographic and clinical characteristics and risk factors of the children (≤ 3 years of age) with primary congenital glaucoma presenting to Biratnagar Eye Hospital.

Methods

Retrospective review of records of all the children (≤ 3 years) with primary congenital glaucoma who presented to the Glaucoma clinic between 2018 and 2022 was done. Diagnosis of congenital glaucoma was made only after examination under anaesthesia (EUA). Children with IOP > 21 mm Hg associated with enlarged corneal diameter (>11mm in newborn; >12mm in a child < 1year or >13 in a child of any age), corneal haze, Haab striae, buphthalmos and increased axial length were defined to have congenital glaucoma. All diagnosed children underwent combined trabeculotomy with trabeculectomy of one eye in the same sitting and the second eye in bilateral cases after 4 – 6 weeks.

Results

48 children (80 eyes) were diagnosed with primary congenital glaucoma in this period; 32 (66.7%) had bilateral involvement. There were 33 (67%) boys and 15 (33%) girls. Mean age of initial presentation was 11.7 ± 8.9 months. Mean horizontal corneal diameter, IOP and the axial length were 12.4±1mm, 42 ± 8.72mm Hg (range, 18-55) and 23.98 ± 1.7mm respectively. Consanguinity was observed in13 (27%) children. All of the eyes underwent trabeculotomy with trabeculectomy under general anesthesia.

Image



Conclusions

This study provided baseline data on the present scenario of primary congenital glaucoma in the region with consanguinity being identified as an important risk factor.

P-090
DEMOGRAPHIC AND CLINICAL PROFILE OF JUVENILE OPEN ANGLE GLAUCOMA (JOAG) IN SAUDI ARABIA: A TERTIARY HOSPITAL STUDY

A Almulhim

Purpose
To report the demographic, clinical manifestations, and medical/ surgical outcomes of Juvenile Open Angle Glaucoma (JOAG) in Saudi Arabia.

Methods
We reviewed the medical records of patients who were diagnosed with JOAG at King Abdul Aziz University Hospital, Riyadh, Saudi Arabia between 2015-2022 with a minimum follow up of 6 months. The institutional review board approval was taken and conformed to the tenets of the Declaration of Helsinki.

The clinical data includes any systemic disease, refractive error, best corrected visual acuity (initial and final), IOP (initial, final), the cup disc ratio, visual field (mean deviation), number of antiglaucoma medications, surgical interventions, further antiglaucoma if needed post-operatively and post-operative complications. The minimum period of follow-up was 6 months.

Results
Eighty-three eyes of 44 patients with JOAG, of which there were 22 (50.0%) males and 22 (50.0%) females. The mean age at diagnosis was 26.9±9.3years (range:6.0 to 38.0 years). The mean follow-up time was 43.1±22.4months (range:6.0 to 84.0 months). Twenty-three (52.3%) patients were with a family history of glaucoma.

Thirty-nine (88.6%) patients were diagnosed with bilateral JOAG and 5(11.4%) patients were diagnosed with unilateral JOAG.

For the whole study sample, the mean visual acuity was 0.50±1.02 logMAR (Snellen:20/63) at the initial and 0.53±1.14logMAR (Snellen:20/68) at the final visit. The mean IOP was 32.0±6.7mmHg (range:23.0 to 54.0mmHg) at initial and 14.3±7.1mmHg (range:4.0 to 52.0mmHg) at finial visit.

Conclusions
This study describes the demographic, clinical manifestations and management outcomes of JOAG population in Saudi Arabia.

Myopia and positive family history of glaucoma in our study are almost double what has been reported in similar reports.

For better care, in the presence of FHx of glaucoma, we recommend starting yearly ophthalmic screening as early as possible, since this can lead to early diagnosis and better management outcomes.

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P-091

STEROID INDUCED GLAUCOMA – A STUDY OF PREVALENCE AND RISK FACTORS AS NOTED IN WESTERN MAHARASHTRA, INDIA

K VKS, K Malasane, A Veer, V Chelerkar, R Deshpande

Purpose

Glaucoma is a progressive optic neuropathy, with characteristic optic nerve damage, corresponding visual field defects, with or without elevated intra ocular pressure.

Steroids are one of the most commonly prescribed ocular drugs. Despite its many uses, unmonitored use of steroids leads to serious diseases such as - glaucoma and cataract.

The aim of our study was to assess the prevalence and risk factors for steroid response leading to steroid induced Glaucoma.

Methods

Patients above 10 years of age, referred to Glaucoma OPD with raised IOP (>/= 22 mmHg) and a history of topical steroid usage were screened for the study. Visual acuity, Goldman applanation tonometry, gonioscopy, optic disc evaluation with 90D lens, and Perimetry were done at 1, 3 and 6 month visits. Data entry was done on Microsoft Excel 2013. Analysis was done by descriptive statistics. Comparison was done by Chi square test and Fishers exact test. A statistical package SPSS version 23.0 was used to do the analysis. $p<0.05$ considered as significant.

Results

Of 4609 cases of glaucoma presenting at the Hospital over 12 months, 380 eyes of 190 patients i.e (4.1%) were diagnosed with steroid induced glaucoma. In about 93.6% cases (318 eyes) anti glaucoma medications were started. 22 eyes required filtration surgery. Mean IOP at first visit was 26.83mmHg. It fell to 16.28mmHg and 14.07mmHg. At 1 and 6 months respectively.

By using post hoc test Bon Feronni t test for repeated measures, it was found that the difference at each interval was statistically significant. ($P<0.001$). Mean CDR was estimated at different time intervals. On first visit the mean CDR was 0.45. At 3 and 6 months it was- 0.45 and 0.66. But this increase was not found to be significant.($p=0.813$).

Risk factors noted were diabetes mellitus (13%) young patients with allergic conjunctivitis (12.1%), autoimmune diseases (5.2%), family history of glaucoma (4.8%). High myopia (4.2%). Common indication for steroid use were - over the counter use for redness (20%), vernal keratoconjunctivitis (19.0%), post cataract surgery (12.4%), allergic conjunctivitis (12.5%), cystoid macular oedema (4.5%) post refractive surgery (4.2%) post optical PK (1.9%).

Conclusions

Steroid response is reversible if offending drugs withdrawn early. Timely management can reduce IOP and prevent disease progression. Where ever possible steroids sparing antiallergics should be used. Over the counter sale of steroids should be restricted and patient awareness should be created.

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P-092

THE CLINICAL FEATURES IN PATIENTS WITH NEWLY DIAGNOSED PSEUDOEXFOLIATIVE GLAUCOMA IN SERBIA

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Purpose
To evaluate the clinical characteristics of newly diagnosed pseudoexfoliative glaucoma (XFG) and compare them with those pertaining to newly diagnosed primary open-angle glaucoma (POAG) as well as pseudoexfoliation syndrome (XFS).

Methods
This case control study involved 306 participants, including patients with newly diagnosed XFG, age- and sex-matched normal controls (NC), patients with newly diagnosed POAG, and subjects with XFS. The study was conducted at the Glaucoma Department of Clinic for Eye Diseases, Clinical Centre of Serbia, Belgrade.

Results
The mean age in the XFG, POAG, XFS and NC groups was 73.61±8.46, 65.50±8.97, 74.81±6.80 and 73.58±9.34 years, respectively (XFG vs. POAG, p<0.001). Unilateral XFG was diagnosed in 35 patients (42.2%) and analyses of the demographic characteristics revealed that patients with unilateral XFG were younger than bilaterally affected patients (70.8 ± 8.2, vs. 75.6 ± 8.1; p=0.040). They were predominantly male (57.1%) and were more likely to report family history of glaucoma, at 8 (22.9%) vs. 3 (6.25%), p=0.028. The intraocular pressure (IOP) was higher in the eyes affected by XFG (32.0±9.5 mmHg) than in the POAG eyes (28.8±5.9 mm Hg), p<0.001. In XFG and POAG eyes, glaucoma severity was determined via vertical cup to disc ratio (C/D) 0.65 (0.45 – 1.0) vs. 0.60 (0.45 – 1.0), p=0.048 and visual field mean deviation (MD) -5.68 (-1.58 to -30.9) vs. -4.70 (-1.39 to -31.0), p=0.045. A greater visual field loss was noted in eyes affected by pseudoexfoliative glaucoma relative to the POAG eyes, p<0.001. In the XFG group, MD was greater in males compared females,-5.93(-1.60 to -30.9) vs. -4.79(-1.58 to -30.24). A statistically significantly smaller vC/D and mC/D was recorded in the POAG group.

Cataract was more frequent in the eyes affected by XFG relative to the POAG eyes (79.4% vs. 27.5%, p<0.001) and NC (64.4%, p=0.008). On the other hand, the difference between XFG and XFS eyes was not statistically significant (81.0%, p=0.350). Moreover, phacodonesis was more common in the XFG than in the other three groups (p<0.001). Alzheimer's was the only systemic disease associated with XFG in the study sample, with an OR of 0.021 (95% CI = 0.00−21.52, p=0.022).

Conclusions
At the time of diagnosis, XFG exhibits different clinical features compare with POAG. Higher IOP, narrow or occludable angle, increased trabecular pigmentation, phacodonesis and poorer pupillary dilatation emerged as the factors associated with XFG.

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P-093

PREVALENCE OF HIGH-RISK FEATURES IN UNITED KINGDOM COMMUNITY OPTOMETRY GLAUCOMA ELECTRONIC REFERRALS TO HOSPITAL EYE SERVICE

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Purpose

We aimed to examine the prevalence of high-risk features in community optometry glaucoma electronic referrals to a tertiary hospital eye service. With an ageing population, better life expectancy and backlogs due to the Covid-19 pandemic there is an increasing demand on hospital eye care[1] with prolonged waiting times leading to irreversible visual loss in some patients[2]. Risk stratification is therefore essential to identify patients at highest risk of visual loss/morbidity to enable prioritisation of clinical services.

Methods

A retrospective cohort study of 97 consecutive electronic glaucoma referrals from community optometry to a tertiary referral NHS eye centre was performed. High risk features adapted from the GLAU-STRAT-FAST tool[3] were applied to electronic referrals from community practitioners to identify the prevalence of 'red flag' or high-risk features as follows: Only/ better eye status, Severe glaucoma (MD worse than 20dB at initial VF), Severe unexplained visual loss, IOP over 40mmHg or suspected tumour.

Results

Electronic referral records for 97 consecutive patients (41 men, 56 women) between July and November 2021 were analysed. The average age of referred patients was 67.1 (±14.6 years). Median highest IOP was 18mmHg (IQR 15-22.5mmHg). Positive family history of glaucoma was present in 21 referrals (21.6%). Examining high risk factors, 5 referrals affected the only or better eye (5.1%), severe unexplained visual loss in 2 eyes (2.0%) and vulnerable patient status in 4 referrals (4.1%). None of the referrals contained severe glaucoma, IOP over 40mmHg or suspect tumour.

Conclusions

Our study is the first to examine the prevalence of high-risk factors in community optometry glaucoma electronic referrals to tertiary care in Scotland. Reassuringly there is a low prevalence of high-risk factors in community optometry electronic referrals to the hospital eye service. This may be due to good awareness of red flag features amongst community optometrists, where referrals with red flag features are sent directly to emergency services bypassing electronic referral. Further research should examine risk stratification in refinement of referrals.

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P-094

EVALUATION OF ADHERENCE TO GLAUCOMA TREATMENT AT A SOUTHERN BRAZILIAN HOSPITAL

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Purpose

To understand the profile of patients and the main risk factors for non-adherence to drug therapy.

Methods

Observational, analytical, cross-sectional study through interviews with a population of the glaucoma ambulatory of the Regional Hospital of São José - Homero de Miranda Gomes, between February and August of 2020.

In this study were included patients aged ≥18 years with glaucoma, who were regularly monitored at the glaucoma clinic and who had used at least one antihypertensive eye drop for at least 6 months.

The questionnaire approached demographic factors, disease data, adherence and knowledge about glaucoma.

The adherence rate was defined in relation to the 7 days preceding the appointment. Poor adherence was defined when patient did not use the medication at least 01 day a week or dripped the eye drops at the wrong time 03 or more times.

Results

A total of 211 patients with a mean age of 59.66 years (±13.8) were interviewed, of which 53.08% (n=112) were female. Regarding the education level, the average time of schooling of the patients in the sample was 6.4 years (±3.4 years) and the average family income per person was U$304.00 (± U$ 192.00).

Participants had been diagnosed with glaucoma approximately 7.3 years ago, with 56.87% (n=120) having visual acuity less than 20/400 or visual field less than 10o in at least one eye and 59.72% (n=126) had already undergone at least one anti-glaucoma surgery.

They used an average of 2.58 (+-1,017) classes of antiglaucoma eye drops, in 4.09 drops instilled per day. The main eye drops used were: Timolol (87.2%), Brimonidine (64.45%), Dorzolamide (53.08%) and Bimatoprost (23.22).

Limitations for the regular use of medications were mentioned by 71.09% of respondents, with eye drops cost being the main reason mentioned (45.33%), followed by side effects (23.33%) and lack of discipline (21.33%).

The eye drops cost (for Timolol, Brimonidine and Dorzolamide) represented 7.03% of the family income and when Bimatoprost was added, this value changed to 11.4% of the average family income. Individuals who reported use limitations are strongly associated with poor adherence.

Conclusions

The medications cost was the main difficulty reported for maintaining their regular use. Understanding the patients' profile with higher risk of non-adherence helps to improve the therapeutic approach, preventing non-adherence factors.

P-095
EVALUATION OF ADHERENCE TO GLAUCOMA TREATMENT AT A SOUTHERN BRAZILIAN HOSPITAL

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Purpose
To identify the profile of patients at greater risk of non-adherence and explore individual barriers to the correct use of medications.

Methods
Observational, analytical, cross-sectional study through interviews with a population of the glaucoma ambulatory of the Regional Hospital of São José - Homero de Miranda Gomes, between February and August of 2020.

In this study were included patients aged ≥18 years with glaucoma, who were regularly monitored at the glaucoma clinic and who had used at least one antihypertensive eye drop for at least 6 months.

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Limitations for the regular use of medications were mentioned by 71.09% of respondents, with eye drops cost being the main reason mentioned (45.33%), followed by side effects (23.33%) and lack of discipline (21.33%).

The eye drops cost (for Timolol, Brimonidine and Dorzolamide) represented 7.03% of the family income and when Bimatoprost was added, this value changed to 11.4% of the average family income. Individuals who reported use limitations are strongly associated with poor adherence.

Conclusions

The medications cost was the main difficulty reported for maintaining their regular use. Understanding the patients' profile with higher risk of non-adherence helps to improve the therapeutic approach, preventing non-adherence factors.

P-096

PREVALENCE OF ANXIETY AND DEPRESSION AND THEIR IMPACT ON QUALITY OF LIFE OF PATIENTS WITH GLAUCOMA IN A REFERRAL HOSPITAL IN MEXICO

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Purpose

Find the prevalence of depression and anxiety in patients diagnosed with primary open-angle glaucoma, primary angle-closure glaucoma and glaucoma suspect. Compare which psychiatric disease has the highest prevalence in glaucoma patients. Assess quality of life of patients with glaucoma and depression or anxiety.

Methods

The study included patients with a confirmed diagnosis of primary open-angle glaucoma or primary angle-closure glaucoma in the age group of 40-80 years old, with regular follow-up and good adherence to treatment.

Each subject will receive a complete ophthalmological examination. Two surveys will be used, the Glaucoma Quality of Life (GQOL-15) and the Hospital Anxiety and Depression Scale (HADS), these surveys will be translated into Spanish and validated for use in this population.

Results

A total of 204 patients were included, most patients were men (62.3%), with a median age of 68 years. Among the diagnoses, POAG was the most frequent (50%) followed by NVG (25%). The median drug use was 2 drugs. Regarding the severity of glaucoma, the highest proportion of patients were classified as severe (46.1%) and only 2 patients received visual rehabilitation (1%). In the HADS-Anxiety test, the diagnosis was made in 23.5% of the patients. Regarding the HADS-Depression test the diagnosis was made in 31.9% of the patients. The presence of both conditions (anxiety and depression) occurred in 21.5% of the patients. Finally, the comparison of the score obtained in the GQOL-15 questionnaire was made depending on the presence depression or anxiety. The presence of anxiety and depression was shown to present significantly higher scores GQOL-15 compared to people who did not have these comorbidities ($p<0.001$). Since all variables were statistically relevant, the Z score was obtained, depression was more significantly related to the increase in the score obtained compared to anxiety (Z score anxiety -4.75 vs Z score depression - 5.51) and the presence of both conditions generated a slight additional increase in the score (Z score depression+anxiety -5.53).

Conclusions

The presence of anxiety and depression is associated with a worse quality of life evaluated by the GQOL-15 questionnaire, we recommend a psychological health approach to glaucoma care due to its impact on quality of life, further studies are required to identify whether it contributes to other aspects such as poor pharmacological adherence or worse clinical outcomes.

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P-097
GLAUCOMA PATIENT PRIORITISATION AUDIT

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Purpose
The SARS-CoV-2 pandemic has lead to significant pressure on already stretched glaucoma services across the UK with greater need to identify high-risk patients to prevent avoidable blindness from delays in treatment. A risk stratification tool was developed in collaboration with RCOphth and UKEGS. We describe the results of our audit applying this tool to our cohort of patients in order to stratify the risk of progressive loss of vision and level of resource needed.

Methods
All patients attending glaucoma clinic at Western Eye Hospital from January 2019 to December 2020 were included. Medisoft was approached by senior author in order to create an appropriate database to identify these patients and categorise as per the audit tool. Patients were categorised into high-risk (Red), moderate(Amber) and low(Green) groups based on their diagnosis, intraocular pressure change and progression on visual field using the patient's worse eye.

Results
6451 patients were included. Patients in the highest-risk category included those with high IOP>40(n=41,0.6%), patients on acetazolamide(n=57,0.9%), patients showing visual field progression of <-2db/year(n=27,0.4%), 1.5-2 db/year(n=19,0.3%) and 1-1.5 db/year(n=167,2.6%). In the amber category, patients were controlled on less than 3 glaucoma drops with 1136 controlled on 2 drops(18%) and 998 patients on one drop only(15%). 1096 patients(17%) had loss of two lines or more if vision in either eye at most recent follow up and 909 patients underwent glaucoma surgery(14%). The green category was the largest category with 3747 patients on no drops(58%). Of these, 1670 patients had ocular hypertension(26%) and 2129 glaucoma suspects(33%).

Conclusions
We have successfully applied the risk stratification tool to our cohort and identified high-risk patients to better manage our resources.

P-099

IMPACT OF THE COVID-19 PANDEMIC ON THE CHARACTERISTICS OF PATIENTS NEWLY ADMITTED TO THE GLAUCOMA DEPARTMENT

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Purpose

To evaluate the impact on the characteristics of new patients admitted to the glaucoma department on a third level ophthalmological referral center in Mexico City during the COVID-19 pandemic.

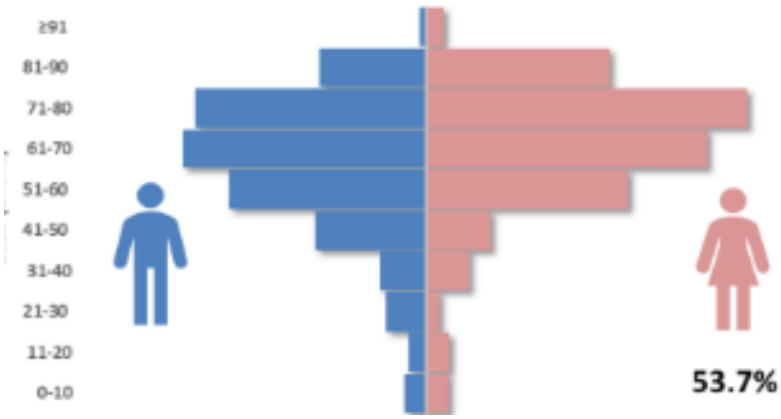
Methods

Retrospective, descriptive, cross-sectional study. The records of newly admitted patients from March 2020 to February 2021 were reviewed. Baseline data about date, sex, age, place of residence; family, past medical and ophthalmological history; type of glaucoma, intraocular pressure (IOP), laterality; glaucoma diagnosis, damage, and medication, were recorded at admission. Data about proposed surgical treatment, type of surgery and and in whom the surgery was performed was also included. In all of the admissions the date and COVID status in form of "traffic-light" monitoring system, adopted by the goverment, was gathered and compared. The country was divided into regions for the analysis of place of origin. The statistical package Stata version 15.1 was used in the analysis.

Results

We included 2687 eyes of 1549 patients, divided into groups according the "traffic-light" monitoring system. 53.7% were female, with a mean age of 62.3 ± 18 years. Most of the patients were from the South Central region of the country (74.2%) and presented bilateral involvement (73%). The most frequent diagnosis was primary open angle glaucoma. The median IOP at admission was similar in all groups. Among patients admitted in orange and red traffic-light, more than 40% presented severe damage; those admitted in yellow traffic-light presented mild to moderate damage. Surgical treatment was indicated in 26.8% and 20.7% of the orange and red traffic light cases, respectively. The percentage of emergency admissions was similar during the orange and red traffic lights (21.7% and 20.5%, respectively); no cases were admitted for emergency during the yellow traffic light.

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Conclusions

A reduction in the admissions and surgical procedures was observed during the first year of the COVID-19 pandemic. The most frequent glaucoma diagnosis and the mean age at admission was similar to previous epidemiological studies in Mexico. One of the reasons that could partly explain this findings is that Mexico implemented a partial confinement policy in which activities were maintained as much as possible; and, public assistance hospitals prioritized the care of COVID-19 patients, so our hospital was one of the few providing ophthalmological care.

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P-100
PIGGYBACKING GLAUCOMA SCREENING AND MANAGEMENT IN RURAL NORTHEAST NIGERIA

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Purpose
The prevalence of glaucoma is much higher in SSA; about 50% of glaucoma patients are blind in at least one eye at presentation in clinics (without outreach screening).[2.3.4] There is a paucity of data from Yobe state in north-eastern Nigeria. The state has a population of over 4 million, one resident ophthalmologist with 9 eye clinics at primary, secondary and tertiary levelled centres.[5] The study aims to assess the feasibility and outcome of piggy-backing glaucoma screening to existing cataract surgical programs and the management of detected cases in a rural north-eastern Nigerian population

Methods
This was a cross-sectional study carried out at a cataract outreach programme. Data was collected using structured 2-part questionnaires from consenting participants, the first part collected data on the demographics of the participants while the second part comprised ophthalmological examination findings carried out by the ophthalmologists. The data was analysed using IBM SPSS STATISTICS software version 21, and p-values of <0.05 were considered statistically significant.

Results
Three hundred and sixty-four individuals consented to the study, and 278 consented to be screened for glaucoma, giving a positive response rate of 76.4%. The respondents ranged from age 18-90 years with a mean age of 55 (± 15.9 SD). The occupation of participants, their educational qualification and their awareness of glaucoma were all directly related to their history of ocular examination and this was statistically significant with p-values of 0.04, 0.006 and 0.000 respectively, all < 0.05. The combined prevalence of glaucoma and suspected glaucoma were very high at 50 % of the study population.

Conclusions
Glaucoma screening to the best of our knowledge has never been conducted in this study population, thus, the public's acceptance of screening was very encouraging. Piggybacking on existing eye care programmes for to cataract screening and surgical camps may create a good framework to build up glaucoma blindness prevention programmes. There is a potential in the long-term for the successful prevention of blindness from glaucoma.

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P-101

THE IMPACT OF THE FINANCIAL BURDEN OF HEALTHCARE AND INSURANCES ON ACCESS TO GLAUCOMA CARE IN SWITZERLAND

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Purpose

In order to fulfil the principles of universality and equality, Switzerland has made it compulsory for all its residents to take out private health insurance. Yet, Switzerland has the second highest health expenditure per capita in the world, and inequality in access to healthcare are frequently reported. The aim of the present study was to explore the financial burden of healthcare on glaucoma patients in Switzerland.

Methods

In this prospective study, primary data were collected from 12 private ophthalmology clinics in Switzerland. A web-based questionnaire was used to assess the impact of the cost of health insurances and medical consultations on patients' ophthalmic health and psychological wellbeing. Measures were made on modified 10-point Likert scales. Every patient who attended an appointment at one of the participating clinics on randomly selected dates in October 2020 was offered voluntary enrolment.

Results

In all, the surveys from 54 glaucoma patients were analysed. Their mean age was 67.0 ± 9.4 years, 51.9% were female and 81.5% were Swiss nationals. Overall, 40.7% of respondents only had a basic insurance, 55.6% had a private insurance, and the remaining 3.7% had no Swiss insurance. At the time of the survey, 85.2% of responders had reached their annual deductible amount, and 7.4% did not know. Of all responders, 55.5% considered their insurance plan too expensive, while 25.9% considered its price was fair, and 18.5% were unsure. Similarly, 25.9% considered ophthalmology consultations too expensive, while 33.3% considered their prices were fair, and 44.7% were unsure. Of all surveyed patients, 14.8% had previously postponed or cancelled a medical appointment because of financial hardships, and 29.6% frequently felt stressed because of medical or insurance bills. Basic health insurances and high annual deductible amounts moderately correlated with the likelihood of cancelling medical appointments due to financial difficulties ($r = 0.52$ and $r = 0.46$, respectively). The latter was also associated with a higher self-reported glaucoma severity ($r = 0.41$) and a higher likelihood of missing subsequent appointments ($r = 0.46$).

Conclusions

The present research highlights the impact of the financial burden of healthcare and health insurances on glaucoma patients' follow-up and psychological wellbeing in Switzerland. This suggests that lower deductibles may contribute to reducing health inequalities and improving glaucoma monitoring.

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P-102

LEVEL OF AWARENESS AND KNOWLEDGE ABOUT GLAUCOMA DISEASE IN GLAUCOMA PATIENTS AND THEIR FAMILIES BALI INDONESIA

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Purpose
This study aimed to determine the knowledge about glaucoma in glaucoma patients and their families in Bali Mandara Eye Hospital. This was a descriptive survey study using a questionnaire.

Methods
A hospital-based cross-sectional study includes the people age range of 18 to 80 years; was conducted at Bali Mandara Eye Hospital in September 2019 among patients whose diagnosed with glaucoma and also their families. Respondents were obtained with simple random sampling. Data were collected through face-to-face interviews using a pretested structured questionnaire. The participants were asked about their level of awareness and resources of information about glaucoma using Glaucoma Knowledge Level Questionnaire (GKLQ) developed by National Eye Health Education Program (NEHEP). Knowledge was further classified as good, fair, and poor.

Results
In this study there were 280 respondents, males, and females 51.8% and 48.2%. The majority age group of respondents was between 41-50 years old (25.7%), with education level was senior high school 35.2%, followed by junior high school and below 33.6%, under and post graduated 31.1%. The patient and their family's main sources of glaucoma information were from health professionals 63.2%. A higher number 87.9% of the respondents have treatment using government insurance. Of 137 respondents 48.9% have good awareness and knowledge about glaucoma, the other 88 respondents have a moderate category, and 55 respondents poor category.

Conclusions
Glaucoma awareness and knowledge are very important in terms of disease prevention. Lack of education is the major risk factor for the late presentation of glaucoma. There should be a strategy, especially giving people information about glaucoma based on their level of education.

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P-103

RISK FACTORS FOR NON-COMPLIANCE OF PATIENTS WITH OPEN-ANGLE GLAUCOMA IN THE CENTRAL PART OF SERBIA

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Purpose
The aim of this study was to determine the existence of factors for the non-compliance of glaucoma patients in the central part of Sumadia

Methods
The study included 256 patients diagnosed with primary open-angle glaucoma, in the period from January 2022 to September 2022. The study was conducted at the Clinic for Ophthalmology, UCC Kragujevac, Serbia. The influence of the level of education, the number of prescribed drugs, associated diseases, side effects and the price of drugs on the compliance of patients with POAG was examined.

Results
Patients with a low level of education, as well as those who use more drugs, had a low level of compliance. Patients with malignancy also had a lower degree of compliance compared to patients with other comorbidities (HTA, DM, asthma, thyroid dysfunction). The presence of side effects of drugs, as well as participation in participation when taking drugs were associated with statistical significance in the respondents, $p<0.05$.

Conclusions
The compliance of glaucoma patients depends on a large number of factors. The compliance of glaucoma patients could be improved by a detailed discussion between the ophthalmologist and the patient, better quality of follow-up planning, by lowering the prices of prescribed medicines, well-organized social support for glaucoma patients. It implies the support of ophthalmologists, but also of the society at all.

P-105
OCULAR PARAMETERS ALTERATIONS AFTER HEMODIALYSIS IN PATIENTS WITH CHRONIC KIDNEY DISEASES UNDERGOING HEMODYALISIS

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Purpose
To explore ocular changes during hemodialysis (HD) in chronic renal failure patients and to evaluated the quality of life in CKD patients with ocular involvmnets

Methods
600 eyes of 300 patients with chronic renal failure (CRF) undergoing HD were analyzed. The subjects were categorized into three groups according to the duration of HD. Detailed ophthalmologic examinations were performed before patients were involved in the study. The relationships between the systemic hemodynamic changes and the ophthalmologic changes during HD sessions were evaluated at High Technology Medical Center between October 2018 to October 2021. HD was performed 3 times a week and the duration of the procedure was 3-5 hours.

Results
The changes in the ophthalmologic findings after HD were consistent and significant in all CRF subjects. These changes correlated with the increase in plasma colloid osmotic pressure. HD can correct the volume and composition of ocular fluid. Therefore, it can affect the ophthalmologic findings in a short period of time

Conclusions
In conclusion, renal failure patients undergoing HD may be at increased risk of developing vision-threatening complications, and both physicians of the hemodialysis unit and ophthalmologists should be made aware of this risk.

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P-106

PREVALENCE AND RISK FACTORS FOR GLAUCOMA IN CHINESE AMERICANS: THE CHINESE AMERICAN EYE STUDY

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Purpose
To estimate the prevalence of and identify independent risk factors associated with glaucoma among Chinese American adults.

Methods
A population-based, cross-sectional study of Chinese Americans aged 50 years and older (n=4582) living in Monterey Park, CA, underwent a comprehensive ophthalmologic examination and in-home-administered questionnaire to assess socio-demographic, lifestyle, clinical and ocular characteristics, including measurement of intraocular pressure (IOP), visual field testing and simultaneous stereoscopic fundus photography of the optic disc. Evidence of glaucomatous optic neuropathy on visual fields and/or optic nerve assessment was used to determine the presence of glaucoma by an independent panel of glaucoma specialists. Multivariable logistic regression analysis was used to identify independent factors associated with glaucoma.

Results
The prevalence of glaucoma was 5.8% (95% Confidence Interval [CI], 5.2%-6.6%) (n=253), 4.8% (n=207) had open-angle glaucoma and 1.1% (n=46) had angle-closure glaucoma. Age-specific prevalence of glaucoma ranged from 3.1% (95% CI, 2.4%-3.8%) in those 50-59 years to 16.1% (95% CI, 11.3%-20.8%) in those 80+ years old. Of those diagnosed with glaucoma, sixty percent were previously undiagnosed. The independent risk factors associated with glaucoma included, older age (odds ratio, 95% CI), (1.1, 1.05-1.08) per year, higher IOP (1.2, 1.1-1.2) per mmHg, longer axial length (1.2, 1.1-1.3) per mm, and having a family history of glaucoma (2.1, 1.4-3.2).

Conclusions
Our data suggest that the prevalence of glaucoma is high among Chinese Americans, with a ratio of 4:1 for open angle to angle closure glaucoma. In this population-based sample, more than half of the persons with glaucoma were previously undiagnosed. Screening for glaucoma in persons with these risk factors is important, especially in older persons with high IOP, presence of axial myopia and having family history of glaucoma. These risk factors help identify those persons with glaucoma who may be previously undiagnosed and untreated. If these persons can be identified and treated early, it is likely that the burden of visual field loss and blindness associated with glaucoma can be reduced.

P-107
EFFECT OF NON-OVERLAPPING VISUAL FIELD DEFECTS ON VISION RELATED QUALITY OF LIFE IN GLAUCOMA

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Purpose
Glaucoma patients are often considered to have normal vision as long as each point of visual space is perceived by at least one eye. Aim of this study was to investigate the effect of non-overlapping visual field (VF) defects on vision-related quality life (VR-QoL) in glaucoma.

Methods
We evaluated VR-QoL of glaucoma patients (n=289) and controls (n=113) using four different questionnaires (NEI-VFQ-25, NEI-VFQ neuro-ophthalmology supplement, GQL-15, and a luminance specific questionnaire). We defined 'differential VF' (DVF) as a measure of location-specific differences in the VFs of both eyes. Within the group of glaucoma patients, we analyzed the relationship between different aspects of VR-QoL and DVF using ordinal multiple regression analysis. Analyses were adjusted for age, gender, integrated VF (IVF; an estimate of the binocular VF from the monocular VFs), and visual acuity (higher value of both eyes), and corrected for multiple hypothesis testing.

Results
Glaucoma patients had a lower VR-QoL than controls. Within the glaucoma patients, DVF was significantly associated with general vision (odds ratio 0.77, 95% confidence interval 0.58-0.94), peripheral vision (0.66, 0.53-0.83), feeling of different vision in both eyes (0.73, 0.58-0.92), cycling (0.64, 0.46-0.90), crossing the street (0.63, 0.47-0.84), seeing other road users coming from the side (0.69, 0.55-0.88), and seeing outside on a sunny day (0.74, 0.58-0.95). IVF was a stronger predictor of VR-QoL than DVF and was significantly associated with all aspects of VR-QoL except for general health, ocular pain, having a droopy eyelid, seeing double, feeling eye or eyelid looks unusual, and feeling vision is different in both eyes.

Conclusions
Non-overlapping VF defects affect VR-QoL. Therefore, although IVF is strongly associated with VR-QoL, basing clinical decisions only on IVF leads to overlooking vision problems that patients may have.

P-108

EVALUATION FOR THE EFFECTIVENESS OF HOME-BASED IOP MONITOR COMBINED WITH DIGITAL DISTANCE INTERVENTION GLAUCOMA DISEASE MANAGEMENT MODEL

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Purpose
In China, it was not convenient for patients to monitor intraocular pressure (IOP) in tertiary hospitals. And during the COVID-19 pandemic, patients' follow-up visit to hospitals had been challenged. The purpose of this study was to assess the effectiveness of the home-based glaucoma management model which combining digital platform(record and synchronize out-hospital data) with home IOP monitoring in China.

Methods
It's a single-center, ambispective cohort study. Glaucoma patients who meet the inclusion criteria were enrolled. During the following 6 months, nurses would come to patients' home to measure IOP by using Icare ic100(Icare Finland Oy). Participants would receive educational videos at first home visit and complete questionnaires (MMAS-8 and GlauQoL-17) at first and last visits. IOP and other data would be recorded by a specific Wechat mini APP and synchronized to the doctors. If there was an abnormal increase in IOP, participants would be reminded to have further examination in hospital. Endpoints: 1.The difference of the mean proportion of IOP reached target IOP level within 6 month between retrospective and perspective group. 2.The mean change of scores of MMAS-8 and GlauQoL-17.

Results
By Dec 2022, 141 glaucoma patients were enrollment in prospective group (73 men and 68 women) aged 51.84±14.94 years. The mean score of MMAS-8 is 6.61±1.75 and GlauQOL-17 is 42.94± 9.60 at baseline. 79 people completed a 2-month follow-up, the mean IOP was 17.20±3.45 at base line and 16.79±3.19mmHg at second month. The mean proportion of IOP reached target IOP rate was 55.3% at baseline, 60.0% at first month and 64.56% at second month. Nurses recorded 30 times of 28 subjects of abnormal fluctuations in IOP (> 2mmHg increase in IOP from the target at two consecutive follow-up visits or ≥5mmHg increase IOP compared to previous visit). Among the 28 subjects, 8 reported that they did not take medication as prescribed, 6 stayed up late and did not have a good rest. They returned to the hospital for further examination, and 2 of them received surgery due to poor IOP control.

Conclusions
Home-based IOP monitor combined with digital distance intervention glaucoma disease management model could timely synchronize the out-hospital data of patients to the doctors, which could help patients control IOP and remind them to seek further treatment in time when abnormalities were detected. It might be a useful and sustainable model for managing glaucoma patients.

P-109
ASSESSING QOL BY DISEASE SEVERITY USING THE GLAUCAT

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Purpose
In our current system, providers are unaware of, and prone to misestimates of the importance of specific patient issues. Consequently, it is unknown which aspects of care are of high or low priority according to the patient experience. The purpose of this study is to measure patients' glaucoma specific quality of life (QoL) in up to twelve domains by disease severity using a novel tool, the Glaucoma Computerized Adaptive Test (GlauCAT).

Methods
Patients with a primary ocular diagnosis of glaucoma were recruited from the Wilmer Eye Institute Glaucoma Center of Excellence. The GlauCAT test was administered in one of three ways: in office with an interviewer, in office without an interviewer, or at home using an online link. The test program was uploaded on a tablet for the in office test and using a cloud based link for the at home testing. The test consists of 303 items split across twelve QoL domains. Using an algorithm and information from the person's previous answers, the CAT iteratively selects the next item that most closely matches the person's level of the construct estimated at that point in the test. Disease severity was graded based on visual field mean deviation (MD) of the better seeing eye. Those with MD>=-6 dB were considered to have mild VF damage, while those with MD<-6 dB were considered to have moderate to severe VF damage. Scores (expressed as percentiles) for different QoL domains were compared between the two glaucoma severity groups using Wilcoxon Rank Sum Test. Bonferroni correction was applied to account for multiple comparisons.

Results
The analysis included 120 individuals with varying levels of glaucoma damage. On average, participants were 67 years of age (SD=13.7 years), about half (53%) were female and a little over a third (37%) were Black. The majority of participants had mild VF damage (72%), and the rest had a moderate to severe VF damage. Those with the moderate to severe compared to those with mild VF damage reported poorer emotional well-being (median=83.1% vs. 99%, p=0.03), greater activity limitation (92% vs. 99%, p=0.005), greater difficulty adjusting to different lighting levels (70% vs. 89%, p=0.008), and greater difficultly with life activities in general (76.8% vs. 91.6%, p=0.007).

Conclusions
The impact of this work could help providers prioritize the most important needs of glaucoma patients, cut down unnecessary treatments, and lead to better outcomes within our health care system.

PLB-003

EFFECTS OF VISUAL SEARCH ON DRIVING PERFORMANCE IN GLAUCOMA PATIENTS AT A DRIVING ASSESSMENT CLINIC

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Purpose

We established Japan's first driving assessment clinic at an eye hospital to provide education for drivers with visual field impairment about scenarios that pose specific motor vehicle collision risks to them. The purpose of our study is to assess motor vehicle collision (MVC) risk in drivers with glaucoma using a driving simulator (DS).

Methods

One hundred twenty-seven glaucoma patients (mean age 63.5±12.9 years) underwent testing in a DS (Honda Motor Co.) and with the Humphrey Field Analyzer 24-2 SITA-S program (HFA 24-2) and the binocular Esterman visual field test (EVFT) at a driving assessment clinic. Cognitive impairment was assessed using the Mini Mental State Examination (MMSE). We calculated the integrated visual field (IVF) based on the HFA 24-2 data. Eye movements during DS testing were measured with eye tracking (Tobii Pro Nano), and data on the spatial spread of horizontal and vertical visual search were obtained from the standard deviation of the x and y coordinates, respectively, of eye movement during the 5-minute test. The number of collisions in all 15 scenarios was recorded, and factors involved in DS collisions were examined using multiple regression analysis.

Results

The number of collisions in the DS correlated with age (r=0.56, P<0.0001), MMSE score (r=-0.27, P=0.007), better-eye mean deviation (MD) (r=-0.25, P=0.010), EVFT score (r=-0.27, P=0.005), inferior-hemifield IVF sensitivity (r=-0.38, P<0.0001), and horizontal search (r=-0.39, P<0.0001). A multiple regression analysis identified age (P=0.0001), horizontal search (P=0.0308), and better-eye MD (P=0.0063) as independent risk factors for MVC in the DS.

Conclusions

Patients with glaucoma who are older, have lower better-eye MD, and have little eye movement are at high risk for MVCs and should be carefully monitored when teaching safe driving.

PLB-004

SECONDARY GLAUCOMA SURGERIES AND SUBJECTIVE SIGNS IN EVERY DAY LIFE

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Purpose

Secondary glaucoma surgeries are perfomed for a group of different etiology secondary glaucomas. Non treated can lead to progressive neuropathy of the optic nerve.

To determine a quality of life of patients who underwent surgery for secondary glaucoma we used a questionnaire of visual functions - “Visual Functions Questionnaire-25” and its modification.

Methods

Follow-up was carried out in the glaucoma outpatient clinic and the Ophthalmology Dept., Faculty of Medicine, Comenius Univ. in Bratislava in 4 yeard interval. The included criteria were not the age or gender, but in addition to the established diagnosis we recorded the patients´ subjective feelings, feeling of pain and discomfort in the preoperative period, during the time of surgery but also in the postoperative period. The questionnaire contained 36 questions divided into 5 parts.

Data analysis

We analyzed the individual data of the monitored group (163 eyes) using the methods of descriptive statistics.

Results

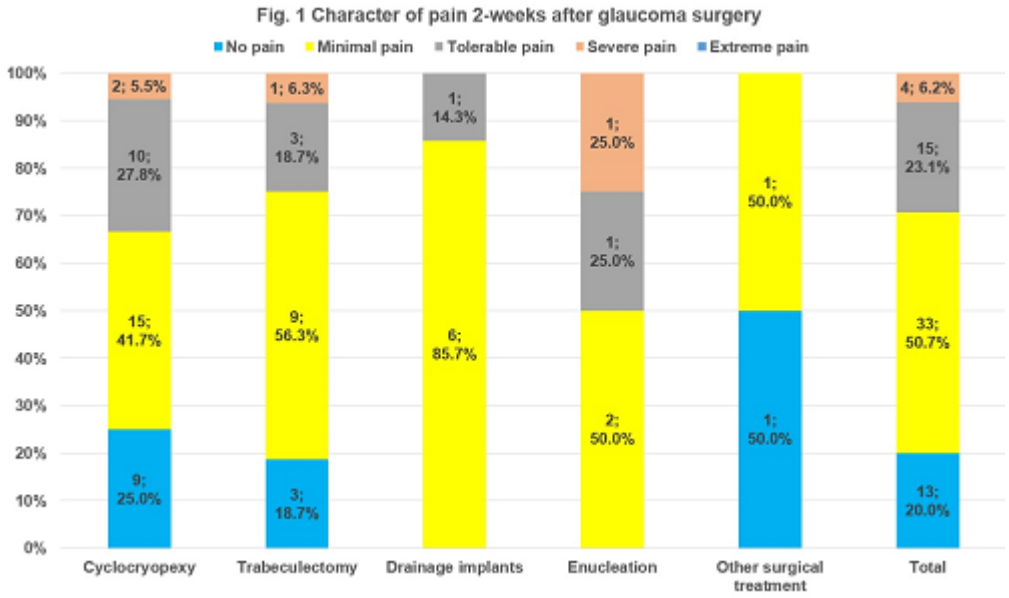
The questionnaire was sent to 98 patients, 65 submitted a completed questionnaire, which represents a 66.3% return rate. Thirty-five respondents (97.2%) of patients who underwent cyclocryopexy reported tolerable, minimal, or no pain during and immediately after surgery, with the majority of patients reporting minimal pain. Twenty-one patients (58.3%) did not complain of pain until one year after surgery. According to the survey, 16 respondents (25%) had undergone trabeculectomy. Most respondents reported tolerable pain during surgery, minimal pain for 2 weeks after surgery, and no or minimal pain for 2 years after surgery. Eleven respondents (68.8%) answered that their eyesight improved in daily life, but the majority of nine (56.3%) did not notice any change in their vision during short-distance movement, short-distance work, or reading. Most serious problems had patients after cyclocryopexy or enucleation of the eye globe.

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Image



Conclusions

Secondary glaucoma surgery for every patient should be personalized and tailored to the patient's every need, taking into account the patient's current health status, knowledge, and skills as well as socioeconomic circumstances.

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PLB-005

GLAUCOMA AND PERIODONTAL DISEASE, A SYSTEMATIC REVIEW AND META-ANALYSIS

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Purpose

To assess the association between periodontal disease and open angle glaucoma in adults through systematic review and meta-analysis of observational studies.

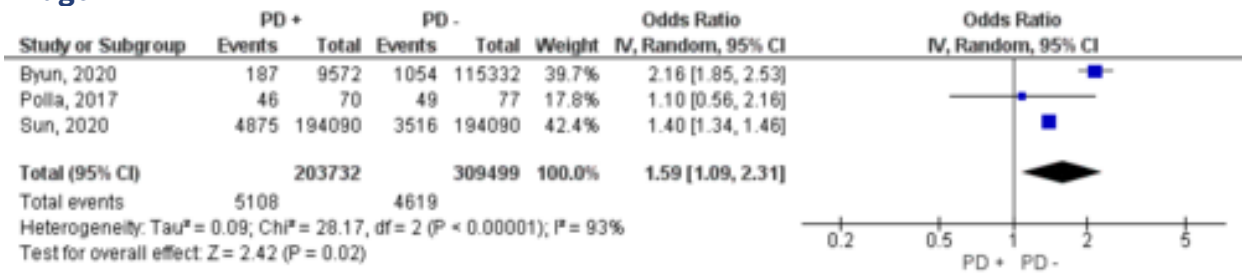
Methods

A systematic search was performed in PubMed/medline, Scopus, Web of Science, Embase, Cochrane Library, LILACS and Google Scholar, available until April 11th, 2023. The study was performed in compliance with the Preferred Reporting Items for Systematic Reviews and Meta-analyses reporting guidelines. Eligible articles were independently screened and quality assessed by 3 reviewers. All case-control, cross-sectional, and cohort studies reporting a quantitative effect estimates and 95% confidence interval (CI) for the association between periodontal disease and OAG were included. Effect estimates for the association with OAG were pooled using random effects meta-analysis (Review Manager Version 5.4). Studies not meeting formal inclusion criteria for systematic review, but with pertinent results, were also appraised and discussed.

Results

255 studies were screened, and three studies were included in the systematic review. Pooled effect estimates indicated a positive association between periodontitis and OAG (OR: 1.59; 95% confidence interval [CI], 1.09 – 2.31; P=0.02; I^2= 93%).

Image



Conclusions

Available studies showed a significative association between periodontal disease and glaucoma. Patients with periodontal disease have a higher odd to present glaucoma, compared with patients without it.

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PLB-006

ACUTE PRIMARY ANGLE CLOSURE CONCURRENT WITH CORONAVIRUS DISEASE 2019 RECURRENCE IN CHINA: A MULTI-CENTER STUDY

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Purpose

To report the concurrence of acute primary angle closure (APAC) and coronavirus disease 2019 (COVID-19) recurrence during the lift of the COVID-19 restriction policy.

Methods

An observational, retrospective, multi-center study. Consecutive patients seeking APAC treatment at two eye centers in China from December 7, 2022 to January 13, 2023 (RECURRENCE period) and from the same period in the previous year (CONTROL period) were collected. Electronic medical records were reviewed. Ocular data of the affected eye were analyzed for patients with unilateral APAC and both eyes in cases of bilateral APAC.

Results

A total of 189 (219 APAC eyes) and 51 patients with APAC (54 APAC eyes) were identified during the RECURRENCE and CONTROL periods, respectively. The patients identified during the RECURRENCE period tended to be younger (P=0.043), with longer time from symptoms to treatment (P=0.039), had shorter axial length (P=0.002), larger pupil diameter (P=0.004), larger vertical cup disc ratio (P=0.004), worse mean deviation values (P=0.003), and more glaucomatous optic neuropathy diagnoses (P=0.032) in comparison with the APAC patients identified during the CONTROL period.

Conclusions

Number of APAC patients significantly increased and concurred with the COVID-19 pandemic during the RECURRENCE period. The association between APAC and COVID-19 recurrence that might be mediated by COVID symptoms such as coughing and vomiting, and behavioral and psychological changes concurrent with COVID-19 infection requires further investigation.

PLB-007

RISK FACTORS FOR GLAUCOMA AND THEIR PROGNOSTIC SIGNIFICANCE IN WEST-AFRICAN ADULT GLAUCOMA PATIENTS

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Purpose
Glaucoma is a major cause of avoidable, irreversible blindness and visual impairment worldwide.[1] Knowledge of specific risk factors for glaucoma helps with its diagnosis and management.[2,3,4] These risk factors may be similar or vary between populations.[4,5] There is paucity of published data on risk factors for glaucoma in indigenous West African populations. Subsequently, from the authors' personal experience, guidelines used in the diagnosis and management of glaucoma in this population are from landmark studies involving African populations in other parts of the world. The aim of this study was to determine the significant risk factors for glaucoma and their prognostic significance in a hospital-based Ghanaian population in Ghana, West Africa.

Methods
This study was a prospective hospital-based case-control study involving 150 cases and 150 age- and sex-matched controls aged ≥18years, conducted from January-June 2021. Ethical clearance was obtained. Data was captured on pre-designed questionnaires and analyzed using descriptive and inferential statistics. The risk factors analyzed were older age (≥40 year), sex, occupation, education, positive family history of glaucoma, medical comorbidities (hypertension, diabetes, migraine, sickle cell disease), intraocular pressure (IOP), central corneal thickness (CCT) and refractive status (myopia, hyperopia). Level of significance was $p<0.05$.

Results
Female: male ratio for both cases and controls was 1.5:1. Mean age was 58.4±17.4 and 52.35±18.5 years for cases and controls respectively. Glaucoma constituted 7.8% of cases. Primary open angle glaucoma (POAG) was the predominant glaucoma type (N116, 77.3%). Majority of eyes of cases had advanced glaucoma at diagnosis (right eyes: N76, 50.7%; left eyes N87, 58.0 %).

From multivariate logistic regression analysis, age >40years (OR 2.8, 1.4-5.7 95% CI, p=0.003), positive family history of glaucoma (OR 3.2, 1.7-5.8 95% CI, p=0.001), hypertension (OR 2.5, 1.4-4.7 95% CI, p=0.003), myopia (OR 4.1, 1.9-8.5 95% CI, p=0.001) and IOP>22mmHg (OR 4.4, 2.1-9.6 95% CI, p=0.001) were the significant risk factors for POAG. No association was established with age (p=0.777), sex (p=0.858), education (p=0.111), occupation (p=0.156) and glaucoma severity. Advanced glaucoma at presentation was associated with IOP>22 mmHg (p=0.0020), myopia (p=0.0001) and hypertension (p=0.0001).

Conclusions
Significant risk factors for glaucoma in this West-African population were age>40years, positive family history of glaucoma, hypertension, myopia, and high IOP.

POAG was the most common glaucoma type (77.3%). Fifty-four percent of eyes presented with advanced glaucoma. Advanced glaucoma at presentation was associated with high IOP, myopia and hypertension.

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PLB-008

THE IMPACT OF COVID-19 ON THE WAIT TIMES AND SEVERITY OF SURGICAL GLAUCOMA CASES EVALUATED AT A TERTIARY EYE CENTER

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Purpose
COVID-19 has caused shortages in health services worldwide. In Canada, this led to a relocation of medical staff, which paradoxically acted as potential barriers to access to care when considering the significant delays reported in elective surgeries. The purpose of this study was to assess the effect of pandemic related delays on the wait times and severity of surgical glaucoma cases in a single tertiary referral center in Quebec, Canada.

Methods
In this retrospective cohort study, 182 and 201 eyes of patients who underwent glaucoma surgery at Hôpital Saint-Sacrement, Quebec City, between the periods of March 1 to June 30, 2019 (pre-pandemic) and 2021 (pandemic), were included. Severity data included mean visual field deficit, intraocular pressure (IOP), number of drops, and preoperative best corrected visual acuity (BCVA). The times from referral to surgery (referral time) and from listing date to surgery (listing time) were calculated.

Results
Visual field deficit was -11.6 ± 7.7 dB in 2019 versus -11.6 ± 7.5 dB in 2021 (P=0.92). Mean preoperative IOP was 21.1 ± 9.70 mmHg in 2019 versus 20.0 ± 9.52 mmHg in 2021 (P=0.25). The mean MAVC in the affected eye was 0.60 ± 0.72 LogMAR in 2019 versus 0.55 ± 0.73 LogMAR (P=0.07). The mean number of preoperative drop classes was 3 ± 1 in both groups (P=0.56). The mean number of patients referred with oral glaucoma medication increased from 45 to 70 in 2019 and 2021 respectively (P=0.03). Time to consultation was 122 ± 120 days in 2019 versus 144 ± 136 days in 2021 (P=0.17), whereas time to list was 48 ± 57 days in 2019 versus 38 ± 43 days in 2021 (P=0.05).

Conclusions
There were no statistically significant differences in the severity of surgical glaucoma cases operated on during the pandemic. Waiting list time decreased, possibly secondary to the prioritization of more urgent glaucoma cases over other ophthalmic surgeries. These reassuring data suggest that the barriers of the pandemic did not lead to a severe worsening of access to care for surgical glaucoma patients.

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PLB-009
GLAUCOMA IN A DIFFERENT SCENE: PRIMARY CARE, POVERTY AND ILLITERACY

H Sepúlveda, C Sandoval

Purpose
To evaluate the resolution capacity of Primary Care Units in Ophthalmology in the screening, diagnosis and follow-up of glaucoma in a population with a high level of poverty and rurality in Chile.

On the other hand, the Ministry of Health in conjunction with the Chilean Society of Ophthalmology structured between 2003 and 2004 the National Ocular Health Program, to cover pathologies that are not included in the GES System, executed through two pilot plans carried out at the primary health level in clinics in the Metropolitan Region and in the Bío Bío Region. Based on this experience, starting in 2008, the opening of Primary Care Units in Ophthalmology (Unidades de Atención Primaria en Oftalmología, UAPOs) began throughout the country, installed in primary care health centers, which have an ophthalmologist and Medical Technologist, high-tech equipment for detection and management of refractive vice, glaucoma and minor emergencies. In addition, they have been located in urban and rural sectors, to decongest hospitals and improve access for the population of low socioeconomic and educational level.

Methods
Quantitative, non-experimental and cross-sectional study, where the monthly statistical records and the ophthalmological waiting list of the Ñuble region generated between 2017 and 2022 are evaluated.

Results
On average 1,875 (± 983) medical consultations and 3,407 (± 1625) Medical Technologist consultations were carried out annually, with a resolution level of 84%: being 82% for resolution of refractive vice; 80.1% ($p < 0.001$) of glaucoma resolved in less than 150 days

Conclusions
The Primary Care Units in Ophthalmology are highly decisive in the specialty of ophthalmology, inserted in primary care, for the decongestion of the secondary level, bringing closer and decentralizing ophthalmological care, they have specialized equipment and professionals, changing the model centered on the doctor to a work one between medical and non-medical professionals with a high resolution level, which can even be replicated in other medical specialties, according to the guidelines that international health organizations have promoted, and granting better access and opportunity of care to the beneficiary population of the region

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Genetics, Genomics & Biomarkers

P-110

PHARMACOGENETIC MARKERS OF RESPONSE TO LATANOPROST TREATMENT IN PATIENTS WITH PRIMARY OPEN-ANGLE GLAUCOMA AND OCULAR HYPERTENSION

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Purpose
To search for pharmacogenetic markers of response to latanoprost treatment in patients with primary open-angle glaucoma (POAG) and ocular hypertension.

Methods
We enrolled 52 treatment naïve patients with POAG or ocular hypertension. The severity of glaucoma was determined by the visual field index mean defect (MD) and classified as early (MD < 6dB), moderate (MD 6-12dB) and advanced (MD > 12dB). Intraocular pressure (IOP) was measured at baseline and 6 weeks after the start of latanoprost treatment, and the IOP values of the most severely affected eye were analysed. Blood samples from the cubital vein were used for genotyping of single nucleotide polymorphisms (SNPs) in pathways associated with: latanoprost activation (CES1P1 rs3785161), transport (SLCO2A1 rs34550074 and rs4241366), receptor (PTGFR rs3753380); antioxidants (GSTM1*0, GSTT1*0, GSTP1 rs1695 and rs1138272, SOD2 rs4880, CAT rs1001179, GPX1 rs1050450); inflammation (TNF rs1800629, IL1B rs16944 and rs1143623, IL6 rs1800795). We performed descriptive statistics, logistic regression analysis and used dominant and additive genetic models.

Results
The genotypes SOD2 rs4880 CT (Padd=0.036), CAT rs1001179 TT (Padd=0.012) and TNF rs1800629 GG (Pdom=0.012) were significantly associated with a decrease in absolute IOP after latanoprost treatment in the additive model, while carriers of at least one GSTT1 gene copy achieved higher percentage of IOP reduction in the dominant model (P=0.024). The other polymorphisms studied were not statistically significantly associated with response to latanoprost treatment.

Conclusions
Pharmacogenetic biomarkers associated with response to latanoprost treatment may contribute to more effective and personalised treatment of POAG and ocular hypertension.

P-111

NON-INVASIVE INFRARED SPECTROSCOPY OF AQUEOUS HUMOUR SAMPLES IN GLAUCOMA COMPARED TO CONTROLS

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Purpose

Metabolic profiling in ophthalmology has gained increasing interest in recent years to determine potential biomarkers for glaucoma. Previous studies have used costly and sample destructive techniques including mass spectrometry and nuclear magnetic resonance-based metabolomics. This study aims to understand the use of vibrational spectroscopy for the evaluation of aqueous samples and to determine the differences between glaucoma and controls for downstream development of cheaper, non-invasive and portable technology for metabolomics evaluation.

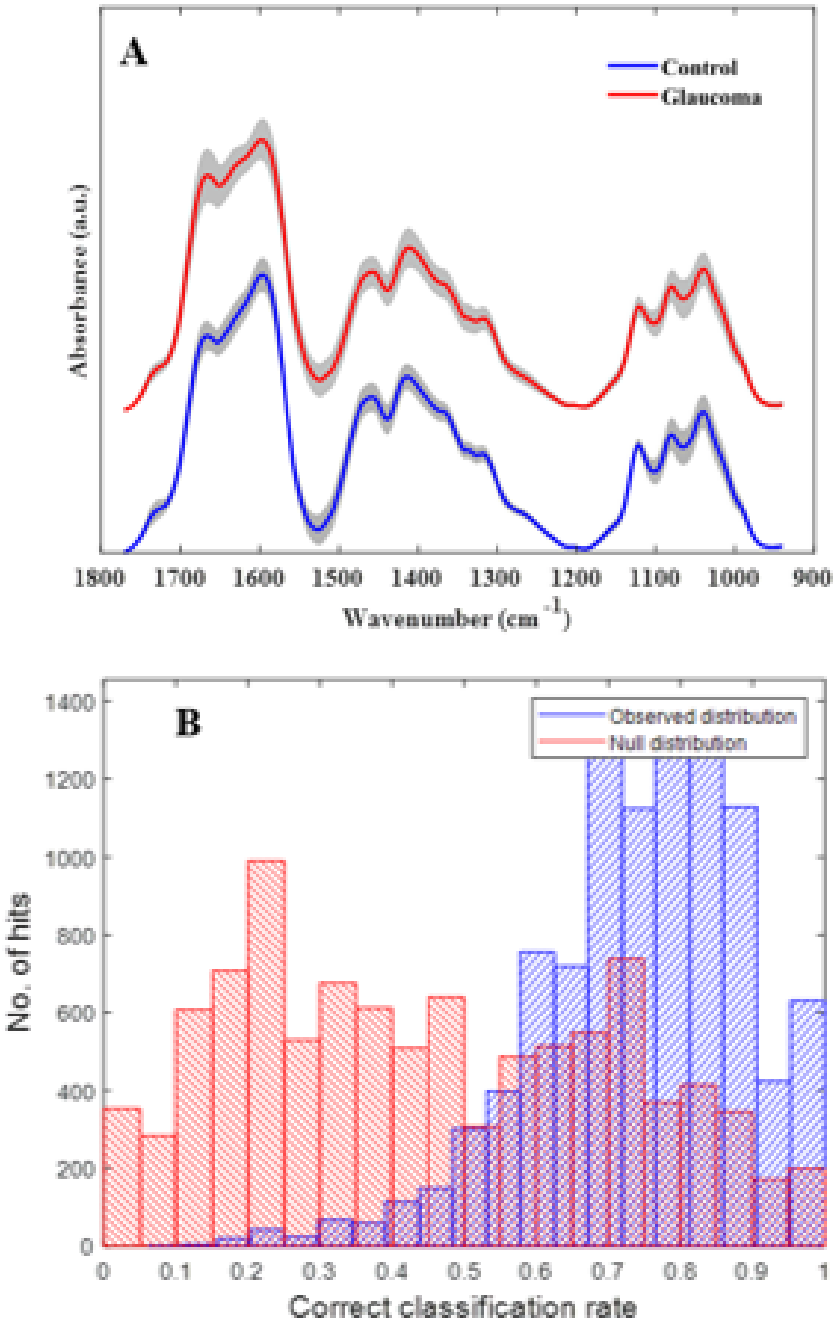
Methods

Aqueous samples were acquired from patients undergoing glaucoma surgery (n=10) or patients having cataract surgery in whom cataract had been excluded (n=10) and stored at -80°C by the Liverpool Research Eye Biobank. A high throughput Fourier transform infrared (FTIR) spectrometer was used to obtain spectra and identify specific molecular signatures from the aqueous samples and then analysed at the Centre for Metabolomics Research. Briefly, aqueous samples were transferred to a silicon substrate (Bruker Ltd, Coventry, UK) and dried in an oven (50 °C) prior to data collection. FTIR data were acquired in the mid-IR range (4000–600 cm^{-1}), with 64 spectral co-adds and 4 cm^{-1} resolution, using a Bruker Invenio FTIR spectrometer. A total number of 4 infrared spectra were collected from each sample/patient.

Results

Infrared spectral data collected from diseased and control samples (Fig. 1a) were used as inputs for partial least squares discriminant analysis (PLS-DA) in order to differentiate diseased from control samples. The classification model obtained for the PLS-DA using infrared data is shown in (Fig. 1b). Bootstrapping was performed 10000 times to determine whether the infrared spectrum was disease or control. The output shows two distributions; a 'real' (in blue) and 'null/random' (in red) model, these models displayed a correct classification rate of 75%.

Image



Conclusions

Vibrational spectroscopy, a differing modality of metabolomics, provides evidence of an ability to determine spectral data differences between glaucoma patients compared to controls. This highlights the potential of the use of vibrational spectroscopy as a cost-effective metabolomics technique for the analysis ocular samples and cells.

RF

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P-112

PERFORMANCE OF POLYGENIC RISK SCORES FOR GLAUCOMA IN AFRICAN POPULATIONS

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Purpose

Genome-wide association studies (GWAS) have identified >100 single-nucleotide polymorphisms (SNPs) for primary open-angle glaucoma (POAG). Most of these SNPs have been identified in large studies of European and Asian populations, and only few in populations from sub-Saharan African (SSA) ancestry. Although the prevalence of POAG is known to be 3-5x higher in populations from SSA ancestry and remarkably high in West Africa, almost none of the identified SNPs could be validated in SSAs. We therefore assessed whether the aggregate of European and Asian SNPs could predict POAG risk in SSA populations by calculating a PRS in two case-control studies comprising subjects from Tanzania and South Africa (Genetics In Glaucoma patients of African descent [GIGA] study), and from Ghana, Nigeria, South Africa and African-Americans (Eyes of Africa [EoA] study).

Methods

A PRS based on SNPs from GWAS meta-analysis of European and Asian populations was calculated using a fixed-effects inverse-variance weighting approach. The PRS was computed for each individual in the GIGA and EoA studies by multiplying the 1000 Genomes-imputed dosage with betas obtained from the meta-analysis. We adjusted for age, sex, and population stratification via the first 5 principal components (PCs) in our baseline model. Risk of POAG was estimated based on numerical PRS and quintile of PRS.

Results

The PRS was significantly associated with POAG in South African black (SAB), South African coloured (SAC), Ghanaian, and African-American populations (P≤0.005) after adjusting for age, sex and the first 5 PCs. SAB, SAC, Ghanaian, and African-American subjects in the top quintile of the PRS were 22, 5.13, 2.43 or 1.5 times more likely to have POAG, respectively, compared with those in the bottom quintile (P≤0.03). Adding the PRS to a prediction model for POAG improved the discriminatory power (AUC) significantly by 8% in SAB and by 1% in African American compared to an age, sex, and PCs only model (P=0.006).

Conclusions

A PRS built from European and Asian datasets indicated that these SNPs confer POAG risk in some patients of African descent, but to a lesser extent in non-admixed populations from East and West Africa. Adding this PRS to a diagnostic model has only limited gain in diagnostic performance. Other SNPs may explain the substantial difference in POAG risk for African populations. Future studies on POAG in Africa should focus on identification of these SNPs.

P-114
ACCURACY OF CLINICAL EXOME SEQUENCING FOR NON-ACQUIRED GLAUCOMA

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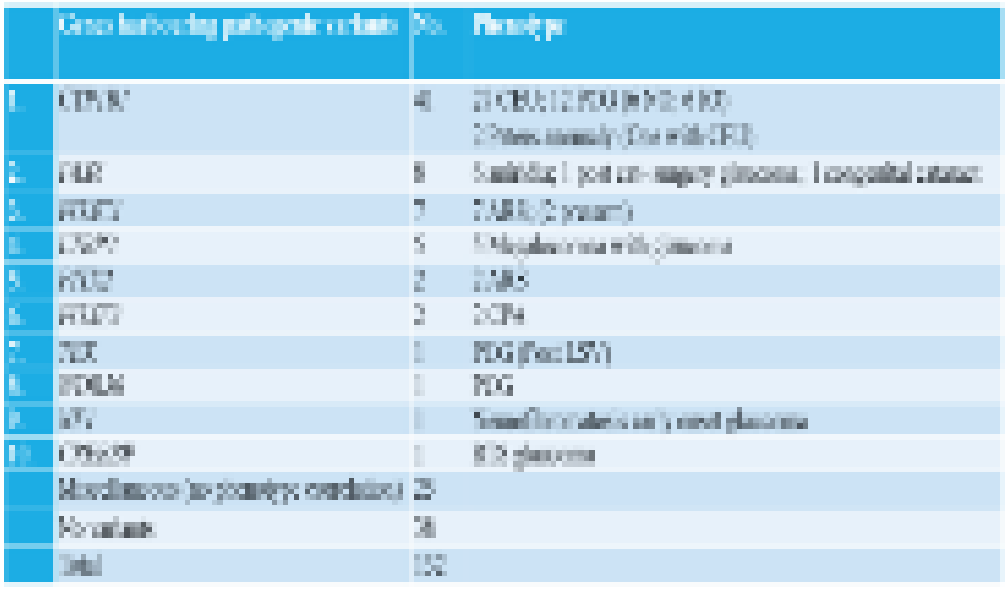
Purpose
To study pathogenic variants detected by Clinical Exome Sequencing (CES) and validated by Sanger's sequencing in a cohort of non-acquired glaucoma (NAG) and to analyze their correlation with the phenotype and outcome.

Methods
Prospective cohort study.

Children who presented with newly diagnosed non-acquired glaucoma between January 2021 and March 2022 underwent clinical exome sequencing (CES). Sequences were aligned to the human reference genome(GRCh38.p13), and variants relevant to glaucoma identified. Pathogenicity of variants was determined using ACMG guidelines and validated by Sanger's sequencing. The phenotype was studied during examination under anaesthesia (EUA). The genetic variants were analyzed with respect to the phenotype, and in case of a sufficient number of variants in any gene, an outcome analysis 6 months following surgery was done.

Results
132 children were analyzed. Ninety-four children (72.4%) harboured pathogenic variants, of which 69 (74%) matched the phenotype. Twenty-seven children had neonatal onset CEU (N-O CEU), 14 had Primary Congenital Glauocma (PCG), 9 had Axenfeld Reigers Syndrome (ARS), six hadAniridia, 5 had megalocornea and glaucoma, two each had Peters anomaly, and congenital primary aphakia (CPA), and one baby each had coexistent congenital cataract, neurofibromatosis and Rubenstein Taybi Syndrom (RTS). Forty-one children(31.1%) had variants in CYP1B1, 8 in PAX6, 7 in FOXC1, 5 in LTBP2, 2 each in PITX2 and FOXE3, and one each in TEK, WDR36, NF1 and CREBBP. CYP1B1 variants were furhter analyzed. 26/41(63.4%) carried the c.1169G>A(p.Arg390His) variant; (nineteen homozygous, and seven compound heterozygous). All 19 harbouring c.1169G>A(p.Arg390His) homozygous variants and 4 with compound heterozygous variants had neonatal-onset congenital ectropion uveae (NO-CEU) with intractable glaucoma and poor outcome. 10/41(24.4%) children harboured the c.1103G>A(p.Arg368His) variant; (two homozygous and eight compounds heterozygous), of whom four presented with infantile-onset primary congenital glaucoma (PCG). Children harbouring c.1103G>A(p.Arg368His) variant had clearer corneas at presentation with a good outcome.

Image



Conclusions

Identification of genetic variants is a valuable predictor of the phenotype and aids in prognosticating childhood glaucoma. We could identify one poor prognosis variant and one good prognosis variant. Deep phenotyping and accurate genotyping may open up avenues for gene therapy in future.

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P-115

DESCRIPTION OF THE MOLECULAR SPECTRUM IN A MEXICAN COHORT OF PATIENTS WITH HEREDITARY PEDIATRIC GLAUCOMA

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Purpose

Glaucoma is a group of diverse diseases characterized by cupping of the optic nerve head due to loss of retinal ganglion cells. It is the most common cause of irreversible blindness throughout the world, and its early detection by ophthalmological examination is very important. Glaucoma has been shown to have significant heritability, and in most pediatric glaucoma a monogenic pattern of inheritance can be observed. The identification of affected genes, their pathogenic variants, and the inheritance pattern in monogenic glaucoma is important for an appropriate family counseling and can have implications in prognosis and treatment of the disease.

Methods

A total of 140 probands with a clinical diagnosis of pediatric glaucoma were enrolled. All probands underwent a complete ophthalmological and genetic evaluation. Genomic DNA was extracted from peripheral blood leukocytes of all participants. Whole exome sequencing and Sanger DNA sequencing were carried out for the identification of pathogenic variants associated to pediatric glaucoma. Designation of pathogenic variants was made according to the American College of Genetics and Genomic (ACMG) guidelines.

Results

A total of 86 patients had primary congenital glaucoma (PCG), 12 had juvenile open-angle glaucoma (JOAP), 36 had glaucoma associated with non-acquired ocular anomalies (GANAOA), and 8 had glaucoma associated with non- acquired systemic diseases or syndromes (GANAS). Sixty-five different pathogenic variants were identified in 17 distinct genes, with 43 mutations being novel glaucoma-causing variants. Genes with most identified pathogenic variants were CYP1B1, FOXC1, TEK, and MYOC. The diagnostic rate in the whole glaucoma group was 54%.

Conclusions

A high diagnostic rate for a genetic cause was identified in this cohort of pediatric glaucoma. Mutations in the TEK gene were commonly identified and thus they should be considered as a frequent cause of PCG in the Mexican population. MYOC was the most frequent cause for JOAP. This is the first multigene study performed in patients with pediatric glaucoma from Mexico and Latin America.

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P-116

BRAIN-DERIVED NEUROTROPHIC FACTOR IN THE SERUM AND AQUEOUS HUMOR OF GLAUCOMA PATIENTS

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Purpose

The aim of this study was to measure serum and aqueous humor levels of brain-derived neurotrophic factor (BDNF) in Japanese patients with primary open angle glaucoma (POAG) and normal tension glaucoma (NTG).

Methods

The first experiment was a prospective observational study of serum BDNF levels in 78 patients who underwent cataract surgery or trabeculectomy (27 glaucoma patients and 51 non-glaucoma cataract patients as controls). The numbers of patients with POAG and NTG were 16 and 11, respectively. Moreover, serum pro-BDNF levels were measured in 63 patients with 23 glaucoma patients and 40 controls.

The second experiment was a prospective observational study of aqueous humor BDNF levels in 62 eyes of 43 patients who underwent cataract surgery or trabeculectomy (11 glaucoma patients and 32 controls). BDNF concentrations were examined by enzyme linked immunosorbent assay (ELISA) techniques.

Results

In the first experiment, serum BDNF concentration measured with ELISA kit was significantly lower in the glaucoma group (including both POAG and NTG) than in the control group (7.2 ± 3.6 ng/mL vs. 12.2 ± 9.3 ng/mL, p=0.004). Serum BDNF concentration was lower in early glaucoma than in moderate glaucoma. There was no correlation between serum BDNF concentration and age. When patients with NTG and POAG were compared, serum BDNF concentration was lower in the former. Serum BDNF concentration was not significantly correlated with glaucoma parameters, including optical coherence tomography and visual field defects. Serum pro-BDNF concentration was not significantly changed between the glaucoma group (31.3 ± 104.8 pg/mL) and the control group (39.3 ± 90.1 ng/mL).

In the second experiment, two of the techniques detected no BDNF in aqueous humor in any samples; the average value was less than zero. An ultrasensitive ELISA kit did not yield reliable measurements. Finally, in an even more sensitive ELISA (Simoa-HD1), performed by an outside contractor, 25 (54.3%) eyes were below the detection limit, including 20 (55.6%) control and 5 (50%) glaucoma group. For eyes with detectable BDNF, the overall BDNF concentration was 0.158 pg/mL (n=21): 0.196 pg/mL (n=16) in controls and 0.034 pg/mL (n=5) in glaucoma group.

Conclusions

Since serum BDNF concentration was significantly lower in glaucoma patients than in controls, serum BDNF concentration was expected as a biomarker for glaucoma. However, BDNF level in aqueous humor varies widely and further study is necessary in the future.

P-117

A NOVEL BIOMARKER IN PRIMARY GLAUCOMA: AQUEOUS HUMOR AND SERUM LEVELS OF ISCHEMIA MODIFIED ALBUMIN (IMA)

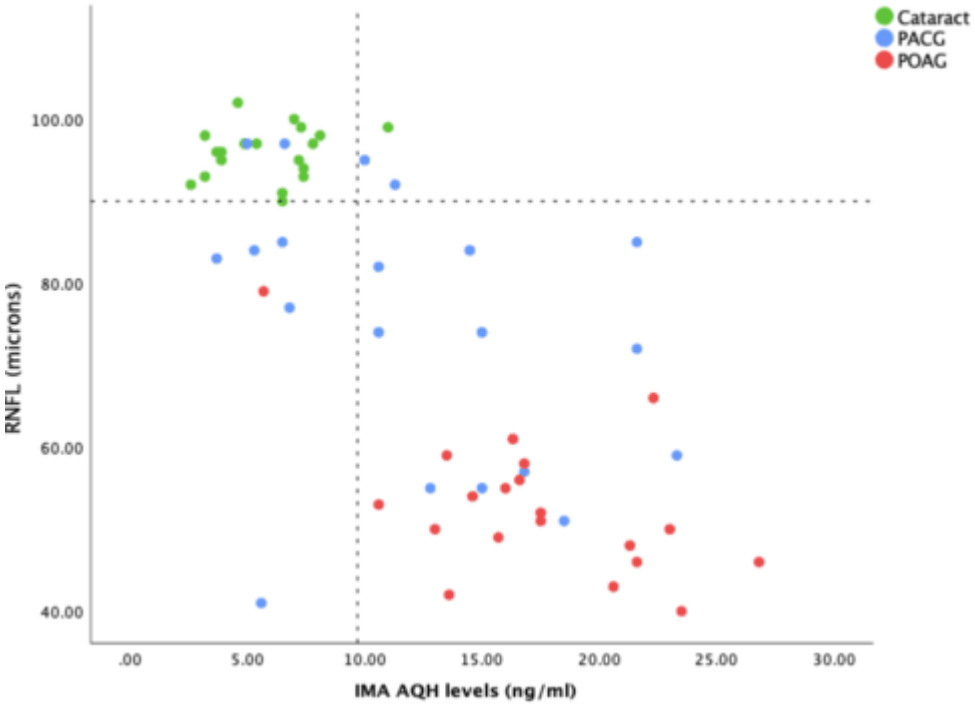
E Rusmayani[1], W Artini[1], M Sasongko[2], S Suhardjo[2], V Viona[1]
[1]Jakarta Eye Center, Jakarta, [2]Gadjah Mada Univeristy, Yogjakarta, Indonesia

Purpose
To analyze ischemia-modified albumin (IMA) levels in aqueous humor and serum, and their correlation to RNFL thinning in primary glaucoma patients

Methods
Patients were divided into the control and glaucoma groups. The control group was patients with senile cataracts. The glaucoma group consisted of patients diagnosed for the first time as primary open-angle glaucoma (POAG) or primary angle closure glaucoma (PACG). Exclusion criteria were secondary glaucoma and patients with systemic disease. A complete cataract examination was done for all patients, and glaucoma examinations for the glaucoma group. Glaucoma examinations were done to assess the structural (OCT) and functional defects (HFA). Glaucoma severity were classified as early, moderate and advance based on mean deviation value. Blood samples were collected in both groups as part of the preoperative examination. Aqueous humor samples (0.1-0.3 cc) by paracentesis were collected in both groups before the cataract surgery or trabeculectomy. IMA was analyzed using an IMA ELISA kit with an autoanalyzer (LS Bio Human Ischemia Modified Albumin Elisa Kit LS-F27035, Seattle, USA). TNF-α was analyzed using a human TNF-a assay (Quantikine® HSTA00E, R&D system, Minneapolis, USA). Malondialdehyde (MDA) was analyzed using MDA ELISA kit (abx257171, R&D system, Minneapolis, USA).

Results
Control group comprised of 33 participants, and glaucoma group 41 patients (21 PACG and 20 POAG). Mean IMA aqueous humor (AQH) levels found in cataract group 6.039±3.16 ng/ml, glaucoma group 14.89±6.08 ng/ml, PACG group 12.69±6.25 ng/ml and POAG group 17.33±4.988 mg/ml. Mean IMA serum levels in cataract group 14.75±6.53 ng/ml, glaucoma group 13.89±6.53 ng/ml, PACG group 12.79±6.46 ng/ml± and POAG group 14.93±10.74 ng/ml. Glaucoma group had significant higher level of IMA in aqueous humor compared to control group, but opposite findings in serum IMA levels between groups. POAG patients had a higher aqueous IMA level compared to PACG group and correlated significantly with IOP. IMA AQH also negatively correlated to of RNFL thickness in both POAG and PACG group. Cut off 9.5 ng/ml was considered as a normal limit value to differentiate between control and glaucoma group.

Image



Conclusions

Primary glaucoma patients showed a significantly increased level of IMA AQH as a local ischemic biomarker compared to the control group. Systemic oxidative activity is not a re-presentation of local ocular oxidative stress in both cataract and glaucoma group.

References

1. This research has been published: DOI : https://doi.org/10.2147/OPTH.S388382

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P-118
GENOTYPIC SPECTRUM OF IRIDOGONIODYSGENESIS WITH GLAUCOMA

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Purpose
Classical goniodysgensis is associated with primary congenital glaucoma while iridogoniodysgensis is seen in Axenfeld-Rieger malformation (ARM). We describe ocular features of a large series of patients presenting with iridogoniodysgenesis who also underwent genetic evaluation.

Methods
Unrelated patients presenting with early onset glaucoma, following up from 2002 were recruited. Ocular and systemic features of iridogoniodysgenesis, defined by the presence of developmental iris anomalies like corectopia, polycoria, hypoplasia and atrophy, with or without the presence of posterior embryotoxon, were looked for. After an informed consent blood samples of the patients, and if possible their parents, were collected and evaluated using exome sequencing, to look for disease causing mutations in any of the known glaucoma genes. Only variants of uncertain significance, likely pathogenic or pathogenic as per ACMG guidelines were selected.

Results
Our cohort consisted of 67 patients with iridogoniodysgenesis and glaucoma, 38 of these had either FOXC1 (n=29) or PITX2 (n=9) mutation. Bialleic CYP1B1 mutations were (with at least one variant that was likely pathogenic or pathogenic) seen in 7(10.5%).Variants of uncertain significance (VUS) were seen in the ASB10 gene in 3 patients and one patient had a VUS in COL1A2 gene. No mutation in any known glaucoma causing genes could be found in 26% (18 out of 70) patients.

Conclusions
Apart from FOXC1 and PITX2, even biallelic CYP1B1 mutations could be associated with the iridogoniodysgensis phenotype. While these cases phenotypically resemble ARM, they are genetically distinct. Other gene mutations need to be explored for the causation of iridogoniodysgensis and glaucoma.

P-119

PHARMACOGENETIC MARKERS OF RESPONSE TO SELECTIVE LASER TRABECULOPLASTY IN PATIENTS WITH PRIMARY OPEN-ANGLE GLAUCOMA AND OCULAR HYPERTENSION

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Purpose
To search for pharmacogenetic markers of response to selective laser trabeculoplasty (SLT) in patients with primary open-angle glaucoma (POAG) and ocular hypertension.

Methods
We enrolled 51 treatment naïve patients with POAG or ocular hypertension. Intraocular pressure (IOP) was measured at baseline and 6 weeks following 360-degree SLT. The IOP values of the more severely affected eye of the subject were analysed. IOP reduction to SLT was defined as poor (< 15%), moderate (15-30%) or good (≥ 30%). Blood samples from cubital vein were used for genotyping single nucleotide polymorphisms (SNPs) in pathways associated with: antioxidants (GSTM1*0, GSTT1*0, GSTP1 rs1695 and rs1138272, SOD2 rs4880, CAT rs1001179, GPX1 rs1050450); inflammation (TNF rs1800629, IL1B rs16944 and rs1143623, IL6 rs1800795); matrix metalloproteinases (MMP14 rs1042703, rs1042704 and rs743257, MMP3 rs3025058). We performed descriptive statistics, logistic regression analysis and used dominant and additive genetic models.

Results
Seven subjects (13.7%) had poor, 24 (47.1%) had moderate and 20 (39.2%) had good IOP response to SLT treatment. The IL6 rs1800795 GG genotype was significantly associated with better absolute and relative IOP lowering in the additive (Padd=0.009 and Padd=0.033) and dominant genetic model (Pdom=0.002 and P=0.010). Carriers of at least one IL6 rs1800795 polymorphic allele were less likely to have a good IOP response (≥ 30%) to SLT. The other polymorphisms studied were not statistically significantly associated with response to SLT treatment.

Conclusions
SNPs in genes involved in the inflammatory pathway may serve as potential biomarkers for predicting response to SLT treatment.

P-121

ANGLE CLOSURE GLAUCOMA IN A NANOPHTHALMIC PATIENT WITH MFRP AND BEST1 MUTATIONS

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Purpose

Nanophthalmos is a small-eye disorder with a global prevalence below 1/2,000. Bi-allelic mutations in the MFRP gene and homozygous mutations in BEST1 are both implicated in nanophthalmos. Here we describe a case of nanophthalmos with a homozygous mutation in MFRP and a heterozygous mutation in BEST1. To our knowledge, this is the first genetically confirmed case of nanophthalmos in the Philippines.

Methods

This is a case report of a nanophthalmic patient, born out of a consanguineous marriage, who presented with acute angle closure glaucoma. Despite maximum anti-glaucoma therapy and laser iriditomy combined with iridoplasty, intraocular pressure remained uncontrolled and trabeculectomy was done on the left eye. The patient underwent ophthalmic assessment and ocular parameters were measured. A microphthalmia/anophthalmia panel consisting of 23 genes was done to confirm the diagnosis.

Results

Ocular examination revealed best-corrected visual acuity of light perception, a 6mm pupil non-reactive to light, elevated intraocular pressure (40mmHg), and closed angles on the left eye. Both eyes were found to have a high hyperopic refractive error (+13.50 D) and short corneal diameters (10.5mm, 9.5mm). Ancillaries showed steep corneal curvatures (50.12 D, 50.22 D) and short axial lengths (21mm, 20.5mm). Fundus of the right eye showed petalloid pattern of abnormal reflex in the central macula. Ocular coherence tomography of the right eye revealed macular edema consistent with the fundus findings. Genetic test results showed a pathogenic homozygous mutation in MFRP c.1150dup (p.His384Profs*8) and a heterozygous variant in BEST1 c.1054G>A(p.Ala352Thr).

Image

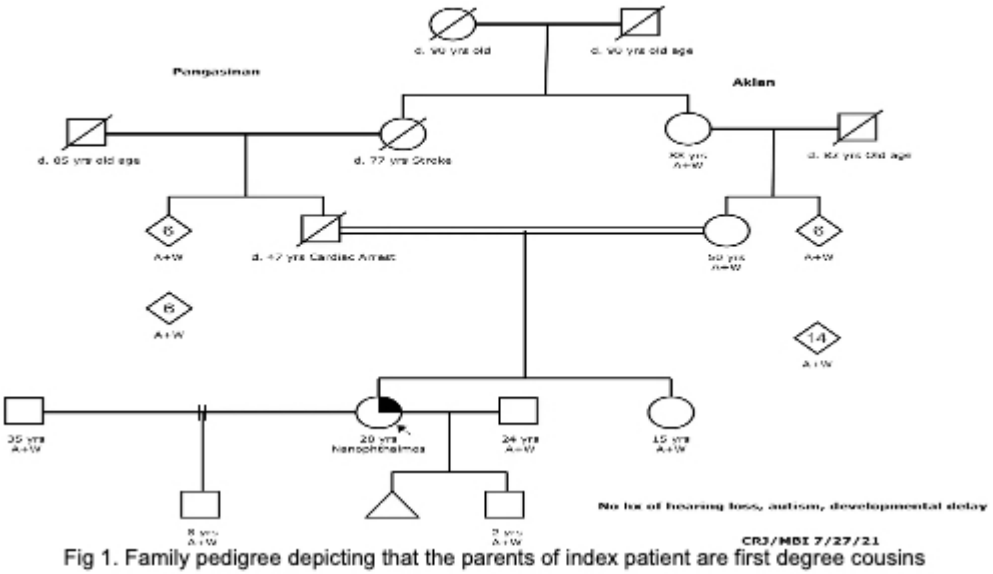


Fig 1. Family pedigree depicting that the parents of index patient are first degree cousins

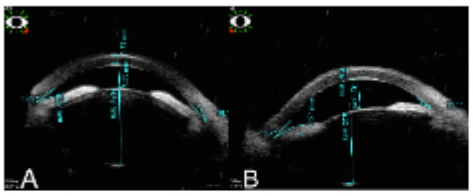


Fig.2 UBM. AC depths were 1.29 on the right (A) and 1.67 on the left eye (B)

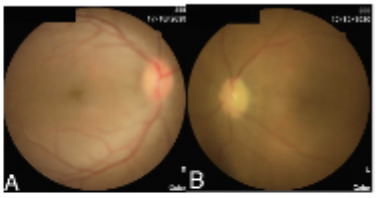


Fig.4 Fundus of right (A) & left eye(B)

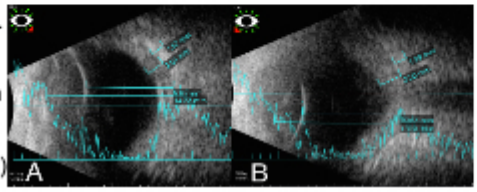


Fig.3 B-scan. Scleral thickness were 2.04 on the right(A) and 2.50 on the left eye(B)

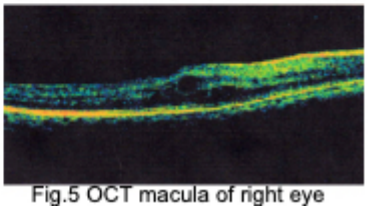


Fig.5 OCT macula of right eye

Conclusions

Nanophthalmic eyes pose a great challenge to ophthalmologists, but prognosis may be favorable if correctly identified and promptly treated. This report highlights and hopes to expand the phenotype of a rare case of nanophthalmos presenting with angle closure glaucoma and genetically confirmed to have variants in both MFRP and BEST1.

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P-123

STUDY OF THE DISTRIBUTION FREQUENCY OF MUTANT ALLELES OF THE FII, FV GENES IN PATIENTS WITH NEOVASCULAR GLAUCOMA

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Purpose

To study the distribution frequency of mutant alleles of FII, FV genes in patients with neovascular glaucoma.

Methods

The study of the distribution frequency of mutant alleles of the FII, FV genes in patients with neovascular glaucoma was carried out at the Republican Specialized Scientific and Practical Medical Center for Eye Microsurgery and at the Center for Hematology. Ophthalmological and molecular genetic studies were carried out in 106 patients with neovascular glaucoma and 220 healthy individuals of the Uzbek population, who did not have ophthalmic pathologies and no thromboembolic history.

Results

As a result of studies of 220 donors, a rather low frequency of the G20210A mutation of the FII gene (1.4%) was revealed in 3 donors, which proves the population specificity of this genetic marker.

In the group of 85 examined patients with glaucoma, the mutant allele of the FII gene was found in 4 cases (4.7%). The calculated frequency of the mutant allele of this polymorphism in the studied group of patients and healthy donors was 2.6% and 0.7%, respectively (X2= 3.1; P=0.04; OR=3.5; 95% CI 0.777-15.85). The chance of developing thrombosis in carriers of this allele was 3.5 times higher than in the control group.

At the same time, the distribution frequency of heterozygous carriage among patients and in the control group was 4.7% and 1.4%, respectively. The homozygous genotype of this polymorphism was not identified in both groups. The calculated probability of developing retinal vein thrombosis among carriers of this polymorphism is 3.6 times significantly higher than in the control group, while the risk of developing thrombosis in male carriers was much, *i.e.* 4.8 higher than in healthy individuals.

It was found that the frequency of occurrence of the “1691G” allele of the FV gene in the examined group of healthy people (excluding gender characteristics) was 98.2%, while the frequency of the mutant “1691A” allele was exactly 1.8%. In the group of patients, the frequency of mutant and healthy alleles was 5.3% and 94.7%, respectively. The probability of developing retinal vein thrombosis and its complications in carriers of this “unfavorable” allele is 3.1 times higher than in non-carriers of this allele.

Conclusions

The facts obtained by us, proving the very high significance of the mutation in the FV-Leiden factor gene in the formation of predisposition to neovascular glaucoma.

P-124

EFFECT OF TXNRD2 RS35934224, FOXC1 RS2745599 AND RS984253 GENETIC POLYMORPHISMS COMBINATIONS ON THE DEVELOPMENT OF POAG

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Purpose

The aim of the study was to determine the effect of TXNRD2 rs35934224, FOXC1 rs2745599 and rs984253 genetic polymorphisms combinations on the development of primary open-angle glaucoma and their degree of association with the disease.

Methods

The study included 185 eyes with POAG stage I-IV and 178 eyes control subjects without of glaucoma. The patients were divided into four groups according to the degree of perimetric changes (Nesterov A. P., 2008). All patients performed standart ophthalmological examination. Analysis of the TXNRD2 rs35934224, FOXC1 rs2745599 and rs984253 genetic polymorphism with POAG was performed in real time using a polymerase chain reaction (PCR) in Gene Amp® PCR System 7500 (Applied Biosystems, USA) automatic amplifier. In the first stage of the study, the genomic DNA from whole venous blood was isolated using the standard reagents PureLink® Genomic DNA Kit for purification of genomic DNA, manufactured by INVITROGEN (USA). The analysis of polymorphism was carried out using unified test systems of TaqMan Mutation Detection Assays Life-Technology (USA). It was determined that the association with POAG had the genotype C/T*A/A*T/A as by comparing control with all patients, and by stratification - with the 1st, 2nd and 3rd groups of patients.

Results

The obtained results showed the evidentiary effect of this genotype combinations on the appearance of POAG, and on its progression by the stages of perimetric changes. The risk of the occurrence of POAG in carriers of genotypes C/T*A/A*T/A was increased by 2.8 times ($p < 0.001$). In this combination, the two polymorphisms had heterozygous genotypes (rs35934224 - C/T, rs984253 - T/A), and the genotype rs2745599 - a mutant homozygote A/A. A combination of genotypes C/C*G/A*T/A was also important for the progression of the disease till stage II, which increased the risk of development of the POAG stage II by 2.9 times ($p < 0.01$) compared to control. The risk of occurrence of the POAG in general and development of stage IV increased the presence of combinations of three minor genotypes T/T*A/A*A/A, which was encountered only in patients with POAG (in stage II - f = 0.025, in the third stage - f = 0.036, and in IV- f = 0.071).

Conclusions

In our opinion, it confirmed the proposed working hypothesis of the study and showed that the more genotype combinations have the mutant alleles, the stronger this genotype affects the development of POAG.

P-125

GENETIC VARIANTS ASSOCIATED WITH A HISTORY OF GLAUCOMA SURGERY IN JAPANESE PATIENTS WITH PRIMARY OPEN-ANGLE GLAUCOMA

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Purpose
To investigate the genetic variants associated with a history of glaucoma surgery in Japanese patients with primary open-angle glaucoma (POAG).

Methods
Japanese patients with POAG (n=468), including normal tension glaucoma (n=246) and high tension glaucoma (n=222), and control subjects (n=246) were genotyped for 22 genetic variants predisposing to POAG that can be classified into those associated with intraocular pressure (IOP) elevation (IOP-related genetic variants) and optic nerve vulnerability independent of IOP (optic nerve-related genetic variants). The total number of risk alleles of the 17 IOP-related and 5 optic nerve-related genetic variants were calculated as the genetic risk score (GRS), and the association between the GRS and history of glaucoma surgery was evaluated.

Results
There was a significant association (odds ratio 1.13 per GRS, 95% confidence interval 1.03 to 1.24, P=0.0093) between the IOP-related GRS, but not optic nerve-related GRS, and history of glaucoma surgery. The IOP-related GRS was correlated positively with need for glaucoma surgery.

Conclusions
The IOP-related genetic variants were associated with a history of glaucoma surgery in Japanese patients with POAG. The results indicate that the magnitude of IOP elevation induced by additive effects of IOP-related genetic variants rather than optic nerve vulnerability induced by optic nerve-related genetic variants may influence whether POAG patients have undergone surgery for glaucoma.

P-126
LTBP2 GENE MUTATION IN TWO SIBLINGS WITH JUVENILE-ONSET OPEN ANGLE GLAUCOMA

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Purpose
Juvenile onset open-angle glaucoma (JOAG) is a rare form of primary open-angle glaucoma (POAG) with an age of onset before 40 years. The MYOC and CYP1B1 genes explain only 5-34% and 2-86% of cases, respectively, in different ethnicities. Herein, we described a family with four affected members, father with POAG and three siblings with JOAG, who were shown to have a missense mutation in latent TGF-β-binding protein gene (LTBP2).

Methods
A pedigree was carefully charted by examining all family members. The father was diagnosed as POAG with high intraocular pressures (IOP) in right and left eyes (35 and 27 mmHg, respectively) and peripapillary retinal nerve fiber layer thickness (RNFLT) of 76 mm OD and 103 mm OS. The mother had normal eye examination and there was no consanguinity between the father and the mother. Out of 5 children (3 females and 2 males), 3 had JOAG. Age of JOAG siblings were 28 years (Male, Proband I), 24 years (Male) and 20 years (Female, Proband II). At presentation, the IOPs of the proband I were 40 mmHg and 35 mmHg in OD and OS, respectively, and 26 and 42 mmHg in OD and OS of proband II, despite maximal medical antiglaucomatous treatment. Best corrected visual acuities (BCVA) were hand motion OD and 20/200 OS in proband I and 20/25 OD and 20/80 OS in proband II. They underwent glaucoma surgeries in both eyes. The DNA samples obtained from the peripheral blood of the probands were subjected to DNA sequencing analysis using the next-generation sequencing method. The analysis of the obtained data was carried out on the Genomize Seq platform.

Results
In both siblings, a novel c.607C>T (rs777450651) homozygous variant was detected in the LTBP2 gene, which is a missense mutation converting arginine 203 to cysteine (R203C). No mutation was found in MYOC and CYP1B1 genes.

Conclusions
LTBP2 gene is positioned within locus GLC3D (OMIM 602091), which lies very close to GLC3C on chromosome 14q24.2- 14q24.3. It encodes an ECM protein that is expressed in elastic tissues and associates with fibrillin-1-containing microfibrils. In addition to structural roles, it may affect the activities of TGF- β, which is a potent multifunctional cytokine that modulates ECM production and oxidative stress response. LTBP2 gene mutations were shown to be associated with primary congenital glaucoma, microspherophakia and/or megalocornea, with ectopia lentis and with or without secondary glaucoma and Weill-Marchesani syndrome.

P-127

PREDICTING THE OCCURRENCE OF PRIMARY OPEN-ANGLE GLAUCOMA DEPENDING ON THE GENETIC POLYMORPHISM ENDOTHELIAL NO SYNTHASE GENE

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Purpose

Was to develop the model for predicting primary open – angle glaucoma (POAG) depending on the presence of the genetic polymorphism in the endothelial NO-synthase (NOS3) gene.

Methods

The results of genotyping 153 patients (153 eyes) with POAG are included in this investigation. 47 patients were in the control group. Their age was 65,0±13,1 years, duration of disease – 4,9±5,3 years. The polymerase chain reaction was carried out in the patients' blood in the real time mode (Gene Amp® PCR System 7500 amplifier; USA) with the help of the TaqMan Mutation Detection Assays Life-Technology test system (USA). The program Statistica 10 (StatSoft, Inc., USA) was used for mathematical testing of the obtained results.

Results

The regression analysis confirmed the effect of rs1799983 and rs2070744 polymorphisms of the NOS3 gene on the development of POAG. Calculating their specific gravity based on the degree of the impact on the probability of developing the disease showed that rs2070744 – 72.2% had the greater impact than rs1799983 – 38.5%. The regression model of POAG risk depending on the genotypes of the NOS3 gene rs1799983 and rs2070744 polymorphisms was constructed with the satisfactory quality of mathematical prediction (-2log=202.59; $\chi 2 = 28.91$; P<0.001). The value of probability of developing POAG exceeded the limit value (Cut-off=0.8), respectively, OR 4.39 (95% CI 1.00-19.30; P=0.048) and OR 14.15 (95% CI 1.88-106.28; P<0.001) in carriers of the rs1799983 and rs2070744 GT-CC and TT-CC haplotypes.

Conclusions

The results of the study proved the importance of risk genotypes (TT rs1799983 and CC rs 2070744) for the development of POAG in patients from the Ukrainian population. It has been shown that the significant increase in the risk of POAG exists for carriers of the GT-CC and TT-CC haplotypes.

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P-128
"THROUGH THE EYES OF A CHILD" A FOX C1 GENE-RELATED PRIMARY CONGENITAL GLAUCOMA A CASE REPORT

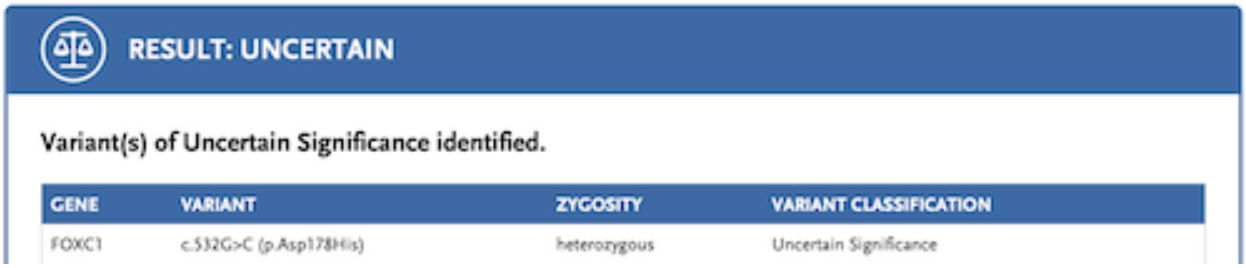
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Purpose
This paper aims to discuss a case of Primary Congenital Glaucoma (PCG) managed holistically. This report calls attention to the importance of comprehensive evaluation, early recognition, genetic counselling and adequate management of such a visually disabling disease.

Methods
This is a case of a 9-month-old female who presented with right eye opacity with enlargement of both eyes and intolerance to light. She sought consult at our institution and was given an impression of bilateral PCG. She underwent examination under anesthesia (EUA) with bilateral glaucoma surgery. She was also referred to an ocular geneticist for further investigation and genetic counseling, where a glaucoma panel was ordered.

Results
EUA confirmed our working diagnosis of bilateral PCG. Patient underwent glaucoma drainage device placement on the right eye and goniotomy on the left which resulted to a decrease in IOP on both eyes. Eventually, there was an increase in IOP on the left eye which necessitated another glaucoma drainage device placement which afforded relief.

A FOXC1 gene mutation was detected in our patient. This FOXC1 variant (c.532G>C (p.Asp178His) has not yet been reported in literature in individuals with primary congenital glaucoma.

Image

RESULT: UNCERTAIN

Variant(s) of Uncertain Significance identified.

GENE	VARIANT	ZYGOSITY	VARIANT CLASSIFICATION
FOXC1	c.532G>C (p.Asp178His)	heterozygous	Uncertain Significance

Conclusions
Primary congenital glaucoma is a debilitating disorder caused by increased IOP in infants. A comprehensive approach to history taking and ophthalmological examination in patients who manifest with these symptoms is crucial to curb the progression of this sight- threatening disease. Thus, detection of symptoms early in this patient was key to a timely treatment course. The surgical success rate, family's disposition, patient's expectation should all be given special consideration when deciding between procedures. Genetic studies plays a key role in treatment planning for the patient and her family members. Continued surveillance and frequent monitoring are important in preventing relapses and complications.

PCG carries a poor prognosis if left unmanaged, but holds, a favorable outcome if treated without delay. This case illustrates how a high index of suspicion along appropiate management may help curtail such an ill- fated disease. This FOXC1 variant has not yet been reported in literature in individuals with primary congenital glaucoma. With ongoing genetic studies, It may be the first in the Philippines if proven pathogenic.

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P-129
INVESTIGATION OF THE ASSOCIATION BETWEEN INTERLEUKIN-18 POLYMORPHISM AND NORMAL TENSION GLAUCOMA

C Wang

Purpose
Recent laboratory evidence indicates that the inflammatory cytokine, interleukin-18 (IL-18), have adverse effects on normal tension glaucoma (NTG). Inheritance of the IL-18 (-607) polymorphism (the C allele), previously shown to increase IL-18 production, has been associated with an elevated risk of Alzheimer's disease. The neuronal injuries associated with Alzheimer's disease have a number of similarities with the optic nerve changes often seen with NTG. In this report we have explored the possible association between the IL-18 (-607) polymorphism and the development of NTG.

Methods
112 patients with NTG were recruited and compared with 117 healthy controls in Chinese population. Polymorphisms will be determined using sequence-specific primers (SSPs) and polymerase chain reaction (PCR). Patients and controls were genotyped for the C/A polymorphism at position -607 of the IL-18 gene promoter region.

Results
The frequency of the IL-18 (-607) C allele (61% vs. 50%, respectively; p=0.02) and were greater in NTG patients compared with controls. There is a higher risk of NTG associated with homozygosity for the IL-18 (-607) C allele (CC genotype) compared with the control population (CC genotype; 33% vs. 22%, respectively, p=0.04).

Conclusions
The IL-18 (-607) C allele polymorphism, previously shown to increase IL-18 gene expression, may be a risk factor in the development of NTG.

P-130
PAPILLORENAL SYNDROME : A NEW MUTATION

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Purpose
Papillorenal syndrome or renal coloboma is a autosomal dominant process, caused by a mutation of PAX2 gene. It is a hereditary vascular dysgenesis, being the ocular and renal circulation mainly affecting.We describe a new mutation of this syndrome.

Methods
We present a 52-year-old man case who attended glaucoma clinic consultation due to eye pressure into the limits of normality derived from previous retinal section. He suffers chronic renal failure, sequel to a kidney transplant surgery. A horizontal-rotary nystagmus is observed in the medical examination, greatly impaired visual acuity, and an eye fundus with bilateral optic nerve coloboma with changes in the pigmentary epithelium at macular level.

Results
Consequence to the patient's history, especially for the renal surgery, a genetic study to confirm a possible papillorenal syndrome is requested, obtaining a mutation in the PAX2 gene: c 91C (p. Arg31Gly) in heterozygosity previously not described.

Conclusions
Differential diagnosis should be done in presence of excavation anomalies, including papillary staphyloma, Morning Glory papilla, the megalopapilla, the optic pit and the papillorenal syndrome. Lattest one is due to a PAX 2 gene mutation, with an autosomal dominant pattern of inheritance. Facing a patient who presents both renal and ocular anomalies, this syndrome should be considered by requesting a genetic study to confirm it.

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P-132

PHENOTYPE – GENOTYPE CORRELATION IN PRIMARY CONGENITAL GLAUCOMA (PCG) IN SAUDIA ARABIA

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Purpose

as a part of PCG prevention program, by genetic testing & counselling for families with members suffering from PCG, we reviewed phenotype in association with mutations found

Methods

patient with PCG approached during their routine clinic visit, about genetic testing for any known mutations that can cause PCG, then the electronic medical record reviewed, looking for a specific characteristic common in patients with similar mutations; like age of onset, severity of the disease, surgeries and medications needed to control glaucoma

Results

Sample collected from 284 PCG patients; 42% male, 58% female, age 2-60 years old, they were 31% from central area, 30% southern, 24% western, 12% northern and 3% from eastern region (all Saudis),

219 showed CYP1B1 mutation, 207 carried Homozygous mutation (173 of Gly61Glu & 34 Arg469Trp), 12 had Heterozygous mutation of Gly61Glu, associated with heterozygous Arg469Trp in 5 of them, the rest were negative for the previous mutations and the other known common mutation in CYP1B1 in Saudi Arabia (Glu229Lys)

Some patients (n=5) had no surgeries done, the rest had from 1 to 13 surgeries between both eyes, most of the patients underwent 2 surgeries (in 26%), 3 (in 16%) and 4 (in 15%).

Only 7% were off medications, but most of the patients were on multimedications, and on maximum treatment (4 medications) in 23%

Total 55% had advanced disease in one or both eyes, in Arg469Trp mutation carriers 73% had sever disease, but 27% of them needed 2 or less surgeries only

80% were legally blind in one or both eyes (because of glaucoma's disc damage, corneal opacities, high myopia and amblyopia)

Having Heterozygous mutation didn't show different picture

Conclusions

High percentage of our population carry homozygous CYP1B1 mutation, many of them lost vision (in one or both eyes). The best way to prevent PCG, is premarital genetic screening for carriers.

We are still looking for other mutations for the samples that were not solved , and there are 140 known CYP1B1 mutation associated with PCG

there was no difference in phenotype between patients with homozygous or combined heterozygous mutations on the same gene.

P-133

PRIMARY CONGENITAL GLAUCOMA: WHEN THE PHENOTYPE IS CONCLUSIVE BUT THE GENOTYPE IS NOT: IMPLICATIONS FOR MANAGEMENT AND GENETIC COUNSELING

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Purpose

Describe a clinical case whose phenotype corresponds to Primary Congenital Glaucoma PCG, where the molecular study is not conclusive. We analyze the variants found and present the genetic counseling of the proband.

Methods

We present a 37-year-old female patient with PCG, who at 6 months of life underwent bilateral eye surgery, goniotomy, then Trabeculotomy at 16 years old ,trabeculectomy at 35 years old. She refers atopic dermatitis, myopia and hypertrichosis.

She has 2 daughters 10 and 8 years old, the latter operated on for PCG in Both eyes at 4 and 6 months of life. She presents an only sister without glaucoma with 2 daughters, one of them 1 year old affected with PCG, operated on 2 times on both eyes.

She does not mention antecedents in previous generations or in the father of her daughters.

At the ophthalmological examination the VA in RE : Sph -2.00 cyl.-5.00 at 80°: 20/20 and LE sph-6.75 cyl. -1.00 at 25°:20/20.

Biomicroscopy shows HAAB streaks, filtering blebs, and Embriotoxon. Gonioscopy shows embryotoxon, high iris insertion , 360° goniodysgenesis.At the patient's request, the DNA study was carried out, taking a peripheral blood sample, with NGS massive sequencing technique, using a panel of 942 genes related to ophthalmological pathology, including the mitochondrial genome.

Results

The patient presented stable IOP , 12mmHg in OU in the follow-up

The molecular study did not detect pathogenic or probably pathogenic variants.

Thirty-two heterozygous variants of uncertain significance were detected : AARS2, ABHD12, ATP7B, BBS9, C12orf57 ,CSPP1 ,EPHA2 , ESCO2 ,FRAS1 ,GNPAT ,GPR179 , HADHB ,HMCN1 , HMCN1 ,KIAA0556 , MGME1 ,PEX6 ,RP1,RERE , AMD11 ,SARS2 ,EPHA2, SLC25A26 ,SLC7A14 ,SOX3 ,TBK1 ,TRMT5 ,TRMT5 ,TUBGCP6 ,VPS13B ,WDR17 and ZNF469.

These Mutations are possibly associated with ocular disease and are found in heterozygosis and in PEX in homozygosis These mutations are not reported in the database.The Inheritance form by the clinic is suspected Dominant or Pseudominant.

Conclusions

PCG , are sporadic ,40% have genetic bases.Mutations in CYP1B1 is the best known of autosomal recessive inheritance.

Genetics are complex and the inheritance is not yet fully understood.We advise the proband to carry out the molecular study on the family ,daughters, sister and daughters. to determine which variant they have in common and elucidate mechanism of inheritance.

We believe that the genetic study is a powerful tool to diagnose ,manage and to study risk of recurrence.

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P-134

EVALUATION OF POLYGENIC RISK SCORE AND VALIDATION OF DIAGNOSTIC CODES OF PRIMARY OPEN-ANGLE GLAUCOMA IN ELECTRONIC HEALTH RECORD-LINKED BIOBANKS

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Purpose

A polygenic risk score (PRS) may improve risk stratification for primary open-angle glaucoma (POAG). In constructing a PRS, case definitions are often based on diagnostic codes which may introduce misclassification. To assess the utility of ICD-code-based PRS construction and future usage, we validated ICD codes of POAG status and tested PRS performance among ICD-code-based and manually validated cases/controls in two electronic health record (EHR)-linked biobanks.

Methods

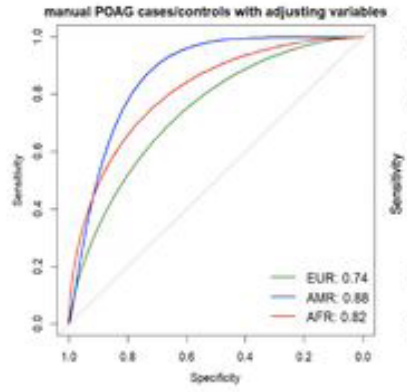
We constructed the PRS using the Lassosum penalized regression framework from 10,238,000 directly genotyped and imputed variants for 449,186 UK Biobank samples (14,171 cases, 394,292 controls). The calculated weights were used to compute a POAG PRS in 4,824 Mount Sinai BioMe Biobank and 34,547 Mass General Brigham (MGB) Biobank participants. We reviewed records of ICD-identified POAG subjects in each biobank and confirmed cases based on chart notes, optical coherence tomograms, and visual fields (VF). In a 5% random sample, controls were verified based on intraocular pressure and cup-disc ratio. We compared the PRS area under curve (AUC) performance of manually reviewed vs. ICD-identified cases/controls.

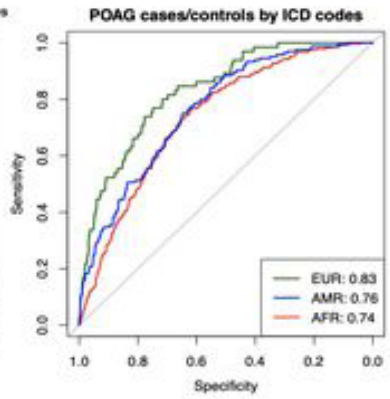
Results

485/610 and 545/889 patients from BioMe and MGB had ≥1 POAG ICD code and VF for chart review. Among cases manually reviewed in BioMe and MGB, the most common ancestral groups represented were Hispanic (54.7%) and European (80.5%), respectively. For BioMe and MGB, respectively: positive predictive value was 60% vs. 52%; negative predictive value was 95% vs. 96%; sensitivity 94% vs. 96%; and specificity 62% vs. 53%. When adjusted for age, sex, and genotyping array, AUC for association with POAG using manual review vs. ICD codes in BioMe (Fig 1) was, respectively: 0.77 vs. 0.74 for African, 0.82 vs. 0.76 for Hispanic, and 0.87 vs. 0.83 for European; for MGB: 0.82 vs. 0.82 for African, 0.88 vs. 0.90 for Hispanic, 0.74 vs. 0.77 for European. In BioMe, the manual AUC performed better than ICD-based coding in Hispanics ($p=0.02$); for MGB, the AUC between ICD-identified vs. manual review was similar ($p \geq 0.16$; Fig 1).

Image

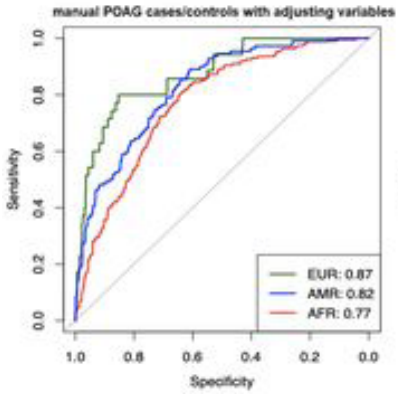
BioMe Adjusted AUC Estimation

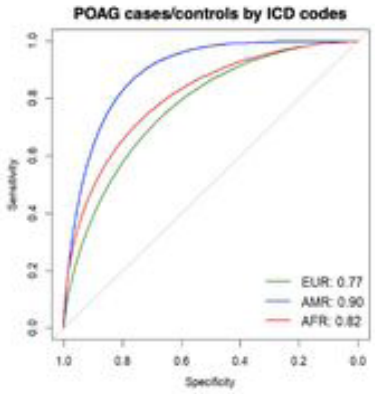




Ancestry	P-value (Compare two ROC curves)
African	0.12
Hispanic	0.02
European	0.28

MGB Adjusted AUC Estimation





Ancestry	P-value (Compare two ROC curves)
African	0.96
Hispanic	0.62
European	0.16

Conclusions

A PRS designed to identify POAG performed similarly using either manual clinical standard or ICD coding across most ancestries in two EHR-linked biobanks.

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P-136

CAUSAL ASSOCIATION OF THE USE OF CALCIUM CHANNEL BLOCKERS ON PRIMARY OPEN-ANGLE GLAUCOMA: A TWO-SAMPLE MENDELIAN RANDOMIZATION STUDY

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Purpose

To evaluate the causal association between the use of calcium channel blockers (CCBs) and primary open-angle glaucoma (POAG) using genetic data from multi-ethnic population.

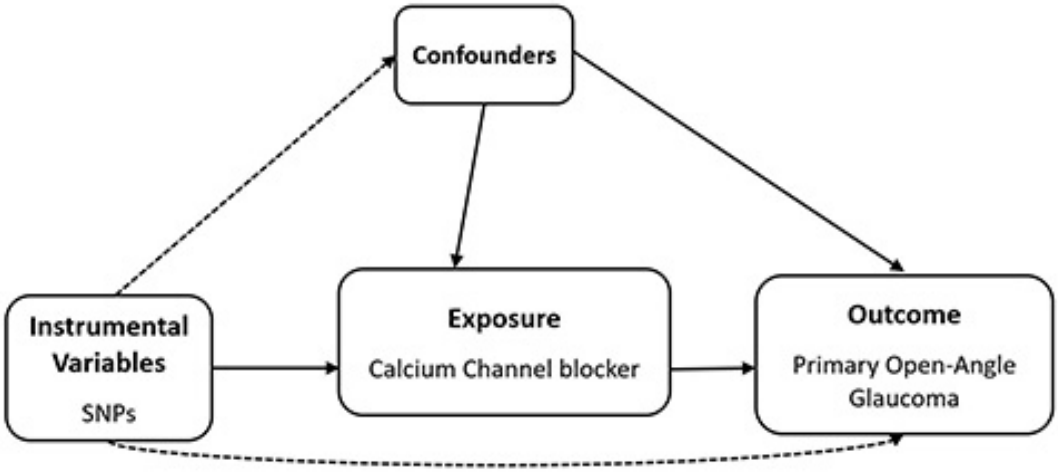
Methods

The single nucleotide polymorphisms (SNPs) associated with exposures for the uses of CCBs were selected as instrumental variables (IVs) from meta-analysis data (n=628,000) from Biobank Japan and UK biobank (UKB). The genome-wide association study dataset for POAG were used from the meta-analysis data of Genetic Epidemiology Research in Adult Health and Aging and UKB (n=240,302, 12,315 cases and 227,987 controls). A two-sample Mendelian randomization (MR) study was conductd to assess the casual estimates using inverse-variance wieghted (IVW) method, MR Egger method, and MR-Pleiotropy Residual Sum and Outlier test (MR-PRESSO). In addition, we performed Cochran's Q statistic and MR–PRESSO global test to assess heterogeneity and pleiotropy.

Results

The 101 SNPs with ($P < 5.0 \times 10^{-8}$) were selected as IVs for CCBs use in this study. The Cochran's Q statistic showed the heterogeneity (P<0.001) and MR–PRESSO global test revealed horizontal pleiotropy (P<0.001). The IVW analysis with the fixed effect model revealed a substantial protective relationship between CCB consumption and POAG (β =-0.081, P=0.012), although IVW analysis with the random effect model showed marginal significance (β =-0.081, P=0.076). Since the presence of horizontal pleiotropy and heterogeneity for the IVs, we adopted MR–PRESSO for optimal MR analysis, indicating the protective association of CCBs uses on POAG (β =-0.09289, P=0.0077).

Image



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Conclusions

Our study revealed that the uses of CCBs on the protective impact of POAG were considerably discovered for multi-ethnic population through MR-PRESSO analysis. The protective effect of CCBs uses on POAG implies the need for further investigation for neuroprotection aspects for glaucoma pathology.

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P-137

HIGHER TESTOSTERONE IS ASSOCIATED WITH OPEN-ANGLE GLAUCOMA IN WOMEN: A GENETIC PREDISPOSITION?

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Purpose
Testosterone may be a possible modifiable risk factor for open-angle glaucoma (OAG) and intraocular pressure (IOP), but evidence has been scarce and conflicting. In this study we evaluated the association of testosterone and its genetic predisposition with incident (i) OAG, IOP, retinal nerve fiber layer (RNFL), and ganglion cell-inner plexiform layer (GCL+).

Methods
Participants aged 45-100 years were derived from the prospective, population-based Rotterdam Study. Ophthalmic examinations and serum testosterone measurements (including bioavailable and free testosterone) were performed from 1991 onwards. Follow-up took place every 4-5 years. A total of 187 out of 7898 participants were diagnosed with iOAG during follow-up. Of these, 6873 participants were genotyped. We calculated sex-specific weighted genetic risk scores (GRS) for total and bioavailable testosterone. Associations with iOAG were analyzed using multivariable logistic regression. Associations with IOP, RNFL, and GCL+ were analyzed with multivariable linear regression. Analyses were stratified on sex and adjusted for at least age, body mass index, and follow-up duration.

Results
In men, testosterone was not associated with iOAG. However, the GRS for higher total testosterone was associated with an increased iOAG risk (odds ratio [OR] with 95% confidence interval [95% CI]: 2.31 [1.04; 5.14], per unit). In women, higher values of bioavailable testosterone (2.05 [1.00; 4.18] per nmol/L) and free testosterone (1.79 [1.00; 3.20] per ng/dL) were significantly associated with increased risk of iOAG. Moreover, the GRS for higher bioavailable testosterone was associated with an increased iOAG risk (3.08 [1.32; 7.18], per unit). Higher bioavailable and free testosterone were adversely associated with IOP (0.58 [0.05; 1.10] per nmol/L and 0.47 [0.04; 0.90] per ng/dL). Higher total testosterone was inversely associated with peripapillary RNFL and GCL+ (Beta [95% CI]: -3.54 [-7.02; -0.06] per nmol/L and -2.18 [-4.11; -0.25] per nmol/L, respectively).

Conclusions
In women, testosterone is adversely associated with iOAG. Both IOP-dependent and IOP-independent mechanisms may underlie this association. These findings are important since the number of gender dysphoric individuals seeking hormonal therapy is increasing and OAG is a common sight-threatening disorder. If any, transgender men receiving testosterone therapy may have an increased risk of OAG.

P-138

MITOCHONDRIAL TXNRD2 AND ME3 GENETIC RISK SCORES ARE ASSOCIATED WITH SPECIFIC PRIMARY OPEN-ANGLE GLAUCOMA PHENOTYPES

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Purpose

Genetic variants in regions that include the mitochondrial genes TXNRD2 and ME3 are associated with primary open-angle glaucoma (POAG) in genome-wide association studies (GWAS). To assess their clinical impact, we investigated whether TXNRD2 and ME3 genetic risk scores (GRSs) are associated with specific glaucoma phenotypes.

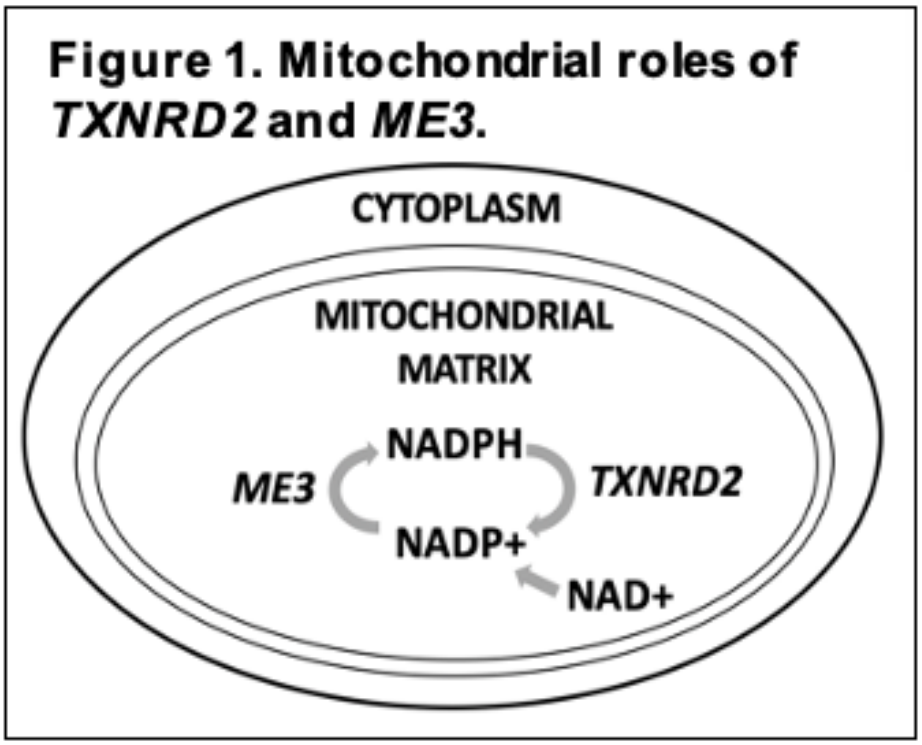
Methods

2617 POAG cases and 2634 controls from the NEIGHBORHOOD consortium were included in this cross-sectional study. All POAG-associated single nucleotide polymorphisms (SNPs) in the TXNRD2 and ME3 loci were identified using GWAS data ($p<0.05$). Of these, 20 TXNRD2 and 24 ME3 SNPs were selected after adjusting for linkage disequilibrium. The correlation between SNP effect size and gene expression levels was investigated using the Gene-Tissue Expression (GTEx) database. GRSs were constructed for each individual using the unweighted sum of TXNRD2, ME3, and TXNRD2+ME3 combined risk alleles. Age and gender-adjusted odds ratios (ORs) for POAG diagnosis were calculated per decile for each GRS. Additionally, the clinical features of POAG cases in the top 1, 5, and 10% of each GRS were compared to the bottom 1, 5, and 10%, respectively.

Results

Increased SNP effect size strongly correlated with higher TXNRD2 and lower ME3 expression levels ($r=0.95$ and -0.97, respectively, $p<0.05$ for both), which would each result in lower levels of NADPH (Figure 1). Individuals in decile 10 of TXNRD2+ME3 GRS had the highest odds of POAG diagnosis (OR=1.79 compared to decile 1, $p<0.001$). POAG cases in the top 1% of TXNRD2 GRS had higher mean maximal treated IOP compared to the bottom 1% (19.9 mmHg vs 15.6 mmHg, adjusted $p=0.03$). POAG cases in the top 1% of ME3 and TXNRD2+ME3 GRS had a higher prevalence of paracentral field loss compared to the bottom 1% (72.7-88.9% vs 14.3-33.3%; adjusted $p=0.03$ for both).

Image



Conclusions

POAG patients with higher TXNRD2 and ME3 GRSs had higher treated IOP and a greater prevalence of paracentral field loss. Functional studies exploring how these variants impact NADPH levels and mitochondrial function in glaucoma patients are warranted.

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P-139

ARCUATE FIELD DEFECTS DO NOT SUPPORT THE LAMINA CRIBROSA AS THE PRIMARY SITE OF INJURY IN CHRONIC GLAUCOMA

S Hasnain

Purpose

The lamina cribrosa (LC) is believed to be the primary site of injury in chronic glaucoma. Superior and inferior arcuate field defects are a pathognomonic feature of glaucoma. These glaucomatous field defects are produced in an orderly and predictable sequence, the basis for performing perimetry in glaucoma. The purpose of this study was to determine if the LC was the primary site of injury based on the arcuate field defects in glaucoma.

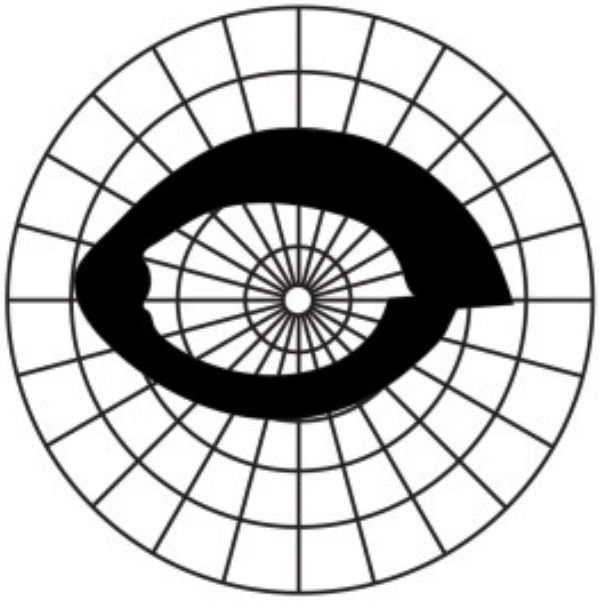
Methods

A literature review on the pathogenesis of chronic glaucoma for the past fifty years was conducted. Prevalent glaucoma theories discussed in the literature were individually analyzed. The study focused primarily on (1) the normal arrangement of nerve fibers (NF) in the retina and in the lamina cribrosa and (2) their correlation with presence of the arcuate field defects.

Results

The literature discussed the LC as the primary site of injury in glaucoma. Some of the prevalent theories include: posterior bowing of the lamina cribrosa (cupping), apoptosis, autoimmune disorder, neurodegeneration of the ganglion cells, and others. However, none of these theories explain production of the arcuate field defects, a salient feature in glaucoma.

Image



Double arcuate field defect (ring scotoma) in glaucoma

Conclusions

Arcuate field defects correspond fully with the arrangement of nerve fibers (NF) in the retina until they make their 90-degree turn towards the LC. After their 90-degree turn, the NF become vertically oriented and lose their arcuate pattern. The arcuate pattern of NF is present

only in the retinal nerve fiber layer. In the LC, the macular NF move to a central location and arcuate NF are no longer distinguishable. Based on production of the arcuate field defects, neither the ganglion cells nor the LC can be the primary site of injury in glaucoma.

It is hypothesized that the LC is sinking, resulting in stretching and the eventual severance (axotomy) of NF at the scleral edge at their 90-degree turn. Axotomy of NF at their 90-degree turn will still produce arcuate field defects, but not after they have made their 90-degree turn. As the LC sinks progressively, the cascade of severance will start with the most peripheral NF, being closest to the scleral edge and end with the most central NF in an orderly sequence. The entire arcuate and macular NF are being axotomized simultaneously at the scleral edge. However the arcuate NF, being fewer in number, are depleted earlier giving rise to the arcuate field defects. In summary, glaucoma may not be an optic disc neuropathy, but an optic disc axotomy.

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P-140

INTEREYE COMPARISON OF LAMINA CRIBROSA CURVATURE BETWEEN EYES WITH ASYMMETRICAL SEVERITY IN TREATMENT NAÏVE BILATERAL NORMAL-TENSION GLAUCOMA PATIENTS

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Purpose
To investigate inter-eye differences in lamina cribrosa (LC) morphology in Patients with treatment naïve Bilateral Normal-Tension Glaucoma with asymmetrical damage.

Methods
Treatment-naive bilateral NTG patients with asymmetrical damage were included. Optic nerve heads were scanned using enhanced depth spectral domain optical coherence tomography. The magnitude of the LC curve was assessed by measuring LC curve index (LCCI) at three locations spaced equidistantly across the vertical optic disc diameter, respectively. LCCI were compared between more damaged and contralateral eyes. Additionally, the conditional logistic regression analysis was performed to identify the ocular risk factors associated with more damage between both eyes in the individuals.

Results
A total of 94 eyes of 47 bilateral NTG patients were included. The mean age of patients was 59.8 ± 11.4 years, 24 males and 23 females. More damaged eyes had higher baseline intraocular pressure (IOP) ($p = 0.004$), thinner global retinal nerve fiber layer thickness ($p = 0.015$) and worse visual field mean deviation ($p < 0.001$) and pattern standard deviation ($p < 0.001$) than contralateral eyes. In contrast, there were no significant inter-eye differences in spherical equivalent and axial length. Average LCCI was significantly larger in more damaged eyes (9.06 ± 1.83 vs. 8.24 ± 1.99 µm, $p = 0.001$). In conditional logistic regression analysis, the higher the baseline IOP ($p = 0.008$) and the larger the LCCI ($p = 0.004$), the higher the risk for having severe damage between both eyes with similar systemic condition.

Conclusions
LC curvature was significantly larger in eyes with more damage, suggesting that LC undergoes significant remodeling in the NTG eyes even their IOPs are within normal range.

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P-141

IOP DIURNAL & NOCTURNAL FLUCTUATION - GAINING MORE INSIGHT IN CLINICAL PRACTICE

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Purpose

Intraocular pressure (IOP) remains the only modifiable glaucoma risk factor. Clinical studies have demonstrated that lowering IOP slows disease progression[1]. However, IOP displays diurnal fluctuations throughout the course of the day with greater fluctuations, as per CIGTS tied to disease progression (i.e >8 mmHg)[1,2,3]. iCare Home detects IOP fluctuations outside of the clinic[4]. This study assessed IOP diurnal and nocturnal variations/ fluctuations with the iCare in a cohort of OAG patients.

Methods

Seventy patients (25 females and 45 males), average age of 65.4 yrs, (33 to 90 yrs), of the Moran Eye Center, U of Utah IRB, #I00137753, were given the iCare Home2 for up to 14 days to assess diurnal/nocturnal IOP variability. iCare Home2 data, including max, min and range of IOP in each eye, was collected and assessed by each clinician as part of treatment decision-making with management often altered based on iCare IOP data that would have been otherwise unavailable.

Results

In patients with asymmetric, advanced and/or severe glaucomatous disease, the iCare Home2 data demonstrated a consistent upsurge in IOP during early am hours. These IOP "spikes" were often greater than 21 mmHg despite ongoing treatment. The max IOP was greater than 21 mm Hg in the left eye in 22/70 patients (31.4%). In the right eye, 19/70 patients (27.1%) demonstrated a max IOP greater than 21 mm Hg. The average difference between the max and mim IOP was 9.9 and 10.0 mm Hg in the left and right eye, respectively. In one 74 yr old white male POAG patient on maximum medical therapy, the severely affected eye fluctuated from 6 to 21 mmHg, while the unaffected eye fluctuated from 7 to 11 mmHg. Fluctuations in some cases exceeded 20 mm Hg over the course of 24 hours. In several patients with pre-perimetric disease, IOP was higher in the eye with mild OCT thinning. In a patient with mild XFG, the affected eye was 17-19 mmHg in the office yet spiking to 26/28 at 6 am, which helped to determine next steps. In 3 OHT patients on no therapy, the iCare Home helped confirm minimal fluctuation which may indicate a low risk for OAG damage.

Conclusions

At an academic glaucoma center, we have utilized the iCare Home to help identify IOP diurnal spikes as well as large IOP fluctuations, more so in severe glaucomatous eyes despite ongoing glaucoma management. In many cases, IOP spikes occurred outside of clinic in the early waking hours. Home tonometry use helped determine max IOP and impacted and guided clinical care.

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P-142

DIURNAL CHANGE OF RETINAL VESSEL DENSITY RELATED TO HEMODYNAMIC VARIATION IN TREATMENT-NAÏVE LOW-TEENS NORMAL-TENSION GLAUCOMA

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Purpose

To investigate the diurnal variation of optical coherence tomography angiography (OCTA) -derived retinal vessel density (RVD) in glaucoma patients with low baseline intraocular pressure (IOP)

Methods

A prospective evaluation was performed on 35 low-teens normal-tension glaucoma (low-teens NTG) patients with pre-treatment IOP < 15mmHg and 32 healthy subjects. Superficial peripapillary and macular RVD by OCTA, IOP, and systemic blood pressure (BP) were all measured four times per day (from 9:00 a.m. to 6:00 p.m.). The magnitudes and patterns of diurnal variation of RVD, BP, and MOPP were analyzed and compared between the low-teens NTG patients and the healthy subjects.

Results

Intra-visit repeatability (0.835-0.948) and inter-visit repeatability (0.755-0.911) for the RVD measurements showed excellent reliability. In the low-teens NTG group, the magnitude of diurnal changes in peripapillary RVD and macular RVD were greater than those in the healthy group (P=0.017 and 0.036). Diurnal variations of diastolic BP (DBP) and MOPP also were greater in the low-teens NTG (P=0.013 and 0.025). As for the patterns of diurnal RVD change, the inferior and temporal sections of macular RVD showed significant differences between the two groups (P=0.029 and 0.036, Figure).

Conclusions

In treatment-naïve low-teens NTG, diurnal changes of RVD and MOPP and were greater than those in healthy eyes. The macular RVD and MOPP showed different diurnal patterns between the two groups. From these findings, OCTA-derived RVD variation could be related to hemodynamic variability in low-teens NTG.

P-143
INTRAOCULAR PRESSURE INDICATORS IN PATIENTS WITH TYPE 1 DIABETES MELLITUS

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Purpose
Diabetes mellitus (DM) is currently the third most common chronic disease in children [1,2]. In diabetes mellitus, an increase in intraocular pressure is often observed [4,5].

Цель исследования - определение внутриглазного давления у детей с сахарным диабетом 1 типа.

Methods
Materials and methods. The study involved 79 children aged 1 to 17 years. Of these, there were 44 boys (55.7%), girls - 35 (44.3%). There were 14 rural residents (17.7%) and 65 urban residents (82.2%). The children examined by us were divided into 6 groups depending on the level of glycated hemoglobin (HbA1c): group 1 - HbA1c up to 6.0% - 8 people, group 2 - with HbA1c from 6.1 to 7.0% - 29 people; group 3 - HbA1c from 7.1 to 8.0% - 21 people, group 4 - HbA1c from 8.1 to 9.0% - 8 people, group 5 - HbA1c from 9.1 to 10% - 5 and, 6 group - HbA1c more than 10% - 8 children. The control group consisted of 52 people. The duration of diabetes mellitus was mainly 1 (27.8%) and 2 (20.2%) years. The median duration was 4.9±3.45 years. Determination of the level of IOP was carried out on a non-contact ophthalmic tonometer HNT-1.

Results
Research results.The median intraocular pressure in all groups of patients, including the control group, was 18.9±2.4 for OD, 19.18±2.65 for OS, and 19.04±2.52 mm Hg for both eyes. The average level of intraocular examination in children of the control group was OD 17.58±2.55, OS 17.78±2.53 mm Hg, median - 17.68±2.54 mm Hg. The highest IOP levels were observed in patients 3 (OD 18±1.98, OS 18.93±2.45, mean values OU 20.93±2.21 mm Hg) and 4 (OD 19.5±3.16 , OS 21.5±2.83, OU 20.5±2.99 mm Hg) groups (P>0.5), the smallest - in children 5 (OD 17±2.8, OS 15.8±1.04, mean values of OU 16.4±1.92 mm Hg) of the group (P>0.5). Analysis of the results of the study of the level of intraocular pressure in children with diabetes mellitus showed a tendency to increase with IOP depending on the duration of the disease. Thus, the highest level of IOP was observed in the group of patients, where the duration of diabetes was 12-14 years (21.5±2.8 mm Hg) (P>0.5), the lowest with the duration of diabetes up to 2 years (17.58± 2.6 mmHg) (P>0.5).

Conclusions
The results of the study showed a trend towards an increase in IOP depending on the duration of the disease. Also, there was a tendency to increase the level of IOP in relation to the control group, regardless of the level of glycosylated hemoglobin.

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P-144

A NOVEL CHRONIC GLAUCOMA MODEL IN MOUSE BY A SINGLE INTRACAMERAL INJECTION PHOTO-CROSSLINKED METHACRYLATE-MODIFIED SERICIN HYDROGEL

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Purpose
The current animal models of glaucoma cannot provide chronically elevated intraocular pressure (IOP) and maintain the clarity of optical media for a long time. In this study, we developed a new mouse model of chronic ocular hypertension, which was induced by a single anterior chamber injection of photo-crosslinked methacrylate-modified sericin (MA-SS) hydrogel.

Methods
C57BL/6J mice aged 6-8 weeks were randomly divided into control group and operation group. After injection of MA-SS, the IOP was measured before operation, 3 days after operation and weekly until the end of the study. Flash visual evoked potential (F-VEP) was used to observe the function of optic nerve before operation and 2,4,6 weeks after chronic ocular hypertension (COH). After COH 2, 4 and 6 weeks, TNF-α, IL-1β and IL-17A protein expression in retina was measured by Western blot. Microglial activation was assessed by immunofluorescence staining and Western blot. The apoptosis and loss of retinal ganglion cells were observed by TUNEL assay and Brn3a protein labeling. The loss of optic nerve axons in COH mice was evaluated by electron microscopy.

Results
IOP increased to an average of 23 ± 2.8 mmHg for at least 8 weeks after a single intracameral injection. There was a significant difference in IOP between COH mice and control mice ($p<0.0001$). The success rate was 80%. The average amplitude of F-VEP in COH mice decreased ($p=0.0231$, 0.0014 and 0.0005 respectively at 2, 4 and 6 weeks after COH compared with the control group), and the average latency of COH mice was longer ($p=0.0250$, <0.0001 and<0.0001) compared with the control group. The protein expression of TNF-α, L-1 β and IL-17A increased in the process of COH compared with the control group. The number of microglia increased, and rounded Iba-1$^+$ CD68$^+$ cells was increased. At 2, 4 and 6 weeks after COH, apoptosis of retinal ganglion cells (RGC) was clearly observed in mice. The RGC density of COH mice decreased significantly ($p=0.002$, 0.0016 and<0.0001 vs the control group). The optic nerve axons of the mice were significantly reduced ($p=0.005$, 0.0012 and<0.0001 vs control group at 2, 4 and 6 weeks after COH).

Conclusions
A single injection of MA-SS hydrogel into the anterior chamber can effectively induce chronic ocular hypertension in mice, leading to progressive loss of retinal ganglion cells, increased expression of inflammatory cytokines, activation of microglia, and deterioration of optic nerve function.

P-145
PROGRESSION TO BILATERALITY IN UNILATERAL PRIMARY CONGENITAL GLAUCOMA

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Purpose
To evaluate the incidence of rise in intraocular pressure (IOP) in fellow eyes of patients with unilateral Primary Congenital Glaucoma, and to identify risk factors for the same over long-term follow-up.

Methods
This observational study reviewed unilateral PCG patients who had completed at least 5 years of follow-up. The incidence of developing ocular hypertension (OHT)/ glaucoma in fellow eyes was analyzed. The risk factors for progression were compared between progressors vs non-progressors, including IOP, visual acuity, axial length, central corneal thickness (CCT), corneal diameters, presence or absence of angle dysgenesis on high-resolution anterior segment ASOCT and morphology of aqueous outflow pathways.

Results
After a median follow-up of 8.2 years (range:5-25.5 years) progression to bilateral disease was found in 31.5% (17/54) patients, of which 14.8% (8/54) developed ocular hypertension, and 16.7% (9/54) developed glaucoma in the fellow eye. A larger corneal diameter >12mm was 10 times more likely to progress amongst the unaffected fellow eyes [OR 9.5, p=0.01, 95% CI: 1.7-54.3]. A patent supraciliary channel in fellow eyes seemed to be the most significant differentiating factor compared to affected eyes on ASOCT [odds ratio 1.4, 95% CI: 0.46-4.68].

Conclusions
One-third of unaffected fellow eyes of unilateral primary congenital glaucoma eventually progress over time, most often after 5 years. A larger corneal diameter at baseline/follow-up in the fellow eye is a decisive predictive factor for progression.

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P-146

A NEW COMBINE MECHANISM OF NORMAL TENSION GLAUCOMA WITH PRIMARY ANGLE CLOSURE? A CASE CONTROL STUDY

H Lai, K Wu, H Tseng

Purpose

To our study, we analyze the risk factor of NTG (IOP fluctuation, trans-lamellar cribosa pressure and diastolic double product) between group A (PAC with advanced glaucomatous optic neuropathy) and group B (only PAC without glaucomatous optic neuropathy).

Methods

The medical records of 10 cases of 20 eyes was diagnosed as PAC with advanced glaucomatous optic neuropathy (group A) and 10 cases of 10 eyes diagnosed as only PAC(group B) (most of cases are the fellow eye of AACG attack), from 2009 to 2020 in Kaohsiung Medical University hospital (KMUH). The records for patients seen by the same consultant glaucoma subspecialist (KYW, HYT, HCL) with extensive experience in performing gonioscopy examination. Diastolic double product was estimate by diastolic blood pressure × heart rate, which may represent a state of cardiovascular autonomic dysregulation, resulting in low ocular perfusion in certain NTG patients[4]. Trans-lamina cribrosa pressure difference (TLCPD) was calculated as IOP minus estimated eCSFP. Estimated cerebrospinal fluid pressure (eCSFP) in mmHg was calculate as 0.55 × body mass index (kg/m2) + 0.16 × diastolic blood pressure (mmHg)—0.18 × age (years)—1.91, which publish on Beijing Eye Study 2011 [5].

Results

In the PAC combine NTG group(20 eyes), the mean dDP was 4779. The significant higher dDP(P=0.004; 6843) was noted in only PAC group compare with PAC combine NTG group. On the other hand, the there was no significant difference in TLCPD between PAC with NTG group and only PAC group. However, the TLCPD was relative higher in PAC combine NTG group (p = 0.079; PAC combine NTG 7.53 vs. only NTG 3.72 mmHg). In the inter-visited IOP fluctuation, the mean IOP in two group was no significant difference (p = 0.47; PAC combine NTG 14.3mmHg vs. only NTG 13.65 mmHg). Instead, the inter-visited IOP fluctuation was higher in PAC combine NTG group with significant difference (p = 0.0001; PAC with NTG IOP-SD 1.93 vs. only NTG 0.71 mmHg).

Conclusions

We find that some angle-closure patients post laser iridotomy may encounter visual field progression despite normal IOP level. In PAC combine NTG group, the risk factors of NTG (such as OP fluctuation, PLCPD and dDP) are more prominent than only PAC group. We presume that NTG is not only a form of OAG, but also plays a role in PAC patients. That is, while treating PAC patients with normal IOP, risk factors for NTG should be also considered, examined, and well treated.

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P-147

THE EFFECT OF UNILATERAL APPLICATION OF TIMOLOL 0.5% ON SYSTEMIC AND OCULAR BLOOD PRESSURE AND PERFUSION

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Purpose

To study the effect of unilateral application of Timolol 0.5% on systemic blood pressure and heart rate. We also aimed to study the correlation of systemic cardiovascular parameters with ocular perfusion and pressure in the treated and untreated eye after unilateral application of Timolol 0.5%.

Methods

This is an experimental clinical study of 14 healthy subjects. Ophthalmic examination included best corrected visual acuity, slit lamp examination and autorefractometry. Systemic blood pressure, heart rate (HR) and IOP were taken after the basic examination. Two drops of ophthalmic solution Timolol 0.5% was instilled in the right eye (RE) of the subjects. Systemic blood pressure and IOP was measured 30 minutes, one hour, one and a half hour and two hours after the local application. We evaluated the following parameters: systolic blood pressure (SBP) (mmHg), diastolic blood pressure (DBP) (mmHg), mean blood pressure (MBP) (mmHg), HR (bpm), IOP(mmHg), estimated trans-laminar pressure difference (TLPD) (mmHg) and OPP (mmHg). Paired t test was used to analyze the parameters before and two hours after instillation of topical Timolol 0.5%. Coefficient of correlation was used to study associations between systemic blood pressure, heart rate and IOP.

Results

Heart rate was significantly reduced two hours after Timolol 0.5% instillation (from 78.40 (±8.10) bpm to 69.10 (±7.36) bpm, p=0.003). The IOP in both eyes was also significantly reduced (RE IOP=15.4 (±2.65) mmHg reduced to 11.90 (±1.88) mmHg (p<0.001); LE IOP=15.80 (2.90) mmHg reduced to 14.40 (±2.86) mmHg (p=0.006). Estimated TLPD was decreased (RE TLPD=1.60 (±4.03) mmHg reduced to -2.08 (±3.02) mmHg (p<0.001); LE TLPD=1.98 (±4.09) mmHg reduced to 0.38 (±3.36) mmHg (p=0.004). OPP increased only in the right eye (RE OPP=45.19 (± 5.27) mmHg increased to 48.80 (±7.17) mmHg, (p=0.021)). The median of coefficients of correlation between the HR and RE IOP was R=0.53 (p=0.051).

Conclusions

Unilateral application of Timolol 0.5% decreased the IOP in both treated and untreated eyes. Heart rate significantly decreased after unilateral topical application of Timolol 0.5% and may be associated with the IOP reduction.

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P-148

EVALUATION OF INTRAOCULAR PRESSURE IN THE EYES AFTER KERATOREFRACTIVE SURGERY - FEMTOLASIK VS PRK

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Purpose

Femtosecond laser-assisted in situ keratomileusis (FS-LASIK) and photorefractive keratectomy (PRK) are surgical procedures performed in the treatment of refractive errors. Given changes in central corneal thickness, intraocular pressure (IOP) may be underestimated, which may lead to a late diagnosis of ocular hypertension/glaucoma. The aim of this study was to evaluate and compare IOP, evaluated by different methods, pre and post FS-LASIK and PRK, for correction of myopia or myopic astigmatism.

Methods

Retrospective study; demographic data were evaluated. Patients submitted to FS-LASIK (group 1) and PRK (group 2) between September 2020 and September 2022 were included and evaluated at different time-points: preoperatively and at the 1st, 3rd and 6th postoperative month. In each evaluation, IOP values were obtained through contact tonometry using Goldmann Applanation Tonometry (GAT), and non-contact tonometry by Corvis® ST, with methods based on pachymetry (obtained through Pentacam®), according to Ehlers, Shah, Dresden, Spoerl formulas, and based on biomechanics, corrected and not corrected. Eyes with previous ocular surgical history or hypertension were excluded.

Results

One hundred ninety-one patients (a total of 364 eyes) were included: 63.7% were female, with a mean age of 32.1±5.1 years; 232 eyes (63.7%) in group 1 and 132 eyes (36.3%) in group 2 with a preoperative spherical equivalent of -3.64 ± 1.7 (group 1) and -2.68 ± 1.1 (group 2) ($p<0.001$). During follow-up, there was a decrease in the mean IOP values obtained through GAT, through the Dresden and Spoerl formulas and through biomechanical adjustment formulas and an increase in mean IOP values was obtained using the Ehlers formula, in both groups. IOP values remained stable with the Shah formula, in group 1, and with the Shah and the Dresden formulas, in group 2.In each group, comparing the preoperative GAT with the final IOP obtained by each postoperative formula, we verified that there were no statistically significant differences in the Ehlers formula (group 1) and in the Shah and Dresden formulas (group 2).

Conclusions

FS-LASIK and PRK may cause underestimation of IOP evaluation by GAT. IOP values obtained from Ehlers formulas in post-FS-LASIK patients and from Shah and Dresden formulas in post-PRK patients seem to overlap with preoperative GAT values. These patients require a complete assessment of the IOP value. More studies are needed to understand the best method to assess IOP after keratorefractive surgery.

P-149

NEW CONVEX APPLANATION TONOMETER FOR MYOPIC PATIENTS AFTER LASER REFRACTIVE SURGERY

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Purpose
To increase the measurement accuracy of intraocular pressure (IOP) post myopic LASIK or PRK procedure, using a new experimental convex applanation tonometer (CT).

Methods
By using finite element analysis simulation, 2 different radii were designed for the new CT: CT1 and CT2. Prospective double-blind comparative study between the CT, the Goldmann applanation tonometer (GAT) and the Ocular Response Analyzer (ORA).

In a first phase, GAT was compared with CT1 and CT2 before and 3 months after surgery in n=102 patients (LASIK (n=73) and PRK (n=29)). In a subgroup of n=36 patients, intra- and inter-observer error (IA/IE) were evaluated. In a second phase, GAT and CT were evaluated before, at 3 months and after one year in n=30 patients, compared with ORA. In all series, the intraclass correlation coefficient (ICC) and the Bland-Altman graph (B-A) were calculated for the concordance between GAT, CT, IOPg (IOP correlated with Goldmann) and IOPcc (IOP with corneal compensation).

Results
In the analysis of LASIK vs PRK at 3 months, CT1 showed greater agreement with GATpre compared to CT2, being more accurate for LASIK than PRK, ICC = 0.718 (95% CI: 0.594-0.812) and ICC = 0.578 (95% CI: 0.182-0.795) respectively. In correlation, B-A showed good concordance with lower values between GATpre and CT1post for LASIK than PRK, -0.19 and 1.62 ($p < 0.001$) respectively. The difference between CT1post and GATpre presented a bias possibly related to the corneal resistance factor ($p < 0.001$). Excellent agreement was observed for IA/IE, and there was an ICC > 0.8 (95% CI) in all cases.

After 12 months post LASIK, CT1 showed the best correlation with GATpre ICC = 0.886 (95% CI: 0.703 - 0.956) compared to IOPcc ICC = 0.568 (95% CI: -0.185 - 0.843). 12m after PRK, CT1 showed a weak correlation with GATpre ICC = -0.266 (95% CI: -3.896 - 0.663) and with IOPcc ICC = 0.256 (95% CI: -0.332 - 0.719).

Conclusions
CT1 was strongly correlated with GATpre after 3 and 12 months post LASIK. It could provide a more accurate alternative method to measure IOP in this subgroup of patients comparing to the gold standard. More studies regarding this new convex prism are needed to assess its accuracy.

P-150
INTRAOCULAR PRESSURE DYNAMICS AFTER WATER DRINKING TEST AND DIURNAL VARIATION TEST IN GLAUCOMA SUSPECTS

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Purpose
To determine the intraocular pressure variation between water drinking test and diurnal variation test in glaucoma suspects.

To evaluate systemic blood pressure fluctuation after water drinking test.

Methods
This was a prospective observational study which included twenty newly diagnosed glaucoma suspects. Participants underwent two hourly IOP measurements for 24 hours. The next day water drinking test was performed by instructing the patient to remain fasting for two hours before the test. Patients were instructed to drink 10 ml/kg body weight of bottled drinking water in 5-15 minutes. IOP was measured four times at 15 minutes intervals for 1 hour. Systolic and diastolic blood pressure was recorded manually before water ingestion and then 15 minutes interval for 1 hour. The difference between maximum IOP and the baseline IOP was considered to be the IOP fluctuation.

Results
The mean age was 39.1 years. The mean IOP (r= 0.8, p = 0.0000) and peak IOP (r=0.73, p = 0.0000) were strongly correlating between DVT and WDT. The IOP fluctuation between WDT and DVT however showed weak correlation. (r= 0.17, p= 0.30). The BP measurements noted showed a slight increase in diastolic BP, while systolic level showed decrease in BP post water drinking.

Conclusions
There was a strong positive correlation between the mean and peak IOP values between the DVT and WDT, which suggests that a reliable mean and peak IOP reading can be obtained with WDT which has benefits of being inexpensive, feasible and less time consuming.

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P-155
INTRAOCULAR PRESSURE IN HEMIFACIAL SPASM MEASURED BY TRANSPALPEBRAL TONOMETER DIATON®

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Purpose
To evaluate the effect of hemifacial spasm (HFS) on intraocular pressure (IOP) measurement by the trans palpebral tonometer Diaton®, before and after botulinum toxin (BTX) treatment of the orbicularis oculi muscle. To compare the IOP measurements obtained by the trans palpebral tonometer with those obtained by Goldmann applanation tonometer (GAT) after BTX treatment in patients with HFS.

Methods
Twenty-seven patients with HFS were enrolled and BTX Dysport® injected into the facial affected muscles, including orbicularis oculi. IOP measurements by the trans palpebral tonometer Diaton® were performed before treatment and 10 to 20 days thereafter, during the period of maximum drug effect. After the treatment, the IOP was also measured by GAT, when spasms were minimal and this measurement was reliable and IOP measurements obtained by both tonometer were compared.

Results
Patients' age ranged from 36 to 80 years. Seventeen (63%) patients were women and 16 (59.1%) had the right side affected by HFS. The duration of the symptoms ranged from 1 to 21 years. Mean IOP by Diaton® was 11 mmHg before treatment in the involved side eye and 9 mmHg in uninvolved side eye. This difference was statistically significant (P = 0.012). However, after the treatment with BTX, no significant difference was found in the IOP measurement (P = 0.204) between affected and non-affected eyes. Also, there was no significant difference after BTX injection on affected and non-affected eyes (P = 0.212 and P = 0.971) in IOP measurement by Diaton® and GAT.

Conclusions
HFS might cause IOP increase. Botulinum toxin applied to the orbicularis oculi muscle in patients with HFS significantly reduced the IOP, when measured by trans palpebral Diaton® tonometer on the affected side. Despite the agreement of the IOP values obtained by the measurements with Diaton® and GAT after treatment with BTX injection, it is recommended to keep the IOP measurement with GAT during the periods when the patients are asymptomatic and it is possible to perform it.

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P-157
VALIDATING TARGET IOP FOR DIFFERENT SEVERITIES OF GLAUCOMA

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Purpose
To validate the effect of attainment of target IOP on the visual field progression. To correlate the percentage visits where target IOP was not met and the mean target IOP difference with the Mean Deviation (MD) change per year.

Methods
The present study was a retrospective study on consecutive primary glaucoma patients visiting a tertiary eye Center who were classified into early, moderate and advanced glaucoma based on the initial visual field MD (Early glaucoma MD >-6.0 dB. Moderate glaucoma MD-6 to-12 dB, Advanced glaucoma <-12 dB). Eyes with MD over-25 dB, unreliable fields, history of non-compliance, and followup of <3 years were excluded from the study. The target IOP was set as 15-18mmHg, 12-15mmHg and <12mmHg respectively for the three groups. The difference from target IOP on medications or surgery was considered out of range if >2 mmHg. Progression was noted if MD was >2dB from baseline. The percentage of visits where the IOP was over the target range and the mean Target IOP difference was correlated with the change in MD per year.

Results
A total of 63 eyes of which 30 were early glaucoma, 21 moderate glaucoma, and 12 advanced glaucoma were analyzed. Progression was noted in 20% of early glaucoma, 19.05% of moderate glaucoma and 41.67% of advanced glaucoma eyes. 88.24% of eyes that progressed on MD had IOP readings outside the target range and 11.76% progressed with IOP within target range (p=0.068). The percentage of visits where the IOP was over the target range in the progression group was 31.36% of the early glaucoma eyes, 20.13% of the moderate glaucoma eyes and 35.02% of the advanced glaucoma eyes versus 15.54%, 45.12% and 28.17% in the non-progression early, moderate and advanced glaucoma eyes respectively. Overall, a mean target IOP difference of 4mmHg was seen in progression eyes versus 3mmHg in non-progression eyes (p=0.054). The mean MD change per year in the progression group was -0.99(-1.203- -0.728) versus 0(-0.002-0.077) in the non-progression group which was statistically significant (p<0.001).

Conclusions
The study showed that a mean MD change of >1dB per year and a mean target IOP difference of 4mmHg can be used as markers to predict risk of progression and reset the target IOP. Eyes with moderate glaucoma appear to need Target IOP below the 12-15mmHg range.

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P-158

CHANGES TO OPTIC NERVE HEAD BLOOD FLOW INDUCED BY ISOMETRIC EXERCISE: OPTICAL COHERENCE TOMOGRAPHY ANGIOGRAPHY FINDINGS IN HEALTHY CONTROLS AND NTG

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Purpose
Vascular dysregulation may be pathogenic in normal tension glaucoma (NTG). A practical, easy-to-perform test investigating vascular dysregulation could be valuable in clinical practice. The aim of the study was to: (1) quantitatively characterise changes in ocular blood flow induced by isometric exercise using optical coherence tomography angiography (OCTA) in healthy people, and; (2) to compare the results to patients with NTG. We hypothesised that there may be significant ocular blood flow changes between the two groups in response to isometric exercise.

Methods
Prospective, cross-sectional, repeated-measures design across two studies. Baseline demographic and health data was recorded. Repeat measurements of blood pressure, heart rate, intraocular pressure and OCTA of the optic nerve head (ONH) were undertaken 10 and 20 minutes prior to a validated, 3-minute sustained, isometric hand grip test. The handgrip test was performed to elevate ocular perfusion pressure. Measurements were repeated during the handgrip test and ten minutes post. OCTA images were quantitatively analysed using a validated image J binarization protocol. The primary outcome was change in peripapillary vessel density at 10 minutes post-exercise.

Results
Thirteen healthy participants (median age 59, interquartile range 33-67) and 13 NTG participants (median age 69, interquartile range 63-74) underwent the study. In both groups, isometric exercise caused a significant elevation of heart rate (P=0.004) and mean arterial pressure (P<0.001), but caused no change in IOP (P=0.41). Images from 11 healthy controls and 11 NTG patients were included in the final analysis. There was a significant decrease in peripapillary vascular density in the post-exercise period displayed by both NTG and healthy participants (mean -36.7%, P<0.001; 95%CI: -34.6,-40.7). No difference in response of vascular density to isometric exercise between the two sample groups was found (P=0.47). There was no significant change in vascular density during exercise for either group.

Conclusions
In this study we found no evidence of a difference in vascular autoregulation response to this isometric exercise, in NTG patients when compared to healthy controls. A significant decrease in OCTA peripapillary vessel density was noted in all participants, 10 minutes after a sustained, isometric hand-grip exercise. The mechanism for this requires further investigation.

P-160

INTRAOCULAR PRESSURE (IOP) IN PRETERM INFANTS WITH AND WITHOUT RETINOPATHY OF PREMATURITY, AND THE EFFECT OF NON-SURGICAL TREATMENT ON THE IOP

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Purpose

To measure the Intraocular Pressure (IOP) in preterm infants with and without Retinopathy of Prematurity (ROP) and the effect of non-surgical treatment on the IOP

Methods

Design-Prospective non-randomized, study.

Method-Infants with a gestational age of less than 34 weeks and a weight of less than 2000 grams who presented to the Pediatric Retina Clinic between 1st July 2021 and 30th June 2022 were recruited. Infants with systemic comorbidities, ocular abnormalities and severe ROP requiring surgery were excluded. Eligible infants were divided into three groups according to the status of ROP. Group 1: Preterm infants with no ROP. Group 2: Preterm infants with ROP not requiring treatment (under observation). Group 3: Preterm infants with ROP requiring non-surgical treatment. IOP measurement was done at baseline, one month and at a three-month follow-up. A Perkins tonometer was used and an average of three readings were computed for analysis.

Primary outcome Measure: IOP in normal preterm infants and preterm infants with ROP

Secondary Outcome Measures: Effect, if any, of non-surgical treatment on IOP.

Results

107 patients met the inclusion criteria. 40 (37.38%) preterm infants were in group 1; (no ROP), 25 (23.36%) were in group 2 (ROP not requiring treatment), and 42 (39.25%) were in group 3; (ROP requiring laser photocoagulation or Anti-VEGF injection). The mean post-menstrual age (PMA) of Group 1, Group 2 and Group 3 were 37.89±2.74 weeks, 36.98±3.38 weeks, and 35.47±2.84 weeks respectively. The IOP showed a significant decline over time in Groups 1 and 2. In Group 1, the mean IOP at baseline, one month, and three months of follow-up were 15.0±2.43 mmHg, 14.29±2.25 mmHg (p=0.01), and 14.24±1.94 mmHg respectively. In infants with ROP under observation, the mean IOP at baseline, one month and three months follow-up was 14.95±2.89 mmHg, 14.61±3.15 mmHg, and 13.55±2.10 mmHg, respectively. In Group 3, there was a transient rise of IOP after intervention (13.46±2.54 mmHg to15.40±2.76 mmHg($p<0.001$)), which decreased to 14.31±1.87 mmHg at 3 months.

Conclusions

Our study adds to the literature regarding IOP assessment in preterm infants. With the advances in neonatal care and better survival of these babies, it is essential to have reliable IOP measurements and aid in the early detection and management of the sight-threatening complication of glaucoma. The IOP elevation after laser treatment must be anticipated and treated in time.

P-161
24-HOUR TELEMETRIC IOP MONITORING IN RABBITS

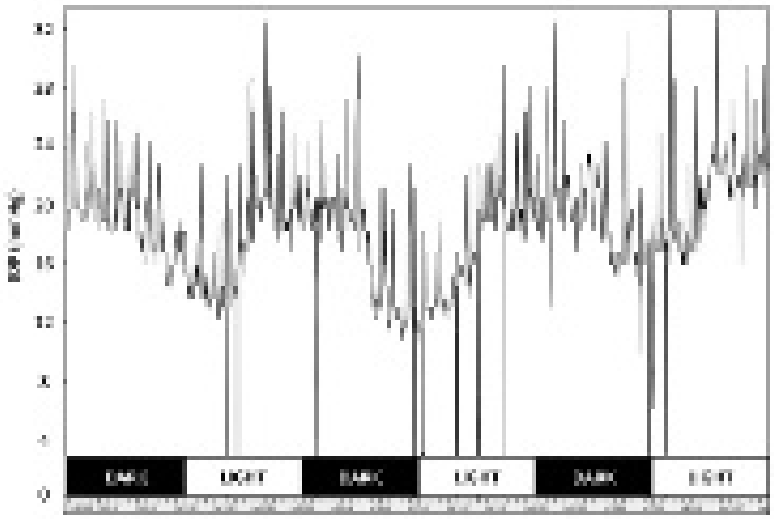
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Purpose
IOP fluctuations have been strongly associated with the risk of developing glaucoma and glaucoma progression.[1] While no clinical devices are available for routine continuous 24-hour IOP monitoring, animal models can provide important information about the variability of IOP. Recent research in non-human primates (NHPs) has been reported,[2] but the challenges and expense associated with NHP research makes it difficult to use as a model where surgery/invasive procedures are required. Rodent models have also been developed[3] but are too small for invasive procedures performed on human eyes. There is a clear need for a low-cost, large animal model for continuous IOP monitoring and subsequent intervention. The purpose of our study was to develop a rabbit model for 24-hour telemetric IOP monitoring.

Methods
An implantable telemetric pressure transducer system (Stellar, TSE-Systems, Chesterfield, MO) was used to measure IOP from the anterior chamber of adult New Zealand White rabbits. Pressure readings were automatically compensated for barometric pressure and recorded at 100 Hz. Manometric IOP sensor calibration was performed biweekly. The IOP signal was digitally filtered for noise and signal dropout, and circadian pattern was assessed after using a 200-second averaging window. Animal motion and temperature were captured using an integrated accelerometer and thermocouple, and housing was kept on a 12-hour light/dark cycle.

Results
IOP fluctuations occurred frequently and by large magnitudes, with transient changes of over 100 mmHg recorded. A strong nychthemeral pattern was observed, with IOP peak occurring at the end of the light phase or beginning of the dark phase, with peak-to-trough of approximately 8 mmHg (Fig 1). Increased frequency and magnitude of IOP fluctuations were associated with animal motion. During periods of inactivity, ocular pulse pressures were detectable with a magnitude of 2-4 mmHg.

Image



Conclusions

Continuous 24-IOP can be successfully measured telemetrically in rabbits. Large magnitude IOP fluctuations are common. The 24-hour IOP pattern shows a larger difference between peak and trough pressures than human or NHP circadian patterns. Since rabbits are nocturnal, the peak IOP occurs towards the end of the sleeping period, which corresponds to circadian IOP patterns in humans.[4]

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P-162

LONG TERM EFFECT OF PHACOEMULSIFICATION ON INTRAOCULAR PRESSURE IN GLAUCOMA PATIENTS - A RETROSPECTIVE ANALYSIS FROM SOUTH INDIA

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Purpose
To examine effects of phacoemulsification on longer-term intraocular pressure (IOP) in patients with medically treated primary open-angle glaucoma (POAG),pseudoexfoliation glaucoma (PXG), or primary angle-closure glaucoma (PACG), without prior or concurrent incisional glaucoma surgery.

Methods
In this retrospective single-center study, we evaluated patients with medically controlled POAG, PXG and PACG, undergoing phacoemulsification by a single surgeon between June 2019 and May 2021.Preoperative IOP is the average IOP from the last three measurements prior to cataract surgery. A minimum follow up of 1 year was followed.Patients were evaluated before surgery and at 7 days, 1 month, 3 months, 6 months and 1 year after surgery for IOP and the number of medications.

Results
A total of 154 eyes of 85 patients,who met the inclusion criteria were included.Out of these, 71 eyes had POAG, 26 eyes had PXG and 57 eyes had PACG. Patients were using a mean of 1.5-1.9 glaucoma medications, before surgery among the different diagnoses.One year after phacoemulsification, there was a change of IOP by a mean -1.15 ± 3 mmHg (p= 0.01), -2.14 ± 3 mmHg (p = 0.005) and -4.2 ± 3 mmHg (p < 0.001) in patients of POAG, PXG and PACG respectively and a change in the number of glaucoma medications by a mean of -0.1 ± 0.43 ,-0.5 ± 0.48 and -1.1 ± 0.52 respectively in the three groups.

Conclusions
Phacoemulsification resulted in small, moderate, and marked reductions of IOP and medications for patients with POAG, PXG, and PACG, respectively, and using 1 to 2 medications before surgery.

P-163
EFFECT OF WEARING A SURGICAL MASK ON INTRAOCULAR PRESSURE DURING COVID-19 PANDEMIC

H Lai

Purpose
During the COVID-19 pandemic, with a restricted policy in Taiwan, individuals were asked to wear a face mask in public in specific situations. Face masks are important components of personal protective equipment for transmitted diseases. However, the effect on intraocular pressure (IOP) remain unknown. Our primary aim is to investigate the effect of wearing a surgical mask on IOP, which has not yet been well-established.

Methods
Patients that required routine IOP measurements were randomly selected. Exclusion criteria included patients that failed to meet the measurement protocol or had corneal disease that was unsuitable for rebound tonometry. We chose the right eye of each patient for IOP analysis. IOP was measured using an iCare rebound tonometer. Every participant will receive two IOP measurements, one with surgical mask and one without. Student's paired sample t-test was applied to compare the IOP differences between wearing and non-wearing facial masks, and an independent sample t-test was applied for the IOP differences between groups.

Results
A total of 174 (103 females and 71 males, between 18 and 90 years of age) individuals were enrolled in the study. There were 90 subjects in the greater or equal to 65 years old group and 84 subjects in the less than 65 years old group. There were 109 subjects diagnosed with glaucoma, seven subjects with suspected glaucoma, and 58 subjects without glaucoma. Our data showed a statistically significant difference in IOP values in all subjects with a surgical mask and without surgical mask conditions. Men were more vulnerable to the effect of surgical masks on IOP values than women. In both age groups, greater or equal to 65 years and less than 65 years group, wearing a surgical mask had a statistically significant effect on IOP. In both glaucoma and non-glaucoma groups, surgical masks had a statistically significant effect on IOP.

Image

	With surgical mask(A)	Without surgical mask(B)	Difference(A-B)	P-value *	P-value #
All(n=174)	17.49±4.94	17.04±4.53	0.45±1.27(0.26-0.64)	<0.001	
Male(n=71)	17.15±4.78	16.47±4.48	0.68±1.26(0.39-0.98)	<0.001	0.045
Female(n=103)	17.72±5.07	17.43±4.55	0.29±1.26(0.05-0.54)	0.021	
>=65 year-old(n=90)	17.35±5.39	17.00±4.91	0.35±1.16(0.11-0.60)	0.005	0.289
<65 year-old(n=84)	17.64±4.45	17.08±4.12	0.56±1.37(0.26-0.86)	<0.001	
With glaucoma(n=109)	17.92±5.65	17.43±5.17	0.49±1.36(0.24-0.75)	<0.001	0.503
Without glaucoma(n=58)	16.60±3.28	16.24±3.02	0.36±1.15(0.06-0.66)	0.021	
With trabeculectomy(n=29)	18.33±7.08	17.85±6.65	0.48±1.48(-0.06-1.02)	0.078	0.934

Conclusions
Wearing a surgical mask causes IOP increment, which was small but significant. Masks should be used properly in certain circumstances to avoid the extra burden of unsatisfied IOP values in glaucoma patients. More researches are needed on the effects of long-term glaucoma progression caused by mask-wearing and the biological processes explaining the relationship between wearing a surgical mask and intraocular pressure.

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P-164

A NEW METHOD FOR MEASURING INTRAOCULAR PRESSURE USING THE DYNAMIC CHARACTERISTICS OF THE EYEBALL

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Purpose

Intraocular pressure (IOP) measurement is a basic test method for measuring important factors in the occurrence and progression of glaucoma in ophthalmology. Because intraocular pressure fluctuates on a 24-hour cycle and changes according to activity and rest, easy and comfortable observation is essential. The existing developed intraocular pressure measurement method needs improvement because it must be measured by an expert or may cause problems such as corneal damage or infection.

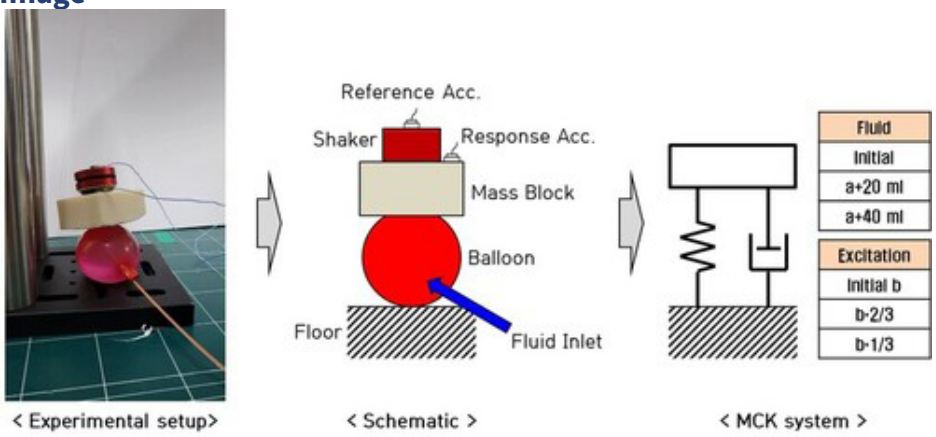
Methods

As the IOP of the eye, which is a viscoelastic material, increases, the vibration response characteristics change. Equipment capable of applying and measuring vibration was fabricated using the specimen. In order to derive the nonlinearity of the viscoelastic material, it can be seen that the magnitude of the response is correlated with the intraocular pressure when the measurement is performed while varying the strength of the excitation force.

Results

In the linear system, the change in the transfer function representing the ratio of input and output appears constant, but the model that simulates the eyeball shows nonlinear vibration characteristics, indicating that the responses of the output changes according to the responses of the input variation. Through the vibration response, it is possible to derive the change in the damping or stiffness of the viscoelastic material, and it seems that the contact stiffness and contact damping generated through the operation of the measuring equipment are also detected.

Image



< Experimental setup> < Schematic > < MCK system >

Conclusions

It is considered that it can be a new method and equipment for measuring IOP using the proposed method. Instead of the method of measuring IOP using specialized equipment after the patient visits the clinic, we proposed a measurement method that can reduce the side effects or fear caused by using inspection equipment on the cornea.

RF

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P-165

THE ASSOCIATION BETWEEN MENSTRUATION PERIOD AND IOP IN HEALTHY POPULATION: THE KOREA NATIONAL HEALTH AND NUTRITION EXAMINATION SURVEY 2010-2011

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Purpose

The purpose of this study was to analyze the relationship between menstruation period and IOP in Korean adult females.

Methods

Design: Korea National Health and Nutrition Examination Survey (KNHANES), a population-based cross-sectional study using a complex, stratified, multistage, probability-cluster survey.

Participants: A total of 5032 participants, aged ≥ 19 years with the information of history of menstruation were included from the KNHANES V database for the years 2010 to 2011.

Methods

A total of 5032 women, who participated in the Korean National Health and Nutrition Examination Survey from 2010 to 2011. Demographic, comorbidity, and health-related behavior information was obtained via interview. Glaucoma diagnosis was based on criteria established by the International Society of Geographic and Epidemiologic Ophthalmology. IOP was measured by goldmann applanation tonometer. We analyzed the relationship between the age of menarche, age of menopause or duration of lifetime exposure to endogenous sex hormones and IOP or prevalence of glaucoma.

Results

The prevalence of glaucoma was 3.3% in female. The mean age at menarche was 14.45 (±0.04) years. The mean age of menopause was 48.67 (±0.15) years. The mean childbearing period was 32.88 (±0.16) years. More than 50 age of menopause and more than 35 years of childbearing period associated with high mean IOP. The prevalence of glaucoma was higher at late menarche group.

Conclusions

The long menstruation period was associated with a higher IOP, but not with prevalence of glaucoma. Age at menarche showed an association with glaucoma, and duration of lifetime exposure to endogenous sex hormones and age at menopause had association with IOP. Therefore, estrogen may have an effect on glaucoma pathophysiology in women, but further investigation is needed.

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P-166
IMMEDIATE RISE IN INTRAOCULAR PRESSURE AFTER SINGLE INTRAVITREAL INJECTION OF BEVACIZUMAB

P Mahar

Purpose
To monitor immediate change in intraocular pressure after single injection of bevacizumab given first time.

Methods
All patients with various chorioretinal disease where bevacizumab was indicated were included in the study. Patients with history of multiple Anti-Vascular Endothelial Growth Factor (VEGF), intravitreal injections, steroid injections and with personal or family history of glaucoma were excluded. Bevacizumab in a dose of 1.25 mg (0.05 ml) was injected intravitreally under topical anesthesia maintaining sterile aseptic conditions in the operating room. Intraocular pressure (IOP) was checked 1 hour prior to the injection and continued monitoring it every hour for next 6 hours.

Results
A total 191 eyes of 147 patients were included in the study. Out of 147 subjects, 92 (62.58%) were male and 55 (37.41%) were female with mean age of 45.5 ± 8.8 years. The mean pre-injection IOP was measured as 12.12± 2.11 mmHg. The frequency of IOP elevation of > 21 mmHg was observed in 169 (88.5%) eyes at 5 minutes, 104 (54.5%) eyes at 30 minutes, 33 (17.3%) eyes at 1 hour and 16 (8.4%) eyes at 2 hours. The raised mean post operative IOP was 30.44±6.53 mmHg at 5 minutes, 26.27± 4.65 mmHg at 30 minutes, 26.12 ± 3.31 mmHg at 1 hour and 25.63±3.03 mmHg at 2 hours. The IOP reduced to pre-injection value at 3 hours and continued to stay at that level for next 3 hours (6 hours post injection).

Conclusions
Majority of the eyes receiving first intravitreal bevacizumab injection showed increased IOP level within 5 minutes to 2 hours post-injection.

P-167

COMPARISON OF INTRAOCULAR PRESSURE MEASUREMENT BETWEEN A NEW HAND HELD(HAWK EYE) MOUNTED GOLDMANN APPLANATION TONOMETER(GAT) AND SLIT LAMP MOUNTED GAT

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Purpose
To assess Accuracy and Precision of intraocular pressure (IOP) measurements obtained with Goldmann applanation tonometer (GAT) mounted on our indigenous hand-held 3D printed mount (Hawk Eye) in comparison with the Gold standard slit lamp mounted GAT

Methods
It was a cross sectional, observational study. The study was conducted in 2 phases. In phase-1, intra-observer agreement was tested in 25 participants with 2 observers: each checked IOP twice with the two devices. In phase 2 hand-held GAT was compared with gold standard slit lamp mounted GAT. 100 participants were included and the IOP was measured for right eye of all participants. First 50 participants, observer 1 recorded IOP with slit lamp mounted GAT followed by observer II recording IOP with Hawk eye. For the next 50 participants the order was reversed, observer II recorded IOP with GAT and observer 1 recorded with Hawk eye. Bland Altman plot was used for intra-observer agreement and Shapiro-Wilk W Test of Normality Distribution.

Results
In phase 1 the 95% limits of agreement by slit-lamp mounted GAT were -1.4 to 1.48 mm Hg and those by Hawk eye were -1.49 to 1.49 mm Hg. In phase 2 the median (1st, 3rd quartile) IOP values by slit-lamp mounted GAT were 15 (12.5, 20) mm Hg and ranged between 6 and 76-mm Hg. With Hawk eye the median (1st, 3rd quartile) IOP values were 14 (11, 18) mm Hg and ranged between 5 and 75-mm Hg. The mean difference of IOP (slit-lamp mounted GAT - Hawk eye) was normally distributed; mean (95% confidence interval) was 1.46 (1.06 to 1.85) mm Hg. The difference in IOP did not differ when either tonometer was used first in the sequence (P= 0.687; Mann Whitney Test).

Conclusions
Hand-held (Hawk eye) mounted GAT gives accurate and precise measurement of IOP when compared with gold standard slit lamp mounted GAT

P-168

COMPARATIVE ANALYSIS OF DEEP OPTIC NERVE HEAD STRUCTURES WITH SPECTRAL DOMAIN AND SWEPT-SOURCE OPTICAL COHERENCE TOMOGRAPHY

R Darwich

Purpose
Although histological studies show evidence of structural changes to the optic nerve's LC in early stages of glaucoma, evaluation *in vivo* remains challenging. This study aims to compare the visibility of the LC and its scleral interfaces with spectral-domain optical coherence tomography (SD-OCT) and swept-source OCT (SS-OCT).

Methods
In total, 12 patients were imaged with SD-OCT (Spectralis® OCT2, 24 radial B-scans centered on the ONH) and SS-OCT (Triton® DRI, horizontal and vertical raster scan pattern containing 5 lines each, centered on the ONH). Matching horizontal and vertical scans from SD-OCT and SS-OCT were selected. Three blinded independent observers determined if the Bruch's membrane opening, posterior choroid surface, anterior scleral canal opening, and anterior LC (ALC) and posterior LC (PLC) insertions into the sclera were detectable in the matched B scan images. McNemar test was used to compare the concordance in detecting each deep ONH structure using the two OCT imaging modalities. Sign test was used to assess the overall concordance of the two OCT imaging modalities.

Results
Inter-observer variation showed no statistically significant variation between the three observers for SD or SS-OCT. Sign tests for the total points of interest showed no statistically significant differences between SD and SS-OCT. However, McNemar tests for the individual structures per region only showed significant difference in visualizing the nasal PLC-scleral insertion, which was more visualized with SS-OCT than SD-OCT (13/36 and 6/36, respectively P=0.04).

Conclusions
Except for the nasal PLC-scleral insertion, there was no significant difference between SD-OCT and SS-OCT in detecting deep optic nerve structure. Overall, both technologies show equivalent visualization of deep optic nerve structures.

P-169

CLINICAL IMPLICATIONS OF INTRAOCULAR PRESSURE CORRECTION FOR CENTRAL CORNEAL THICKNESS IN NORMAL-TENSION GLAUCOMA WITH THIN CENTRAL CORNEAL THICKNESS

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Purpose

Thin central corneal thickness (CCT) is known to be a risk factor for glaucoma progression. We therefore investigated the clinical characteristics, including glaucomatous progression pattern and associated risk factors, of normal-tension glaucoma (NTG) with thin CCT.

Methods

This study retrospectively included 187 eyes of 187 NTG patients with an open angle and baseline intraocular pressure (IOP), as corrected for CCT, was under 20 mmHg. Thin CCT was defined as less than 500 µm in both eyes. Patients with a history of refractive surgery or corneal disease affecting corneal thickness had been excluded from the analysis. IOP as measured by Goldmann tonometry and CCT-corrected IOP (ccIOP; [IOP – (CCT-545)/50 x 2.5]), respectively, were used in the analysis. The total subject group was divided into Progressing and Stable subgroups. The Progressing group was defined as advanced stage (<-12dB) on initial visual field testing or fast visual field progression rate (< -1.0 dB/year).

Results

The mean CCT of the total subjects was 481.2±17.5 µm, the mean age was 66.4±14.6 years, and the mean follow-up period was 6.3±2.5 years. The baseline IOP was 13.7±2.4mmHg and baseline ccIOP 16.6±2.5mmHg, and the average visual field progression rate was -0.79±1.26 dB/yr.

Among the total subjects, 47 (26.6%) were in the Progressing group and 140 (73.4%) were in the Stable group. The Progressing group was older than the Stable group (P<0.001,) and had higher baseline ccIOP (P=0.021). The proportion of pseudophakic eyes also was higher (P<0.001) in the Progressing group. In a multivariate analysis, only baseline ccIOP was identified as a significant factor (hazard ratio 1.702, 95% CI 1.054-4.228, P=0.030).

Conclusions

In this study on NTG with thin CCT, the overall glaucoma progression rate was relatively stable. Thin-CCT NTG with old age, pseudophakia, and high baseline IOP was associated with glaucoma progression. In particular, ccIOP was confirmed as the only significant factor associated with progression of glaucoma. Therefore, in cases of NTG with thin CCT, IOP correction for CCT (ccIOP) could be an effective tool for evaluation of progression risk.

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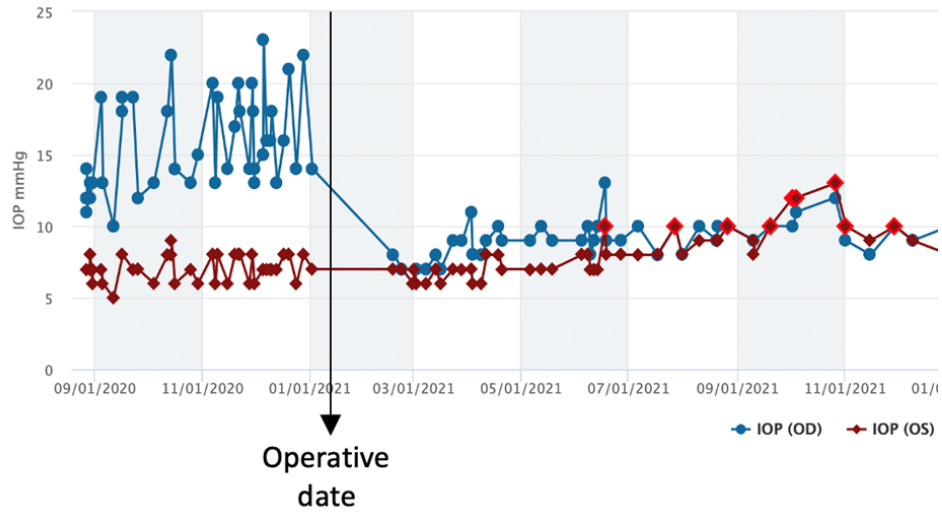
P-170
INTRAOCULAR PRESSURE VARIABILITY MEASURED BY AN ICARE TONOMETER IN PRIMARY OPEN ANGLE GLAUCOMA

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Purpose
To assess variability in intraocular pressure (IOP) measurements obtained before and after surgery for primary open angle glaucoma (POAG) using an at-home iCare tonometer.

Methods
Two patients with bilateral POAG were trained on using an iCare tonometer and obtained intraocular pressure measurements for at least one year. During this period, one patient underwent OD trabeculotomy while the other obtained an OD aqueous shunt to an extraocular equatorial plate reservoir. Mean and standard deviation of the IOP measurements from the iCare device were evaluated before and after glaucoma surgery for each patient.

Results
Subject 1 obtained 46 measurements before OD trabeculotomy with IOP of 15.6 ± 3.4 mmHg. Seventy-seven measurements were obtained after glaucoma surgery with a mean of 9.2 ±1.3 mmHg. Variability decreased by 62% during the post-operative period ($p<0.001$). Subject 2 obtained 84 pre-operative measurements with IOP of 22.1 ± 2.4 mmHg. Post-operative mean was 6 ± 1 mmHg with a total of 113 total measurements. Variability decreased by 58% ($p<0.001$). Measurements for subject 2 are shown in figure 1, showing a significant drop in mean IOP and fluctuation.

Image


Conclusions
Low variability in IOP measurements has been considered a significant factor in long-term glaucoma management.[1] At-home tonometry allows for an avenue to obtain a greater number of IOP measurements and better assess IOP variation in patients with POAG. Variability decreased by >50% in two POAG patients following surgery with IOP measurements obtained from an at-home tonometer.

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P-171

CORNEAL HYSTERESIS USING OCULAR RESPONSE ANALYZER FOR SCREENING EXAMINATION WITH OR WITHOUT GLAUCOMATOUS FUNDUS FINDINGS

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Purpose
To evaluate of measurement reliability using Ocular Response Analyzer (ORA) for screening examination, and compare corneal hysteresis (CH) between eyes with or without glaucomatous fundus findings.

Methods
We retrospectively analyzed 1,488 eyes of 747 outpatients aged 53.5+/-20.4 years (range: 6 to 94) whose intraocular pressure (IOP) measured using ORA (ORA G3, Reichert, Inc.) for screening examination. Eyes that had a history of ocular hypotensive eye drops use or intraocular surgery including laser treatment were excluded. The rate of measurements with Waveform Score less than 6, which implies the unreliable measurements, was calculated. Then, CH was compared between eyes with and without glaucomatous fundus findings (positive group vs negative group, t-test). Presence of glaucomatous fundus findings was judged by the examinations of fundus photograph (AFC-330, Nidek Co., Ltd.) and optical coherence tomography (RS-3000 Advance, Nidek Co., Ltd.).

Results
Mean +/- standard deviation (range) of IOPg, IOPcc, CH, and Waveform Score was 14.9 +/- 4.8 mmHg (1.0 mmHg to 63.2 mmHg, 16.2 +/- 4.7 mmHg (3.2 mmHg to 73.6 mmHg, 9.7 +/- 1.5 mmHg (0.0 mmHg to 20.6 mmHg), and 7.3 +/- 1.5 0.1 to 9.7, respectively. The rate of number was counted Waveform Score under 6 was 18%. A total 192 eyes of 127 patients aged 53.5 +/- 18.0 years were divided into positive group (n=53) and negative group (n=139). Mean +/- standard deviation (range) of CH was 9.6 +/- 1.4 mmHg (6.8 mmHg to 13.3 mmHg) in positive group, and 10.2 +/- 1.2 mmHg (6.9 mmHg to 13.3 mmHg) in negative group, respectively (p=0.003).

Conclusions
In our investigation, the measurement reliability using ORA analyzer for screening examination was satisfied in 80% of cases. Mean CH was lower in eyes with glaucomatous fundus findings than in eyes without that, however, the measured distribution was overlap.

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P-172

ASSOCIATIONS BETWEEN VF PROGRESSION AND DIURNAL CHANGES OF CORNEAL HYSTERESIS IN JAPANESE GLAUCOMA PATIENTS: PROSPECTIVE COHORT STUDY

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Purpose
To evaluate associations between visual field (VF) progression and diurnal changes of corneal hysteresis (CH) in Japanese glaucoma patients.

Methods
This prospective study included patients with primary open-angle glaucoma (POAG) who underwent diurnal measurements of CH and intraocular pressure (IOP) with a minimum of five VF tests (24-2 SITA standard program) at six months intervals. IOP measured using Goldman applanation tonometry (GAT) and CH measured with ocular response analyzer (ORA) were obtained every 3h from 9 AM to 12 AM (six times in total). Diurnal variations of CH and IOP were analyzed using mixed-effect models. Factors associated with mean deviation (MD) slope were also identified with the mixed model.

Results
Forty-nine eyes of 66 patients were enrolled in this study [age 50 ± 11 (mean ± SD)] with mean follow-up period of 41.7 ± 10.4 months. The diurnal CH and IOP values significantly fluctuated (P<0.05) and diurnal amplitudes (max- min) of CH and IOP were 1.0 ± 0.5 mmHg and 3.7 ± 1.5 mmHg, respectively. The mean MD slope in the study period was 0.2 ± 0.7 dB /yr. The multivariate mixed model revealed that older age and deeper anterior chamber depth were significantly associated with faster VF progression (coefficient ± standard errors: -0.018 ± 0.008, -0.516 ± 0.241; P = 0.025, 0.032, respectively) while the diurnal variations of CH and IOP did not have significant impact on the MD slope.

Conclusions
This prospective study did not find significant associations between VF progressions and diurnal changes of CH in this cohort. However, older age and deeper anterior chamber depth may associate with VF progressions.

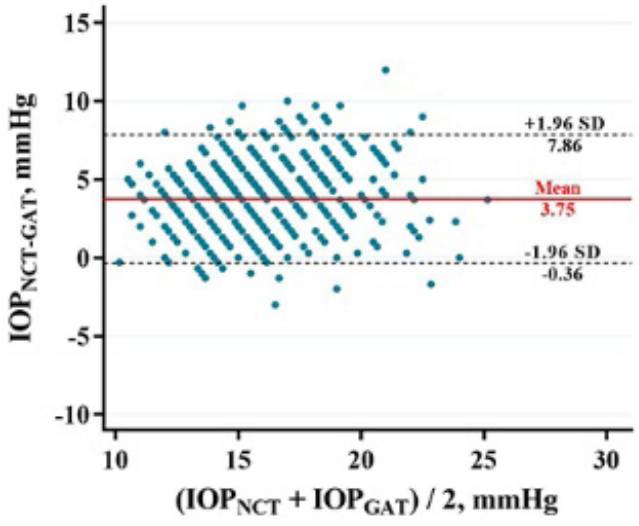
P-173
COMPARISON OF NON-CONTACT TONOMETRY AND GOLDMANN APPLANATION TONOMETRY MEASUREMENTS IN NON-PATHOLOGIC HIGH MYOPIA

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Purpose
To compare intraocular pressure (IOP) values obtained using Goldmann applanation tonometry (IOP_{GAT}) and non-contact tonometry (IOP_{NCT}) in a non-pathologic high myopia population.

Methods
A total of 720 eyes from 720 Chinese adults with non-pathologic high myopia were enrolled in this cross-sectional study. Demographic and ocular characteristics, including axial length, refractive error, central corneal thickness (CCT), and corneal curvature (CC) were recorded. Each patient was successively treated with IOP_{NCT} and IOP_{GAT}. Univariate and multivariable linear regression analyses were conducted to detect factors associated with IOP_{NCT} and IOP_{GAT}, as well as the measurement difference between the two devices ($IOP_{NCT-GAT}$).

Results
In this non-pathologic high myopia population, the mean IOP_{NCT} and IOP_{GAT} values were 17.60 ± 2.76 mmHg and 13.85 ± 2.43 mmHg, respectively. The IOP measurements of the two devices were significantly correlated (r = 0.681, P < 0.001), however, IOP_{NCT} overestimated IOP_{GAT} with a mean difference of 3.75 mmHg (95% confidence interval: 3.60-3.91 mmHg). In multivariate regression, IOP_{NCT} was significantly associated with body mass index (standardized β = 0.075, p = 0.033), systolic blood pressure (SBP) (standardized β = 0.170, p < 0.001), and CCT (standardized β = 0.526, p < 0.001). As for IOP_{GAT}, only SBP (standardized β = 0.162, p < 0.001), CCT (standardized β = 0.259, p < 0.001), and CC (standardized β = 0.156, p < 0.001) were significantly correlated. The mean $IOP_{NCT-GAT}$ difference increased with younger age (standardized β = -0.134, p < 0.001), higher body mass index (standardized β = 0.091, p = 0.009), higher SBP (standardized β = 0.074, p = 0.027), thicker CCT (standardized β = 0.506, p < 0.001), and lower IOP_{GAT} (standardized β = -0.409, p < 0.001).

Image


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Conclusions

In the non-pathologic high myopia population, IOP_{NCT} overestimated IOP_{GAT} at 3.75 ± 2.10 mmHg. This study suggests that the difference between the values obtained by the two devices, and their respective influencing factors, should be considered in the clinical evaluation and management of highly myopic populations.

P-174
DIURNAL PRESSURE CURVE IN PATIENTS WITH PSEUDOEXFOLIATIVE SYNDROME GR.II

D Janjic

Purpose
The aim of this study was to estimate and compare the parameters of Diurnal Pressure Curve (DPC) in patients with unilateral Pseudo Exfoliative Syndrome gr.II (PXF gr.II) and controls.

Methods
This group included up to 60 eyes (30 patients, from 65 to 85 years) with unilateral PXF gr.II presentation and PXF gr.0 on fellow eye, which serves as controls. Intraoculare pressure (IOP) measurements have been done with Goldman aplanation tonometry in algorythm of 5 IOP measurements daily (from 9 am to 5 pm, on 2 hours). DPC parameters have been recorded as: maximum, average and fluctuation values. The comparison between mentioned groups has been done with Studen T-test in Excell Windows.

Results
The following values of DPC parameters were obtained in PXF gr II and PXF gr 0 eyes: Maximum IOP: range 13.75-52 mmHg, mean 25.86 mmHg, variance 101, sd 10.1 // range 13.65-32.00mmHg, mean 19.18mmHg, variance 14.1, sd 3.79. Average IOP: range 18-44.00 mmHg, mean:23.84 mmHg, variance 81.4, sd 9.0 // range 13.50-24.50 mmHg, mean 17.27 mmHg, variance 8.0, sd 2.8. Fluctuation IOP: range 1.0-14.0mmHg, mean: 5.00 mmHg, variance 69.7, sd 8.3 // range 1.0-10.00mmHg, mean 4.88mmHg, variance 8.42, sd 2.9. Owing to T-test results, there was estimated statistically significant difference values of IOP maximum and average between PXF gr.II eyes and controls, PXF gr.0 on the level $p<0.01$ ($t=3.07$, cr.value 2.60// $t=3.48$, cr.value 2.68). The values of IOP fluctuations in examined groups have not show statistically significant difference ($t=0.067$, cr.value= 2.67) on the level $p<0.01$.

Conclusions
Variations of maximum and average values of mintraocular pressure in patients with PXF gr II were significant higher than controls. Such finding can be a warning sign and adittional risk-factor for glaucoma developing.

P-175

COMPARATIVE ASSESSMENT OF IOP MEASUREMENT BETWEEN NON-CONTACT TONOMETRY AND GOLDMANN APPLANATION TONOMETRY AMONG GLAUCOMA PATIENTS IN ANGTHONG

K Thongthong

Purpose

To compare the intraocular pressure (IOP) values acquired from non-contact tonometry and a Goldmann applanation tonometry in glaucoma patients.

Methods

This study involved 400 eyes from 200 glaucoma patients who attended the glaucoma outpatient clinic, Angthong hospital during January 4th, 2021 to June 30th, 2021. IOP measurements were obtained using non-contact tonometry (NCT) and Goldmann applanation tonometry (GAT). The differences in intraocular pressure (IOP) readings between the two techniques were evaluated using paired t-test and calculating the Pearson correlation coefficient. A Bland-Altman analysis was used to determine the limit of agreement between the two techniques.

Results

The mean intraocular pressure as measured by NCT was 17.29 ± 4.21 mmHg, compare the mean intraocular pressure as measured by GAT was 16.50 ± 3.74 mmHg. The mean differences intraocular pressure readings between the two techniques were 0.79 ± 1.09 mmHg. There was a strong correlation between NCT and GAT finding in the right eye ($r = 0.807$, $n = 200$, $P < 0.001$) and in the left eye ($r = 0.857$, $n = 200$, $P < 0.001$). Bland-Altman plots, limit of agreement range from -3.88 to 5.81 mmHg in the right eye (mean = 0.95) and limit of agreement range from -3.67 to 4.92 mmHg in the left eye (mean = 0.62).

Conclusions

In this study found that NCT readings were significant difference and higher IOP readings of the GAT; but within the clinically acceptable inter device measure for IOP. The NCT and GAT measurements correlated positively. NCT can be used as a screening tool for IOP testing in the high volume clinic. However, NCT cannot replace the existing gold standard method for IOP measurement, the GAT.

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P-177

ASSOCIATION BETWEEN CIRCADIAN INTRAOCULAR PRESSURE FLUCTUATION AND RETINAL NERVE FIBER LAYER THICKNESS MEASURED BY OPTICAL COHERENCE TOMOGRAPHY

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Purpose
To evaluate the relationship between circadian fluctuation of intraocular pressure (IOP_F) and RNFL thickness measured by spectral-domain optical coherence tomography (SD-OCT).

Methods
The study included 153 eyes of 80 patients. Seventy-five eyes (49.1%) were considered glaucoma suspects and 78 (50.9%) had a diagnosis of POAG. All eyes underwent peripapillary RNFL imaging with SD-OCT, standard automated perimetry (SAP), and 24-hour IOP measurements. Generalized linear mixed models were used to investigate the relationship between IOP_F and RNFL thickness adjusting for potential confounding factors such as age, diagnosis of glaucoma, central corneal thickness, mean IOP during the 24 hours, and disease severity.

Results
Mean age was 60.0 ± 18.7 years for glaucoma suspects and 64.7 ± 12.4 years for POAG patients. In univariable analyses, while IOP_F was associated with global RNFL thickness (P=0.012), both mean and peak IOP during the 24-hour was not (respectively P=0.492 and P=0.229). In a multivariable analysis, eyes of POAG patients had on average 9.94 µm thinner global RNFL compared to glaucoma suspects (95% CI: 0.94 to 18.93 µm, P=0.031) and each 1 mmHg higher IOP_F was associated with 1.55 µm thinner global RNFL (95% CI: 0.06 to 3.04 µm, P=0.042).

Conclusions
Higher IOP_F was associated with thinner global RNFL thickness measured by SD-OCT. This finding corroborates a potential role for IOP fluctuation as a risk factor for structural loss in glaucoma.

P-178

ULTRASOUND BIOMICROSCOPY IN PSEUDOPHAKIC PATIENTS WITH CHRONIC INTRAOCULAR INFLAMMATION AND/OR INCREASED INTRAOCULAR PRESSURE

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Purpose

Evaluate the position of intraocular lens, as well as, the relationship of the haptics with iris stromal and angle,in cases of cronic intraocular inflammation and/ or raised intraocular pressure after phacoemulsification surgery.

Methods

It was evaluated pseudophakic patients with a history of intraocular inflammation and/or increased intraocular pressure that there was no etiology identified. All cases were examined to exclude known causes as infections and acquired uveitis. They underwent UBM examination to study the following variables: positioning of the optical zone and intraocular lens haptics and their relationship with the structures of the anterior segment, lens inclination and presence of remnants of crystalline cortex.

Results

It was evaluated 36 patients, 64 pseudophakic eyes. All patients presented elevated IOP or intraocular inflammation without other alterations at biomicroscopy and fundoscopy. The visual acuity was 20/20 for all patients examined. 40 patients presented centered intraocular lens (IOL) and 24 presented some degree of descentration or tilted. It was observed contact between lens and IOL in 23 eyes. In 5 cases, althouth the lens was centered, it was presented contact between lens and IOL. It was also observed 41 cases with some cortex remaining. All these findings can be related to the cause of IOP elevation.

Conclusions

Complications related to the positioning of the intraocular lens (IOL) can occasionally be seen, one of them is the proximity of the IOL to the iris, which often cannot be confirmed only with a good biomicroscopy examination. Friction between the lens and the iris can lead to blood flow from the iris, especially in places where haptics are poorly positioned, which in turn leads to complications of chronic intraocular inflammation and/or increased intraocular pressure. Ultrasound biomicroscopy (UBM) showed to be an important tool for the study of these cases. It is a non-invasive exam that allows the anatomical visualization of the optical zone of the IOL and the haptics and their relationship with the structures of the anterior segment. The UBM is an important tool in the diagnosis of pseudophakic patients who evolve with chronic intraocular inflammation and/or increased intraocular pressure with innocent biomicroscopy.

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P-180
MASK-INDUCED DIFFERENCES IN INTRAOCULAR PRESSURE IN GLAUCOMA PATIENTS

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Purpose
To evaluate the differences in intra-ocular pressure (IOP) induced by common facial masks, in glaucoma patients.

Methods
Patients were recruited randomly in the glaucoma clinic. Their IOP was measured using the Goldman Applanation Tonometer, without a mask, with a surgical mask and a KN95 mask, in a random order and 5 minutes apart. Clinical records were reviewed and analyzed for demographics, medical and ocular past history.

Results
Fifty patients participated in the study, 26 females and 24 males, mean age was 71 years, ranged 36-95 years. Among 100 eyes tested, 68 eyes were currently treated for glaucoma with medications, 24 eyes had glaucoma laser treatment in the past and 19 eyes had glaucoma surgery.

Differences in mean IOP were statistically significant ($p = 0.01$), albeit clinically insignificant in most patients: measurements were 15.4 ± 5.2 mmHg [range 3-41] without a mask, 15.3 ± 5.0 mmHg [range 2-32] with a KN95 mask and 14.7 ± 4.7 mmHg [range 2-29] with a surgical mask. In 69% the difference in IOP measurements were up to 2.5 mmHg and in 15% 4 mmHg and higher.

Conclusions
IOP measurements were clinically in good agreement in most glaucoma patients examined with a surgical mask, KN95 mask and without a mask

P-181

ASSESSMENT OF THE IMPACT OF PHYSICAL ACTIVITY ON THE LEVEL OF INTRAOCULAR PRESSURE IN YOUNG PEOPLE

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Purpose

The aim of the study was to assess the level of intraocular pressure (IOP) in medical students before and after exercise and to analyze the possible relationship between body mass index (BMI), blood systolic pressure (AST) and diastolic pressure (ADT) with IOP.

Methods

Examinations were conducted in 77 young people (154 eyes) aged 18-20 years without complaints and pathology of the eye. The study group consisted of 27 males (35%) and 50 females (65%). Assessment of IOP, AST, ADT was performed at the beginning of physical activities and after finishing it. Intraocular pressure was measured with an I-care tonometer. Blood pressure was measured with patient monitor Paramed X3. The duration of physical activity was ± 60 minutes and was divided into two parts.

Results

According to the results it was concluded that there was no statistically significant difference between indicators of blood pressure before and after exercise, but it should be noted that after exercise blood pressure elevated by an average 13%.

Systolic blood pressure before exercise - 116,28 ± 12,83 mm Hg, after exercise - 133,29 ±19,87 mm Hg (p>0,05)

Diastolic blood pressure - 82,15 ± 12,25 mm Hg, after exercise - 94,35 ± 18,49 mm Hg (p>0,05)

The indicators of IOP before and after exercises did not have statistically significant changes, but, from mathematical point of view we could note the decrease an average indicators of IOP for both eyes. IOP of right eye decreased by 3%, for left eye this indicator was 2%.Depending on gender is not detected.

Average indicators of intraocular pressure for boys and girls before exercise and after IOP OD-15,92 ± 4,05, IOP OS - 15,49 ± 3,66 (p>0,05), after physical exertion - IOP OD 15,53 ± 3,86, IOP OS - 15,27 ± 4,04 (p>0,05).

Conclusions

The indicators of arterial diastolic and systolic pressure before and after physical exertion have no significant difference among medical students.

It should be noted that during the correlation analysis no clear interdependencies among the studied factors were found. IOP fluctuations before and after exercise had no significant difference in both eyes.

According to the results of the study, it was found that the blood pressure and IOP indicators in medical students aged 18-20 years do not have reliable changes.

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P-182
WHETHER IT IS NECESSARY TO CONDUCT ROUTINE TONOMETRY IN CHILDREN...

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Purpose
To investigate IOP in children at a routine appointment with an ophthalmologist

Methods
Measurement of IOP in children who visited an ophthalmologist for a routine examination to solve refractive problems. It was carried out with an I-care portable tonometer. The study included data from every 3rd randomized patient aged 5 to 19 years.

In total, the data of 278 patients were processed, of which 56% were female and 44% male. The average age of the patients was 11.35±3.89

Results
The following distribution of refractive errors was observed in the group of patients: myopia middle degree – 77 (28 %), desorders of accommodation – 17(6 %), hypermetropy mild – 32 (12 %), middle – 11 (4 %), hypermetropic astigmatism – 5 (2 %), myopic astigmatism – 49 (18 %) etc.

Indicators of intraocular pressure for the right eye average were 16.46+3.45 mm Hg, for the left - 16.47+3.91mm Hg and had no significant difference between both eyes (p>0,05).

IOP for right eye in 26,65% was low 14 mm Hg , in 57,55% of cases in the frame 15-19 mm Hg and in 16,19% - more than 19 mm. Hg. The results of IOP on the left eye - in accordance – 29,14%, 54,67%, 15,47%.

It should be noted that in 3 children, an excessive increase in IOP (26 mm Hg/ 27 mm Hg /32 mm Hg) was determined in one eye, and a detailed examination revealed the pathology that caused the pressure to rise.

None of the patients showed typical complaints and symptoms. All cases were found by chance.

During subsequent examinations of these patients, other pathological changes on the part of the organ of vision were found - changes in the fields of vision, structural changes of the optic nerve disc on OCT.

In the case of our study, 3 children is 1%.

Children who had IOP pressure above 19 mmHg during the initial examination were taken into account.

Conclusions
I-care is a convenient and quick method of measuring IOP even in children of different ages.

Routine measurement of IOP in children makes it possible to detect pathologies that lead to an increase in IOP in the early stages.

The introduction of IOP measurement as a routine method in the practice of optometrists and ophthalmologists can increase the level of detection of pathology in the early stages.

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P-183

HOMONYMOUS QUADRANTANOPIA ASSOCIATED WITH DEHYDRATION FOLLOWING ACUTE DIARRHEA: A CASE REPORT

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Purpose

Report of a case who developed left occipital lobe infarction secondary to dehydration after acute diarrhea and presented with right inferior homonymous quadrantanopia.

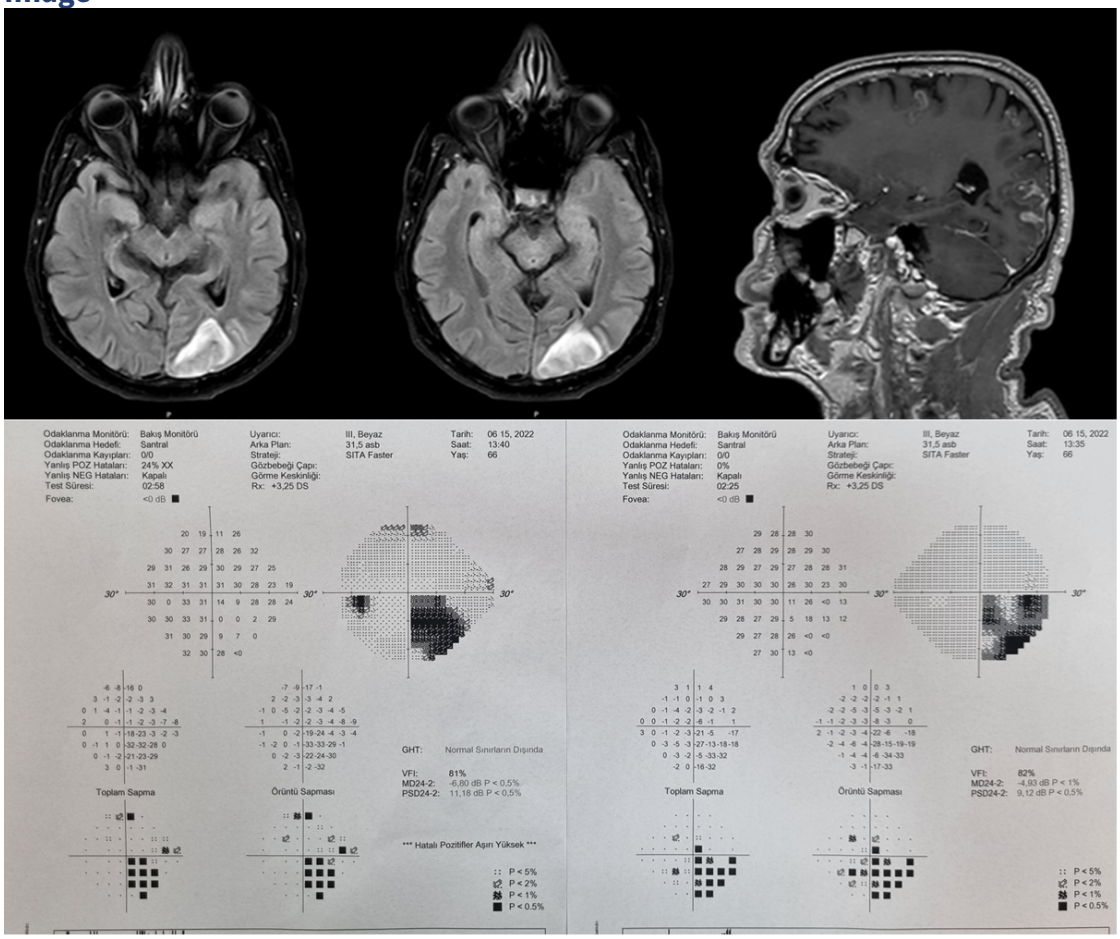
Methods

A 66-year-old male patient presented with complaints of loss of right visual field and blurred vision that started 5 days ago. The patient has no known comorbidities. His history revealed that he admitted to the emergency service 6 days ago with acute diarrhea and a low arterial tension of 7/4 mmHg.

Results

His best corrected visual acuity (BCVA) was 0.5 in the right eye and 0.9 in the left eye. Slit lamp examination was normal in both eyes. Intraocular pressure (IOP) was 14 mmHg in both eyes. Dilated fundus examination showed epiretinal membrane in the right eye and normal findings in the left eye. Cup-to-disc ratio of the optic nerves were 0.4 and symmetrical in both eyes. Humphrey visual field test revealed right inferior homonymous quadrantanopia (Figure 1). Contrast-enhanced magnetic resonance imaging (MRI) revealed gyral and circumferential enhancement areas, *i.e.*, subacute infarcts, in the left occipital lobe (Figure 2). The visual field defect was consistent with the left occipital lobe infarct area on MRI scan. The patient was referred to a neurologist for further investigation.

Image



Conclusions

Systemic hypotension can cause diffusely diminished blood flow to the brain; and result in ischemia. Patients with occipital lobe infarction are known to develop hemianopia with macular sparing. Spontaneous resolution of visual field defects can be seen, but most patients continue to live with residual visual field defects. In our case we initially thought of acute progression of normotensive glaucoma (NTG) due to perfusion disorder. It is believed that vascular dysfunction and defective cardiovascular neuro-regulation may play a major role in the pathogenesis of NTG. Vascular dysfunction and disturbed autoregulation leads to reduced perfusion in the capillary network of the optic nerve and may cause visual field defects. A higher incidence of cardiovascular disorders and ischemic cerebral lesions have been reported in patients with NTG patients, as well. However, in our patient clinical and radiological evaluations revealed occipital lobe infarction as the cause of visual field defect. In cases with a history of acute perfusion defects, it is important to determine the etiology and make a differential diagnosis with NTG. Therefore, they should be handled with MRI and a multidisciplinary approach.

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P-184
CORRELATION BETWEEN BLOOD PRESSURE AND INTRAOCULAR PRESSURE

A Naiem

Purpose
To study the correlation between blood pressure and intraocular pressure at National Ribat University Hospital during the period from July to October 2021.

Methods
This is a descriptive, cross sectional hospital based study, conducted at National Ribat University Hospital during the period from July to October 2021. The study sample which was 111 patients fulfilled the inclusion criteria of the study. Data was collected through a structural questionnaire.

Results
The mean age was 47.90±13.50 years, the mean systolic pressure was 123.73±16.17 mmHg, the mean diastolic pressure was 76.22±12.56 mmHg and the mean intraocular pressure was 13.45±3.98 mmHg. The intraocular pressure was 10– 20 mmHg in 78(70.3%) of the patients, less than 10 mmHg 27(24.3%) and more than 20 mmHg 6(5.4%). Risk factors such as, family history of glaucoma, hypertension, chronic renal diseases, other chronic diseases and older age were found to be significantly associated with increased intraocular pressure, P values = 0.011, 0.019 and 0.026, respectively (P values < 0.05).

Conclusions
The study concludes that the risk factors such as older age, family history of glaucoma and chronic diseases were found to be significantly associated with increased intraocular pressure in patients with high blood pressure.

P-185

COMPARISON OF THREE INTRAOCULAR PRESSURE MEASUREMENT: OCULAR RESPONSE ANALYSER, ICARE AND GOLDMANN APPLANATION TONOMETRY

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Purpose

To compare three tonometry techniques: ocular response analyser (ORA) and iCare tonometers compared against the gold standard Goldmann applanation tonometer (GAT) within a range of subspecialities. ORA is easy to learn, quick to perform and can be carried out by a range of healthcare staff with minimal training. Similarly, iCare can be performed with minimal training as a non-contact technique. Utilising these methods instead of GAT to measure IOP can save time in the outpatient setting, allow more patient throughput, and allow the demand for appointments to be met. This study was completed to audit the readings from 3 different types of equipment to assess the variability of the IOP measurements in a range of outpatient clinic patients across all subspecialities. With growing popularity of alternative methods to measure IOP, we evaluate the accuracy of these measurements.

Methods

Both eyes were measured in 50+ patients with the noncontact ORA tonometer, iCare tonometer and then GAT. A different healthcare professional used each device, ensuring there was no measurement bias when obtaining pressure readings. A minimum of three readings for each eye were obtained from the ORA and the mean measurement taken. The ORA provided a corneal-compensated IOP (IOP_{cc}) and a Goldmann-correlated IOP (IOP_{g}), both of which were compared against the measurement obtained from GAT. To evaluate agreement between devices, paired t-test is performed.

Results

At the time of abstract submission, data collection is on-going but we will present correlation between IOP readings from all 3 equipment and evaluate the agreement between the devices.

Conclusions

To be presented.

P-186

INTRAOCULAR PRESSURE REDUCTION AND PROGRESSION OF HIGHLY MYOPIC GLAUCOMA: A 12-YEAR FOLLOW-UP COHORT STUDY

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Purpose
To investigate the association between amount of intraocular pressure (IOP) reduction and progression of open-angle glaucoma (OAG) in highly myopic eyes and to demonstrate the associated risk factors.

Methods
One hundred and thirty-one (131) eyes of 131 highly myopic OAG patients who had been treated with topical medications and followed for 5 years or longer were enrolled. Patients were divided into tertile groups according to the percentage reduction of IOP, and the cumulative probability of glaucoma progression between the upper- and lower-tertile groups was compared. Kaplan-Meier survival analysis and log-rank testing were used to compare those two groups, and multivariate analysis with Cox's proportional hazard model was performed to identify risk factors for progression.

Results
Throughout the average 11.6 ± 4.4-year follow-up for 131 eyes (mean age, 41.2 years at initial visit; baseline IOP, 16.4 mmHg), glaucoma progression was detected in 72 eyes (55.0%). The Kaplan–Meier analysis indicated that the upper-tertile group (percentage-IOP reduction > 23.7%) showed a greater cumulative probability of non-progression than did the lower-tertile group (percentage-IOP reduction < 11.0%; P=0.034). The multivariate Cox's proportional hazard model identified presence of disc hemorrhage (DH; HR = 2.189; P=0.032) as significantly associated with glaucoma progression. The rate of average RNFL thickness thinning was −0.88 ± 0.74 µm/yr, and the MD change was −0.42 ± 0.36 dB/yr for the progressors.

Conclusions
Glaucoma progression is associated with the amount of IOP reduction using topical medications in highly myopic eyes, and the occurrence of DH is a risk factor for glaucoma progression.

P-187

MECHANISM OF MIR-335-5P/SLC2A3 AXIS REGULATING FERROPTOSIS OF TRABECULAR MESHWORK CELLS IN PRIMARY OPEN-ANGLE GLAUCOMA

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Purpose

Recent studies have found that ferroptosis may be involved in the process of trabecular meshwork (TM) injury in glaucoma[1-2]. This study aims to reveal the new mechanism of ferroptosis-mediated primary open-angle glaucoma (POAG), and to construct a miRNA-mRNA regulatory network identifying biomarkers for POAG. Meanwhile, identification of small molecule drugs will provide a new direction of therapy for POAG.

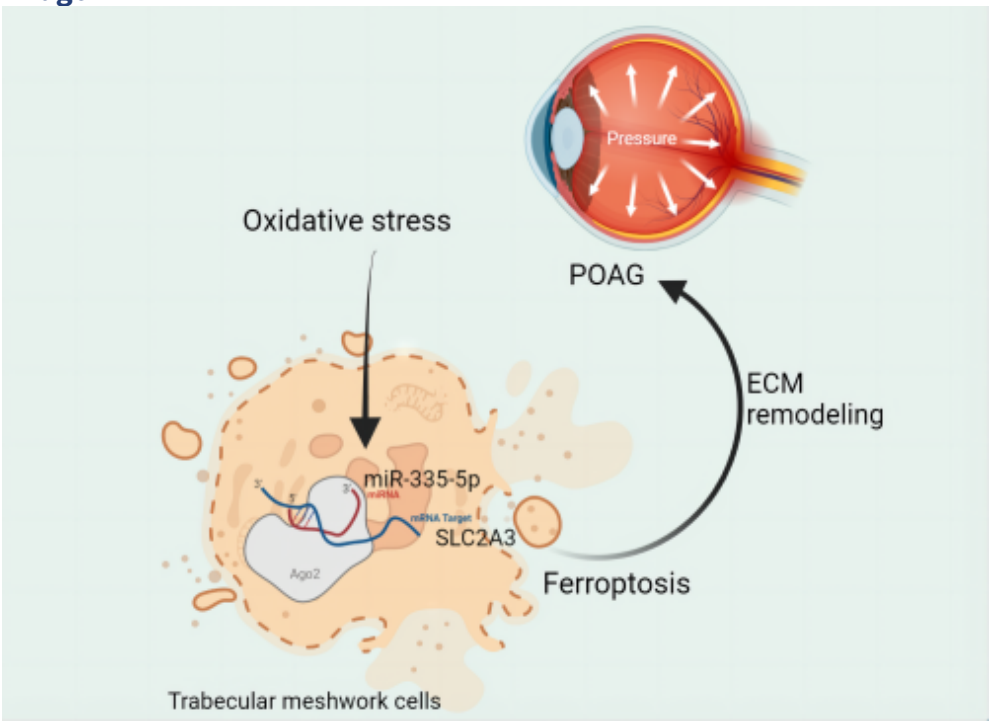
Methods

TM samples from controls and POAG patients were collected and miRNAs and mRNAs profiling were assessed through microarray analysis. The differentially expressed mRNAs (DEmRNAs) between POAG and normal were identified and intersected with ferroptosis-related genes downloaded from FerrDb. Then GO and KEGG analysis of DEmRNAs were performed. Correlation analysis was applied to determine key miRNAs targeting DEmRNAs. PPI of hub genes was identified and miRNA-mRNA network was established by STRING database and Cytoscape software. Gene importance score were constructed to explore the key gene. Small molecule drugs targeting DEmRNAs were predicted via CMAP database. Hydrogen peroxide (H_2O_2)-induced human trabecular meshwork cells (HTMCs) oxidative stress model was constructed to validate the expression of hub gene and miRNA.

Results

A total of 43 ferroptosis-related DmRNAs between control and POAG were identified. GO and KEGG analysis showed that 43 hub genes were enriched in STAT signaling pathway. Through correlation analysis miRNA-mRNA network construction, top 17 hub genes were regulated by 34 miRNAs. Gene importance score showed that SLC2A3 may play an important role in ferroptosis-mediated POAG. And ubiquitin-specific peptidases might be considered as potential therapeutic drugs for POAG. In addition, ferroptosis inhibitor Fer-1 displayed the most significant resistance to H_2O_2-induced HTMCs death and ECM remodeling compared with Nec-1and Z-VAD. H_2O_2 significantly induced differential expression of SLC2A3 and miR-335-5p.

Image



Conclusions

In this study, construction of miRNA-mRNA network and identification of miR-335-5p/SLC2A3 axis regulating HTMCs ferroptosis provide a novel insight into the pathogenesis, early diagnosis and treatment for POAG.

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PLB-010
INCREASED RISKS OF OPEN-ANGLE GLAUCOMA IN UNTREATED HYPERTENSION

H Kim, J Lee, H Bae, S Kim, C Kim

Purpose
Hypertension (HTN) has been associated with open-angle glaucoma (OAG), but whether elevated blood pressure (BP) alone is associated with OAG is unknown. Whether stage 1 hypertension, as per the 2017 American College of Cardiology/American Heart Association (ACC/AHA) BP guidelines, increases the risk of the disease is uncertain.

Methods
A retrospective, observational, cohort study.
A total of 360,330 subjects who were ≥40 years of age, and not taking antihypertensive drug or antiglaucoma drugs at the time of health examinations between January 1, 2002 and December 31, 2003 were included. Subjects were categorized based on their untreated BP, into normal BP (systolic BP (SBP)<120 and diastolic BP (DBP)<80 mmHg; n=104,304), elevated BP (SBP 120-129 and DBP<80mmHg; n=33,139), stage 1 HTN (SBP 130-139 or DBP 80-89 mmHg; n=122,534) or stage 2 HTN (SBP≥140 or DBP≥90mmHg; n=100,353). Cox regression analysis was performed to calculate hazard ratios (HR) of OAG risks.

Results
The mean age of the subjects was 51.17±8.97 years, and 56.2% were male. During a mean follow-up period of 11.76±1.37 years, 12,841 subjects (3.56%) were diagnosed with OAG. Multivariable-adjusted HRs (95% confidence intervals) were 1.056(0.985-1.132) for elevated BP, 1.101(1.050-1.155) for stage 1 HTN and 1.114(1.060-1.170) for stage 2 HTN with normal BP as the reference.

Conclusions
The risks for OAG increase with increases in untreated BP. Stage 1 HTN per 2017 ACC/AHA BP guidelines is a significant risk factor for OAG.

PLB-011

REAL-WORLD VARIATION IN INTRAOCULAR PRESSURE POST INTRAVITREAL STEROID INJECTION AND ITS CORRELATION WITH PRE-EXISTING OR FAMILY HISTORY OF GLAUCOMA

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Purpose

The study primarily aimed to assess the incidence of raised intra-ocular pressure (IOP) above 24 mmHg after steroid injection given for the treatment of macular oedema among subjects of retinal vein occlusion or diabetic retinopathy. The secondary aim of the study was to evaluate its correlation and effect with respect to a family or personal history of glaucoma.

Methods

The study was conducted at Ophthalmology Department at Yeovil District Hospital, Somerset, United Kingdom. 145 eyes of 134 patients were retrospectively reviewed. Of these, analysis was performed on 142 eyes who underwent intravitreal steroid treatment - 700 micrograms of dexamethasone or 190 micrograms of fluocinolone acetonide for macular oedema due to retinal vein occlusion and diabetic retinopathy. Injections were given by multiple eye specialists using the standard intravitreal injection technique. The study was conducted over a period of 51/2 years (February 2017 - June 2022). IOP was assessed with standard rebound tonometry before the steroid injection and every 6-8 weeks for a total of 52 weeks(confirmed with Goldmann Applanation tonometry if found high). Retinal nerve fibre layer (RNFL) assessment was performed every 3 months. Patients who could not be reviewed for a minimum of 3 months were excluded from the study.

Results

The mean age of patients with eye involvement was 71.70 ± 13.56 years. A total of 69 patients received more than 1 injection. IOP levels exceeded 24 mmHg in a total of 35 eyes (24.64%) following steroid injection. IOP reached its highest levels within the first 52 days in 32 eyes (91.7%). Of the entire cohort, 6 (4%) had a family of glaucoma, 10 (6.9%) had glaucoma well-controlled with medication and 17 (11.9%) had neither. Therefore, 8 (80%) who had pre-existing glaucoma and 2 (33.33%), who had a family history of glaucoma, showed a rise in IOP above 24mmHg. No individuals had new onset RNFL thinning or RNFL progression during the follow-up period. The rise in IOP was statistically significant when individuals with a history of glaucoma (N=10) were compared with the rest of the individuals ($\chi 2 = 14.68$; p=0.0001). The rise in IOP responded well to topical glaucoma medication in 33 (94.3%) eyes. However, 2 individuals, both with pre-existing well-controlled glaucoma needed surgical intervention.

Conclusions

Our real-world study shows that in eyes treated with intravitreal steroid injection IOP above 24mmHg can be seen in about a quarter (24.64%), which is similar to other studies. In most individuals, IOP can generally be well controlled with glaucoma medications. We also show a statistically noteworthy difference when individuals with a history of glaucoma were matched with the rest of the individuals (p <0.05). Hence, caution should be exercised when offering intravitreal steroids to this cohort. Regular monitoring of IOP and optic disc evaluation with timely intervention is highly recommended to prevent new or progressive RNFL thinning.

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Laboratory Sciences

P-188

NADPH OXIDASE 2 DE-REPRESSION PRESERVES RGC LOSS IN THE VITRO AND VIVO MOUSE MODEL OF GLAUCOMA

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Purpose
Elevated intraocular pressure and oxidative stress are well-known risk factors for glaucoma. NADPH oxidase 2 (NOX2) is one of the emerging sources of oxidative stress in the retina. The aim was to analyze NOX2-mediated effects on retinal ganglion cell (RGC) in *in vitro* and *in vivo* animal models of glaucoma.

Methods
Retinal explants of WT C57Bl/6J or NOX2 knockout mice were cultured *in vitro* under normal and elevated hydrostatic pressure (EHP) with and without the addition of different concentrations of gp91ds-tat (NOX2-specific inhibitor). High IOP was induced in WT C57Bl/6J mice by extra-scleral vein occlusion (EVO). After efficient IOP increase, gp91ds-tat was injected into EVO mice. Survival of RGCs was measured by means of Brn3a. ROS levels were analyzed by dihydroethidium staining. NOX2 and endothelin-1 (ET-1) were analyzed by immunostaining in cryosection, Western Blotting, and qPCR. qPCR and ELISA were performed to measure NOXs, inflammatory cytokines, and pro-oxidant and antioxidant redox genes expression.

Results
Brn3a-positive RGCs were significantly reduced under EVO and EHP ($p < 0.05$). EHP up-regulated NOX2 and p47phox mRNA expression significantly and induced NOX2-dependent ROS over-production, which occurred mainly in retinal GCL, the vasculature, and capillary endothelial cells ($p<0.05$). Protection of the loss of RGCs post-EVO and EHP by the gp91ds-tat or NOX2 KO ($p<0.05$), whereas no effect on high-IOP in EVO ($p<0.05$). NOX2 deletion down-regulates the NOX2 overexpression and O_2- hyper-production in the retinal vessels and the ganglion cell layer, moreover, down-regulates ET-1 overexpression ($p<0.05$). The gp91ds-tat down-regulates the overexpression of downstream pro-inflammatory cytokines (TNF-α, IL-1β, and IL-6), HO-1, and eNOS induced by EHP-injured ($p<0.05$), whereas no effect with the expression of Gpx1, SOD2, VEGF-A, nNOS and iNOS isoforms.

Conclusions
In experimental glaucoma models, loss of RGC is strongly associated with NOX2 activation and NOX2-dependent overproduction of ROS. The inhibition or knockout of NOX2 could effectively reduce NOX2-mediated hyper-ROS, which could alleviate the retinal endothelial dysfunction via over-activating ET-1-induced while regulating downstream inflammatory and antioxidant factors, ultimately rescuing retinal cell loss induced by high-IOP. Targeted inhibition of NADPH oxidase appears to be a viable strategy to control neuroinflammation and delay or prevent RGC degeneration, which holds unique promise in glaucoma.

P-189

CONTRALATERAL NEUROPROTECTIVE EFFECT OF BRIMONIDINE IN A CHRONIC MONOCULAR HYPERTENSION RAT MODEL

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Purpose

To explore the pathogenesis processes in the contralateral eye of unilateral glaucoma and to elucidate the molecular mechanism of brimonidine's optic neuroprotection on it, so as to provide a new basis for clinically effective prevention and treatment of glaucoma.

Methods

SD rats were used and randomly divided into four groups: control, chronic ocular hypertension (COH), COH + timolol maleate (TIM) and COH + brimonidine tartrate (BMD). Ocular hypertension model was established by injection of magnetic beads into the anterior chamber. Animals were given brimonidine, timolol or PBS respectively for 2 weeks from 1 week after surgery.

IOP was monitored with TonoLab tonometer. HE staining was conducted for analyzing retina morphology. Western Blot were carried out to determine the expression of GFAP, and phosphorylation level of Akt, Erk and JNK.

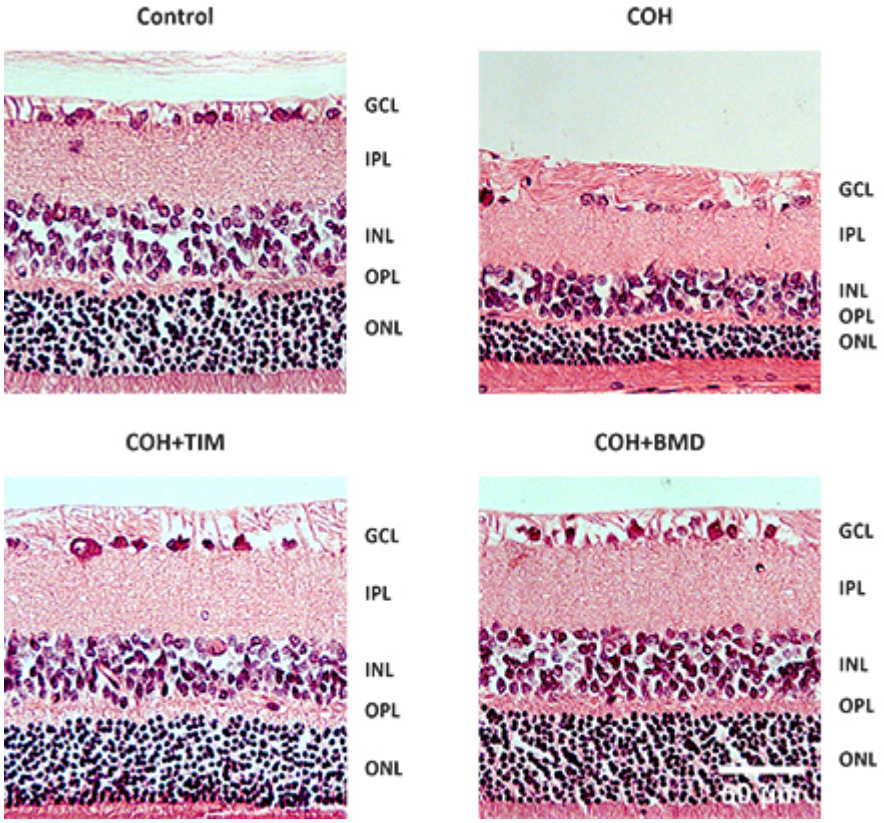
Results

IOP in fellow eyes remained at baseline level (11.52±2.19mmHg) throughout the experimental period.

After continuous ocular hypertension, the thickness of the inner plexiform layer (IPL), the inner nuclear layer (INL) and the outer nuclear layer (ONL) in the fellow eye were thinned by 21.9%, 13.6% and 18.8% respectively (n=3, $p<0.05$). Both brimonidine and timolol treatment restored the retina thickness to the level of control. RGC cell density in the fellow eye decreased by 19.0% by IOP elevation (n=3, $P<0.05$), and remained the same in brimonidine-treated eyes as in control eyes, which was higher than in timolol-treated eyes. (n=3, $p=0.04$)

Elevated IOP induced an increase, and brimonidine and timolol treatment induced a decrease of GFAP expression in the retina of the fellow eye. Ocular hypertension and brimonidine treatment induced an increase in Akt phosphorylation, which was not seen in those treated with timolol. Erk1/2 phosphorylation was downregulated in the fellow eye by continuous ocular hypertension while upregulated by brimonidine treatment but not timolol. Elevated IOP induced an increase in JNK phosphorylation level, which was not decreased by brimonidine or timolol treatment.

Image



Conclusions

Monocular chronic ocular hypertension causes pathological progress in the contralateral eye by upregulating JNK phosphorylation while downregulating of Erk1/2 phosphorylation, thus inducing cell apoptosis and decreasing cell survival.

Brimonidine has direct neuroprotection effect apart from its hypotensive function on the contralateral eye, which is realized by promoting Akt and Erk1/2 phosphorylation.

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P-190

VISUAL CHANGES AND NEUROPROTECTIVE EFFECTS OF ZEAXANTHIN IN A MOUSE MODEL OF RETINAL ISCHEMIA/REPERFUSION INJURY

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Purpose

To evaluate the effect of intravitreal injection of zeaxanthin on visual function and survival of retinal ganglion cells (RGC) after acute IOP elevation in C57Bl/6mouse.

Methods

Visual acuity was measured using Opto kinetic response 3 and 7 days after intravitreal injection of 1 µL of 5 µg/µL zeaxanthin in DMSO (n=4). Additionally a dose response of zeaxanthin was tested on a second group (n=8-10 eyes). A final group of mice (n=8) received intravitreal injections of 1 µL of 5 µg/µL zeaxanthin in DMSO or 1 µL of DMSO. Visual acuity was assessed at baseline and day 3 after the injection using OKR. IOP elevation (110-mmHg for 60-minutes) was performed on day 4 after the injection. A sham procedure performed without elevating the pressure in the contralateral left eye was used as control. Immunohistostaining on flattened retina using brn-3a antibody was performed on day 7 to label RGCs. Images of six 0.18 mm^2 areas at one-sixth (central retina), three-sixths (middle retina), and five-sixths (peripheral retina) of each retina were taken using a confocal microscope. Surviving RGCs were counted in a blind manner using ImageJ. The average cell density of each retina was calculated (n = 4).

Results

Visual acuity was improved after an injection of zeaxanthin intravitreally at day 3 after the injection and returned to baseline levels at day 7 and best dose was 5 µg/µL zeaxanthin. RGC count was significantly decreased in the DMSO and the zeaxanthin groups after IOP elevation ($p < 0.0001$ and $p < 0.05$ respectively). However, the zeaxanthin group had greater RGC survival compared to the DMSO group ($p < 0.05$ zeaxanthin IOP vs. DMSO IOP).

Conclusions

Zeaxanthin administration in retina leads to an increase in visual acuity due to optical reasons and enhances the survival of RGC after retinal ischemia/reperfusion injury in mouse.

P-191

GREATER OUTFLOW FACILITY INCREASE AFTER TARGETED TRABECULAR BYPASS IN ANGIOGRAPHICALLY DETERMINED LOW-FLOW REGIONS COMPARED TO HIGH-FLOW REGIONS

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Purpose
To investigate the impact of trabecular bypass surgery targeted to angiographically-determined high- versus low-aqueous humor outflow areas on outflow facility (C) ex vivo.

Methods
From porcine (n= 14) and human (n=13) post-mortem eyes, anterior segments were dissected, mounted onto a perfusion chamber, and perfused using Dulbecco's phosphate buffered solution containing glucose at a constant-flow rate to achieve a stable baseline facility (C). Fluorescein was perfused into the anterior chamber and used to identify high- and low-flow regions of the conventional outflow pathways. A 5 mm needle goniotomy was performed in either baseline high- or low-flow areas. Subsequently, C was quantitatively re-assessed and compared between "high-flow" and "low-flow" surgery eyes.

Results
In all anterior segments, high- and low-flow regions could be identified. Performing a 5 mm goniotomy increased C to a variable extent depending on their baseline. In the porcine high-flow group (n=8), C increased from 0.31 ± 0.09 to 0.39 ± 0.09 µL/mmHg/min (P = 0.12). In the porcine low-flow group (n=6), C increased from 0.29 ± 0.03 to 0.56 ± 0.10 µL/mmHg/min (P< 0.001). In the human high-flow group (n=6), C increased from 0.38 ± 0.20 to 0.41 ± 0.20 µL/mmHg/min (P = 0.02). In the human low-flow group (n=7), C increased from 0.25 ± 0.11 to 0.32 ± 0.11 µL/mmHg/min (P< 0.001). There was statistically significant greater C increase comparing low- to high-flow groups in both porcine (0.07 ± 0.09 vs 0.27 ± 0.13, P = 0.007 µL/mmHg/min, high- vs. low-flow) and human (0.03 ± 0.03 vs 0.07 ± 0.02, P = 0.03 µL/mmHg/min, high- vs. low-flow) eyes.

Conclusions
Targeting surgery to low-flow areas of the trabecular meshwork yields greater outflow facility (C) increase compared to surgery in high-flow areas. In-vivo studies are needed to confirm this finding and translate it to improved efficacy of common MIGS procedures.

P-192

INDUCTION OF MICROGLIA-INDUCED NEUROINFLAMMATION IN A RAT EX VIVO GLAUCOMA MODEL

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Purpose

Glaucoma is a complex, multifactorial disease in which microglia activation and neuroinflammation have been linked to the death of retinal ganglion cells (RGCs) and axon degeneration. However, the details of the mechanism underlying microglia-induced RGC damage in glaucoma have not been elucidated. In the present study, we used DNA microarrays to examine global changes in retinal mRNA levels in rats after intraocular pressure (IOP) elevation. Additionally, we examined whether IOP elevation activated the microglia and induced upregulation of key proteins of retinal inflammation: NLR family pyrin domain–containing 3 (NLRP3) and interleukin-1β (IL-1β).

Methods

All experiments complied with the ARVO Statement for the Use of Animals in Ophthalmic and Vision Research. Rat ex vivo eyecups were extracted from 30-day-old male Sprague-Dawley rats. The eyecups were incubated in artificial cerebrospinal fluid at 30 °C for 24 hours using a closed pressure system. The pressure in the chamber was increased by introducing 95% O_2 and 5% CO_2. The tissue was processed to determine mRNA changes with a microarray analysis and microglia proliferation was determined using an anti-Iba-1 antibody (a microglia marker). In addition, a western blot of the explanted retinas was performed with anti-NLRP3 and anti-IL-1β antibodies.

Results

We measured RNA expression levels with a microarray analysis and found that the most upregulated mRNA after pressure elevation was intelectin 1, which is involved in the innate immune system and defensins. Correspondingly, a pathway analysis of the microarray data identified the Toll-like receptor signaling pathway, which plays a crucial role in the innate immune system, as being the most commonly upregulated. The density of microglia significantly increased at 75 mmHg compared to 10 mmHg (10 mmHg vs. 75 mmHg=71.0 ± 19.8/mm^2 vs. 118.1 ± 31.7/mm^2, p=0.018, t test). The expression of NLRP3 and pro-IL-1β was significantly elevated at 75 mmHg compared to 10 mmHg (NLRP3, 10 mmHg vs. 75 mmHg= 0.597 vs. 1.926, p=0.045; pro-IL-1β, 0.083 vs. 0.500, p=0.038, paired t test).

Conclusions

Elevated IOP may induce microglial activation and NLRP3-mediated retinal inflammation, resulting in pressure-induced RGC injuries.

P-193

EFFECTS OF ELEVATED IOP ON RETINAL GANGLION CELL DEATH AND EXPRESSION AND INTERACTION OF RETINAL AQUAPORIN 9 AND MONOCARBOXYLIC ACID TRANSPORTERS

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Purpose
Lactate is a neural energy substrate, and aquaporin 9 (AQP9) is an aquaglyceroporin that can transport lactate. Astrocyte-to-neuron lactate shuttle (ANLS) has been known to play an important role in the energy metabolism of neurons, including retinal ganglion cells (RGCs). AQP9 may be involved in ANLS in concert with monocarboxylate transporters (MCTs) to maintain RGC function and survival. To test the effects of elevated intraocular pressure (IOP) on AQP9-MCT interaction and RGC death, elevated IOP was induced in Aqp9 KO mice and wild-type (WT) littermates by anterior chamber injection of microbeads.

Methods
Elevated IOP was induced in Aqp9 KO mice and wild-type (WT) littermates by anterior chamber injection of microbeads. RGC density was measured by TUBB3 immunostaining on retinal flat-mounts. Immunolabeling, immunoblot, and immunoprecipitation were conducted to identify and quantitate expressions of AQP9 and MCTs 1, 2, and 4 in whole retinas and ganglion cell layer (GCL).

Results
Aqp9 KO and WT mice had similar RGC density at baseline. In the elevated IOP induction group, cumulative IOP increased by about 32% by 4 weeks post-treatment, and RGC cell density decreased by 42% in WT mice and 34% in Aqp9 KO mice, but did not differ between the two groups. Elevated IOP decreased the amount of AQP9 protein in the retina of WT mice and changed the AQP9 immunoreactivity of the ganglion cell layer (GCL) from a polygonal pattern to a linear one. Elevated IOP markedly reduced immunoreactivity and protein content of MCTs1 and 2 among MCTs1, 2, and 4 expressed in GCL. On the other hand, elevated IOP resulted in a decrease in MCT1 and an increase in MCT2 that are interacted with AQP9. Aqp9 gene deletion increased baseline MCT2 expression in the GCL and induced a marked increase in MCT2 immunoreactivity and retinal MCT1 and MCT2 expression in the GCL at elevated IOP.

Conclusions
These results indicate that elevated IOP attenuates RGC survival and the association between AQP9 and MCT protein expression.

P-194

MURINE CYTOMEGALOVIRUS LOCALIZATION AND UVEITIC CELL INFILTRATION MIGHT CONTRIBUTE TO TRABECULAR MESHWORK IMPAIRMENT IN POSNER-SCHLOSSMAN SYNDROME

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Purpose

To establish a rat model infected with murine cytomegalovirus (MCMV) simulating Posner-Schlossman syndrome (PSS) and investigate viral behaviors and relevant pathogenetic changes.

Methods

PSS rat model was established using intracameral injection of 3.5 µl 80 pfu/µl MCMV suspensions into the right eye. The left eye was injected with virus medium as control. Rats were examined at 12h, 24h, 48h, 96h, 7d, 14d and 28d post infection (pi), including intraocular pressure (IOP) and anterior uveitis assessment. Rats were sacrificed at various time points. Histological changes of anterior chamber, MCMV gene expression of immediate early 1 (IE1), early 1 (E1) and glycoprotein B (gB), the infiltration of $CD4^+$ and $CD8^+$ T cells in the anterior chamber and pathological changes of trabecular meshwork (TM) were examined and assessed.

Results

IOP and uveitic manifestations peaked at 24hpi (23.25±2.87mmHg compared to 11.00±1.31mmHg, P<.001). Inflammatory cells infiltrated the iridocorneal angle at 24 and 48hpi and gradually disappeared after 96h. The iridocorneal angle remained open consistently. MCMV localized in aqueous humor outflow facilities and the iris from 24h to 28dpi and was detected by in situ hybridization, though it did not transcribe after 7dpi. MCMV transcribed in the order of IE1, E1 and gB in cornea and aqueous humor outflow facilities but was absent in retina. The transcription of MCMV IE1 peaked at 24h in cornea, 48h in iris and ciliary body. $CD8^+$ T cells, rather than $CD4^+$ T cells, infiltrated the iridocorneal angle and formed keratic precipitates (KPs) after transition to adaptive immunity. TM and iris pigment epithelial cells harboring viral inclusion bodies and autophagosomes were present at 28 dpi. TM recovered its cellularity and normal position on the trabecular beams at 28dpi.

Conclusions

MCMV localized in iris and iridocorneal angle and transcribed in a highly ordered cascade during acute infection. Leucocytes from innate immunity and $CD8^+$ T cells from apative immunity infiltrated the chamber angle and formed KPs. Both impairment and repair existed in TM as a result of viral infection and immune responses.

P-195

DENDRITE REGENERATION OF RETINAL GANGLION CELLS BY GENE THERAPY USING A CONSTITUTIVE ACTIVE FORM OF INSULIN RECEPTOR

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Purpose
To determine whether gene therapy using the membrane-anchored intracellular domain of insulin receptor (iIR) by farnesylation can regenerate dendrites of the retinal ganglion cells (RGCs) in GLAST heterozygous mice, a mouse model of normal tension glaucoma (NTG).

Methods
Cos7 cells were transfected with iIR or farnesylated iIR (F-iIR) for 24 hours, and immunoblot analysis was performed using antibodies against total and phosphorylated ERK and AKT. GLAST heterozygous mice were crossed with Thy1-EGFP mice to visualize RGC dendrites, and high-resolution images of αRGCs at 12 weeks of age were obtained using confocal microscopy. Adeno-associated virus vector carrying F-iIR (AAV-F-iIR) or AAV-DsRed as a control group was intraocularly administered at 12 weeks of age, and analyzed at 16 weeks. Dendrite reconstruction was performed using Imaris computer-assisted filament tracing function to measure total dendrite length.

Results
In Cos7 cells, iIR was expressed in the cytoplasm, whereas F-iIR was mainly expressed at the cell membrane. Expression of phosphorylated ERK and AKT were significantly higher in F-iIR-treated Cos7 cells compared with iIR-treated cells. Dendrite length at 12 weeks of age was significantly regressed ($P < 0.001$) in GLAST heterozygous mice (2.6 ± 0.3 mm) compared to Thy1-EGFP mice (4.0 ± 0.2 mm). The dendrite length after AAV-F-iIR treatment (4.4 ± 0.2 mm) was significantly longer ($P < 0.001$) than that in the AAV-DsRed group (3.3 ± 0.2 mm).

Conclusions
The regression of RGC dendrites observed in the NTG model mice could be regenerated by gene therapy with AAV-F-iIR.

P-196

AAV-ELAVL1/HUR GENE THERAPY PROVIDES NEUROPROTECTION OF RETINAL GANGLION CELLS

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Purpose

The aim of this study was to evaluate the impact of gene enrichment therapy using AAV-HuR construct on survival and function of RGC in rat model of glaucoma.

Methods

The study consisted of ex vivo and *in vivo* approaches. Ex vivo, we used rat retinal explants to investigate, whether AAV-HuR delivery affects survival of RGC in the degeneration model induced by axotomy. In vivo approach investigated histology and function of RGC. Eight-week-old rats received intravitreal injection of AAV-HuR, AAV-HuRS202A or AAV-control. Animals underwent electroretinography tests before and 8 weeks after intravitreal injections. To induce chronic glaucoma, 8 weeks after AAV injection, unilateral episcleral vein cauterization was performed to increase intraocular pressure (IOP). Animals underwent electroretinography tests and were sacrificed 8 weeks later. Retinas and optic nerves were collected and processed for immunostainings, western blots and stereology.

Results

In ex vivo retinal explants culture, the RGC count was 162±35, 148±22 and 149±28 for AAV-HuR, AAV-HuRS202A and control, respectively p<0,03). The IOP values were similar for experimental groups (p>0.05), and on average, they were significantly higher than in healthy eyes (p<0.001). In retinal histology, strong neuroprotective effect of the AAV-HuR construct was observed (the loss of RGC was about 6%). In comparison, the loss in the group treated with the AAV-HuRS202A and in the AAV-control group was approximately 20%. After AAV therapy, both constructs (HuR and HuRS202A) showed a significant increase in HuR protein expression in retinal ganglion cells, which was also associated with a significant increase in the expression of brain-derived neurotrophic factor (BDNF) in the retinas, especially after AAV-HuR treatment. In functional tests, the PhNR response was significantly reduced in AAV-control glaucoma (p<0.001). The application of AAV-HuR treatment resulted in the preservation of RGC function at a level very similar to the situation before the induction of glaucoma.

Conclusions

The AAV-HuR construct administered at a dose of 10^8 viral copies/ml shows a very strong neuroprotective effect in a rat glaucoma model. The neuroprotective effect is associated with antioxidant and anti-inflammatory activity and with the increase in BDNF expression, which additionally intensifies the neuroprotective effect.

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P-197

HISTAMINE H3 RECEPTOR ANTAGONIST-NITRIC OXIDE DONOR HYBRID COMPOUNDS FOR IOP CONTROL AND PREVENTION OF PHOTORECEPTOR DEGENERATION IN RABBIT MODELS

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Purpose

Histamine H_3 Receptor (H_3R) antagonists are able to reduce intraocular pressure (IOP) (1); NO, an intracellular messenger, lowers IOP, increasing acqueous humor (AH) outflow from trabecular meshwork (2). Here we evaluate the efficacy of Histamine H_3R antagonists-NO donors hybrid compounds in reducing IOP, ameliorating vascular ocular performance and prevent photoreceptor degeneration in rabbit models of acute and chronic ocular hypertension (OHT), and ischemia/reperfusion (I/R).

Methods

The acute and chronic OHT models were obtained by injection of 50 µl of hypertonic saline (5% NaCl) into the vitreous, or 100 µl of carbomer into the anterior chamber, respectively, of New Zealand White rabbits' eye. The IOP was measured at baseline, 60,120 and 240 minutes after OHT induction in the acute model, or every day 24 hrs after drug dosing for 12 days in the chronic model. The I/R model was obtained by repeated injections of ET-1 twice a week for 6 weeks into the subtenon capsule of the eye. The eyes were treated twice daily with vehicle or hybrid compounds ST-1989, ST-2126, ST-2130 from the third week until week 6. IOP was measured every week after 36 hours of washout. Ophtalmic artery resistence index (OARI) and the retinal function were assessed at baseline, at week 2 and 6 after ET-1 injiections. Inflammation response (IL-6 and TNF-α), oxidative stress (GSH, MnSOD and 8OH2dG), apoptotic process (Caspase 3 activity) were determined.

Results

ST-1989 has proven to be the most responsive molecule, able to reduce the IOP in both acute model (-8.5±2.4 mmHg after 120 min) and chronic OHT model (-11±1.3 mmHg after 13 days) demonstrating a long-lasting effect. In chronic OHT model, ST-1989 significantly reduced the inflammation response, oxidative stress and apoptotic markers versus vehicle group. In the retinal I/R model, ST-1989 attenuated IOP (baseline: 20.9±0.2; week 2: 23±0.9 and week 6: 18.9±0.6), improved ocular perfusion (baseline: 0.37±0.05; week 2: 0.47±0.02 and week 6: 0.37±0.04) and prevent photoreceptor degeneration (baseline 103.8±4.5 µV, week 2: 80.7±14 µV and 119.1±3.9µV after ST 1989 4 weeks treatment).

Conclusions

Compound ST-1989 could be a potential therapeutic drug for ocular hypertension management and neuroprotection.

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P-198

AIBP ENHANCES MITOCHONDRIAL FUNCTION IN MÜLLER GLIA IN RESPONSE TO GLAUCOMATOUS INSULTS

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Purpose

The goal of this study is to investigate the effect of Apolipoprotein A-I binding protein (AIBP; gene name APOAIBP) on mitochondrial structure and function in Müller glia in response to glaucomatous insults such as elevated pressure and oxidative stress.

Methods

Rat Müller glia cell line (rMC-1) cultures were pretreated with BSA or recombinant human AIBP (0.2 mg/ml) at 2 hours before exposure to elevated hydrostatic pressure (HP, 30 mmHg) for 2 h or paraquat (PQ, 500 mM) for 6 or 24 h. Mitochondrial morphology and rate of ATP production were assessed by electron microscope (EM) tomography. Mitochondrial respiration in rMC-1 cells *in vitro* was assessed by measuring oxygen consumption rate using a Seahorse XF24 extracellular flux analyzer. Mitochondrial biogenesis, dynamics and oxidative phosphorylation were measured by Western blot analyses.

Results

We found that administration of recombinant AIBP promoted basal and maximal respiration along with an increase of ATP production and spare respiratory capacity, as well as mitochondrial activity in rMC-1 cells exposed to normal pressure compared to BSA treatment. In BSA treatment, we found that elevated HP significantly reduced maximal respiration and spare respiratory capacity in rMC-1 cells compared to cells exposed to normal pressure. Importantly, administration of recombinant AIBP enhanced basal and maximal respiration, as well as mitochondrial activity and cell viability in rMC-1 cells exposed to elevated HP. EM tomography showed that AIBP triggered cristae biogenesis and this translated into an increased modeled rate of ATP generation per unit mitochondrial volume, which was not affected by elevated HP. The number of crista junctions per crista was found to be higher in HP-induced rMC-1 cells after AIBP treatment. AIBP deficiency significantly exacerbated mitochondrial respiration and ATP production in oxidative stress-induced rMC-1 cells. Furthermore, oxidative stress significantly induced NLRP3 inflammasome activation in rMC-1 cells. However, the administration of recombinant AIBP significantly prevented mitochondrial dysfunction and mitochondria-dependent inflammasome activation in rMC-1 cells against oxidative stress.

Conclusions

These findings suggest that the administration of recombinant AIBP is protective in Müller glia cells against glaucomatous insults such as elevated pressure and oxidative stress.

P-199

ESTABLISHMENT OF OPEN-ANGLE OCULAR HYPERTENSION MODEL BY CONDITIONAL OVER EXPRESSION OF AUTOTAXIN IN MICE EYES

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Purpose

Several animal models of ocular hypertension (OH) have been developed for the research into the pathogenesis and novel target of drug discovery of glaucoma. However, these OH models needed external invasive procedures to obstruct outflow pathways resulting several concerns, such as intraocular pressure (IOP) spike, inflammation, large intra-animal variability, and low success rate of ocular hypertention.[1] Thus, non-invasive OH model based on the pathogenesis of IOP elevation is desirable. Lysophosphatidic acid (LPA) is involved in increased trabecular meshwork (TM) fibrosis and resistance of aqueous outflow through the trabecular pathway, one of the causes of high IOP in human open angle glaucoma.[2] We focused on autotaxin (ATX), an LPA-producing enzyme, and attempted to induce IOP elevation by conditional up-regulation of the ATX gene expression in the mouse eye.

Methods

ATX flox mice were mated with CreER expressing mice to produce ATX Tg mice. In the mice, ATX expression can be conditionally induced by tamoxifen administration in the ATX mice. Tamoxifen was administered to 6- to 8-week-old mice by eye drops three times per day in 4 hours intervals for 5 days to induce ATX overexpression in the eye. IOP measurements and retinal thickness evaluation using OCT were performed over time after the end of tamoxifen treatment. After 3 months, retinal flat-mount were prepared and the number of RGCs was counted.

Results

Immunohistochemical staining of cryosection of the eye tissue and measurement of LysoPLD activity of the aqueous humor confirmed the induction of ATX expression by tamoxifen treatment. The IOP of ATX-expressing mice increased significantly after 1 week from the end of tamoxifen treatment and remained elevated about 4 mmHg for about 2 months, after which it gradually decreased. No obvious anterior segment abnormalities were observed during observation for 3months after induction of ATX expression. OCT evaluation showed no significant change in thickness of RNFL and ganglion cell layer, but there was a significant decrease in the number of RGCs in the peripheral retina. Immunohistochemistry showed increased expression of F-actin near the trabecular meshwork.

Conclusions

We have successfully generated a mouse model of open-angle ocular hypertension in which the conditional induction of ATX expression caused fibrosis in the angle and maintained elevated IOP for a long period of time without external ocular invasive procedure.

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P-200

ASSOCIATION BETWEEN PRIMARY ANGLE CLOSURE GLAUCOMA AND URIC ACID LEVELS IN SERUM AND AQUEOUS HUMOR

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Purpose
To evaluate abnormalities in serum and aqueous humor uric acid (UA) levels in primary angle closure glaucoma (PACG).

Methods
PACG patients and age- and gender-similar controls (patients scheduled for cataract extraction) were prospectively enrolled. Serum UA levels were determined by enzymatic colorimetry; aqueous humor UA levels by Enzyme-Linked ImmunoSorbent Assay. UA levels were compared between PACG patients and controls using a t-test, and among PACG subgroups with different disease severity using one-way ANOVA. Binary logistic regression analysis was used to adjust the comparisons between PACG patients and controls for systemic and ocular confounding factors.

Results
A total of 131 PACG patients and 112 controls were included. The serum UA level was 266±69 µmol/L in the PACG group and 269±73 µmol/L in the control group (P=0.71). The aqueous humor UA level was 35.4±8.2 µmol/L in the PACG group and 53.9±18.6 µmol/L in the control group (P<0.001). This difference remained significant after adjustment for age, gender, systolic blood pressure, diastolic blood pressure, body mass index, axial length, central corneal thickness, anterior chamber depth, lens thickness, white-to-white distance, corneal endothelial cell density, and serum UA level (odds ratio: 0.88, 95% confidence interval: 0.83-0.93, P<0.001).

Conclusions
Aqueous humor UA but not serum UA levels differ between PACG patients and controls. This indicates that local UA rather than systemic UA plays a role in the pathogenesis of PACG.

P-201

HYDROGEN SULFIDE PRECURSOR BALANCES IRON HOMEOSTASIS IN THE RETINA CAUSED BY ELEVATED HYDROSTATIC PRESSURE

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Purpose

Hydrogen sulfide (H2S) has been recognized as a third gas signaling molecule of great importance to the CNS. H2S shows a highly protective effect on neurons by modulating oxidative stress and inflammatory responses. Retinal ganglion cells (RGCs) are highly sensitive to intraocular pressure (IOP). Elevated IOP seems to lead to loss of RGCs by causing an imbalance in iron homeostasis. The aim of this study is to investigate if elevated IOP causes changes in iron homeostasis leading to RGCs loss in retina and whether H2S plays a protective role in RGCs damage resulting from an imbalance in iron homeostasis.

Methods

Retinal explants of 12 weeks aged male C57BL/6 mice (n=24) were cultured for 24 hours under fluctuating pressure for the first 6 hours (pressure was increased to 60mmHg every 15 minutes) with or without adding 100nM H2S donor (GYY4137), or with 500 nM Hemin for the first hour. RGCs were quantified by immunohistochemical staining against Brn3a in flat-mounts. Retinal cryo-sections were immunohistochemically stained against Transferrin receptor (TfR), H-Ferritin, L-Ferritin and Hepcidin and photographed under a confocal microscope (LSM 980 Airyscan, Zeiss). Fluorescence intensity was analyzed by Image J. Statistical significance was determined by t-test and one-way ANOVA with Tukey-Kramer's post hoc tests for comparison between groups. Differences were considered statistically significant at $p< 0.05$.

Results

Compared to the control group, iron overload and elevated pressure led to significant loss of RGCs. The number of RGCs was reduced by approximately 20% ($p< 0.05$) and 35% ($p< 0.05$). H_2S protected the RGCs from loss due to elevated pressure. TfR, H-ferritin, L-Ferritin and Hepcidin were expressed in RGCs. Both iron overload and elevated pressure increased the expression of TfR in the RGC layer ($p<0.05$). In additon, the expression of Hepciden was significantly increased in the retina under elevated hydrostatic pressure ($p<0.05$). However,when H_2S was added to the culture medium, the expression of TfR and Hepciden were significantly decreased ($p<0.05$).

Conclusions

RGCs are sensitive to iron toxicity and elevated hydrostatic pressure. H2S protectes the RGCs against elevated pressure. At the same time elevated hydrostatic pressure disrupts iron homeostasis in retina by increasing iron import, reducing iron export, and decreasing the storage of stabilized iron. H2S precursor protects RGCs lose by promoting iron homeostasis which may indicate an increase in intracellular labile iron.

P-202
OCULAR TISSUE REACTION TO IMPLANTED ANTIGLAUCOMA SHUNT

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Purpose
The histopathologic evaluation of the implanted antiglaucoma shunt with valve in the rabbit's eyes.

Methods
The preclinical research included the implantation of the newly designed antiglaucoma shunt with silicone valve made from PMMA (Polymethyl methacrylate which is a biocompatible material with ocular tissue) into the anterior chamber under a scleral flap. The surgery was performed on steroid-induced hypertension at the eye of New Zealand rabbits, divided into 2 groups (Group A- undergoes filtering device implantation) and Group B (served as control and undergoes trabeculectomy). Five eyes from each group were evaluated histopathologically following rabbits' euthanasia on days 90 after antiglaucoma surgery.

Results
The ocular tissue reaction to PMMA device consisted of a fibrotic capsule, with an amount of fibroblasts in the study group compared with the control one. The samples were devoid of inflammatory cells (such as macrophages and lymphocytes). The lumen of the antiglaucoma shunt with valve was free of inflammatory exudates or other obstructions in all specimens examined. No adverse reactions were registered in Group A for up to 90 days.

Conclusions
The data obtained from the histopathologic examination reveals the good tolerability and safety of the antiglaucoma shunt with valve, with no adverse effects and inflammatory response. The device can be an alternative to trabeculectomy.

P-203

ROLE OF INFLAMMATORY AND AUTOIMMUNE BIOMARKERS IN OPEN-ANGLE GLAUCOMA: A PILOT STUDY

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Purpose
To study the role of inflammatory and autoimmune markers in primary open-angle glaucoma (POAG).

Methods
Biomarkers in tear and serum samples of 20 POAG, 20 NTG, and 10 controls were evaluated prospectively and compared. Estimation of tear cytokines (IL-6&10 and TNF-α) by flow cytometry, serum Heat Shock Proteins (HSP-27 &60) by ELISA, and Antinuclear antibody (ANA) with immunoblotting were done.

Results
Mean tear level of IL-6 was higher in NTG while tear IL-10 and TNF-α were higher in controls. ANA positivity was seen in 45% of POAG, 40% of NTG, and 20% of controls. The mean serum HSP-27 level was slightly lesser in glaucoma groups in comparison to the control. Both glaucoma groups had a positive correlation between IL-10 and TNF-α in addition to IL-6 and HSP-27. The serum level of IL6 was higher among the severe glaucoma group, whereas the serum level of TNF-α was higher among mild grades of OAGs. Female subjects had a higher mean level of TNF-α. 33.3% of POAG had multiple ANA, whereas none of the NTG patients had such variations. All groups had a negative correlation of IL-6 with TNF-α and visual acuity. The best diagnostic parameters in terms of sensitivity and specificity were serum HSP-27 and tear IL-10 respectively.

Conclusions
These tear and serum biomarkers have a potential role in diagnosing and discriminating OAGs. Studies with a larger sample size are required for further validation.

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P-204

EFFECT OF MITOMYCIN-C AND RETINOIC ACID ON CONJUNCTIVAL LYMPHATICS IN RAT EYES: AN EXPERIMENTAL STUDY

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Purpose

Exact mechanism of bleb drainage post trabeculectomy is incompletely understood. Few studies have shown the role of lymphatics in bleb drainage and a possible toxic effect of MMC on conjunctival lymphatic progenitor cells.1,2

Retinoic acid is being evaluated for its lymphangiogenetic potential to treat lymphedema in humans.3 Some studies have shown an equal biological effect of EC23, a synthetic retinoic acid as compared to all-trans retinoic acid.4

This study was done to evaluate the effect of MMC on conjunctival lymphatics and to evaluate the potential of retinoic acid as a lymphangiogenetic agent.

Methods

A prospective Non-randomized Experimental Interventional study was done with 50 eyes of 25 Sprague-Dawley rats. Five Rats were allocated in five groups each. Right eye of each group had a sub conjunctival bleb formation with 5 different agents and left eye was control the agents used were:

GROUP A - Balanced salt solution (BSS)

GROUP B - 0.01% MMC

GROUP C - 10 nM Synthetic Retinoid ec23

GROUP D- 100 nM Synthetic Retinoid ec23

GROUP E - 0.1 % Dimethyl sulfoxide (DMSO)

Rats were euthanized on post operative day 14 and enucleated. Each conjunctival specimen was stained with Masson trichome, CD 31(vascular endothelial marker) and D2-40 (lymphatic endothelial cell marker) and fibrosis, lymphatic and vascular density in these specimens was compared within and between groups and described as Median with interquartile range.

Results

Median score for CD 31 (Right-3;2-3, Left-1.5;1-2.75) and D2-40 (Right-3;1-6, Left-1;1-1) was higher in intervention eyes of group A while it was comparable in both eyes for Masson trichome.

Median score for CD 31 (Right-1;1-3, Left-2;1.5-3) and D2-40 (Right-2.5;1.25-3, Left-3;3-3) was higher in control than intervention eyes in group B while it was comparable in both eyes for Masson trichome.

Median score for D2-40 was higher in intervention (5;3-6) than control eyes (3;2-4) in Group D.

Median score for CD 31 (Right-1;1-2, Left-3.5-1.5-4.75) and D2-40 (Right-1;0.5-2, Left-3;2-3) was lower in intervention than control eyes in Group E.

Conclusions

There was an increase in conjunctival lymphatics following localised trauma to tissue, thus hinting towards the role of lymphatics in sub-conjunctival fluid drainage. MMC does have a toxic effect on the lymphatic cells and possibly contributes to bleb failure post trabeculectomy. Ec23 at 100nM concentration has potential to induce lymphangiogenesis in conjunctiva however, larger studies are required to study it in detail.

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P-205

ANALYSIS OF AUTOPHAGY MARKERS IN DIFFERENT CELL TYPES OF THE RETINA WITH AGE AND AFTER IOP INJURY WITH SINGLE CELL SEQUENCING

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Purpose

Autophagy is a key cell recycling process that breaks down and recycles damaged proteins and organelles. With age, levels of autophagy decrease which contributes to many age-related neurodegenerative diseases, such as glaucoma. Analysis of autophagy in the whole retina shows decline of autophagy levels with age and studies suggest neuroprotective effects with boosting autophagy in animal glaucoma models, however, the literature is contradictory. This may be due to altering autophagy levels within different cell types of the retina. This study aimed to analyse autophagy genes with ageing and after IOP challenge in the single cell populations of the retina.

Methods

Acute IOP elevation (50mmHg for 30 mins) was performed by cannulation of the anterior chamber in 3, 12 and 24month old C57BL/6J mice. 3 days after injury retina from the injured and non-injured eye were collected (n=2 per group). Papain dissociation was performed. RGCs and astrocytes were enriched using MACS technology (CD90.2 microbeads and ASCA-2 antibody). Libraries were generated using the 10x Genomics kit and were sequenced on the Illumina HiSeq platform. Data analysis was carried out via Seurat. Differentially expressed genes were identified for different cell types by comparing the transcriptome of middle-aged and old mice to young mice.

Results

Between 7800-10590 cells were detected per sample. Using known cell markers, we characterised the cells in each sample and identified around 300 RGCs, 1400 macroglia and 100 microglia. Analysing autophagy related genes, markers such as MAP1lc3a, a macroautophagy marker, decreased with age in RGCs and macroglia, whereas it was stable in microglia. After IOP elevation, MAP1lc3a increased in an age-related manner in microglia, but not in RGCs or macroglia. PINK1, a mitophagy marker, showed an age-related increase in macroglial cells after IOP injury, but not in RGCs or microglia. Expression of Hspa8, a marker of chaperone mediated autophagy, increased with age in macroglia, but not RGCs or microglia, but showed increased expression in microglia and RGCs after IOP injury.

Conclusions

Our scSeq data suggests that autophagy levels with age and after IOP injury are regulated differently in the various cell types of the retina. This first analysis suggests, levels of macroautophagy decline with age in RGCs and macroglia, and that IOP elevation has the most impact on levels of macroautophagy in microglial cells. Further detailed analysis is necessary.

P-207

NNA1 DEFICIENCY CAUSES RETINAL DEGENERATION AND GLAUCOMA IN A PCD MOUSE MODEL

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Purpose

We investigate the histological character and mechanism of photoreceptor cell degeneration and the effect on intraocular pressure in the Purkinje cell degeneration (pcd) mutant mice, which have a mutation in the Nna1 gene, which encodes an enzyme for posttranslational modification of tubulins.

Methods

Nna1 null mice were prepared at different ages (1, 3, 4, 8, and 24 weeks old), and then, we analyzed the change in retinal thickness and the time course of retinal thickness change using the paraffin sections. In addition, changes in intraocular pressure under anesthesia were compared with those in control mice using Icare® TONOLAB. We also performed histological analysis on the mechanism of cell death in the degenerating retina of pcd mice.

Results

In 4-week-old Nna1KO mice, the retinal thickness was decreased significantly (89.2±19.5 µm, 5 eyes) compared to in control mice (122.4±17.1 µm, 5 eyes, p=0.02). In addition, retinal thickness began to decrease from 3 weeks (WT: 147 µm, KO:58 µm, 3 eyes, p=0.02) and continued to decrease until 24 weeks (WT:131 µm, KO: 44 µm, 2 eyes, p=0.005). In the retina, the photoreceptor layer tended to have a higher degree of degeneration (WT:84.4 ± 11.1 µm, KO:54.8 ± 16.5 µm, p=0.01). Immunohistochemical analysis of 4-week-old Nna1KO mouse eyes revealed enhanced expression of GFAP, an astroglial marker, and γH2AX, a DNA damage marker. In addition, the intraocular pressure significantly increased in 4-week-old Nna1KO mice (11.4±0.8 mmHg, 8 eyes) compared to control mice (8.6±1.3 mmHg, 24 eyes, p<0.0001).

Conclusions

Nna1 deficiency caused retinal degeneration mainly in the photoreceptor layer around 3 weeks old, in addition to Purkinje cell degeneration in the cerebellum. During the photoreceptor cell degeneration, DNA damage occurs, and the astroglial cells are activated. In parallel, increased intraocular pressure was increased at 4 weeks old in the eye of pcd mice.

P-208

TRANSFORMING GROWTH FACTOR-B (TGFB) 1 AND 2 PROMOTES THE DIFFERENTIATION OF HUMAN TRABECULAR MESHWORK PROGENITOR CELLS

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Purpose
Whilst TM progenitor cells (TMPCs) have the potential to repopulate the trabecular meshwork (TM), there is loss and dysfunction of TM cells which occurs with increasing age and in primary open-angle glaucoma (POAG). The profibrotic cytokine transforming growth factor-β (TGFβ) plays key role in the regulation of extracellular matrix and pathobiology of the trabecular meshwork (TM) in POAG. The mechanisms of TMPCs differentiation are poorly understood and may represent a novel target for cell-based therapies to restore TM function in POAG. The role of TGF-β-1 and -2 on TMPSC differentiation are currently unknown and we sought to determine the effect of TGF-β-1 and -2 on an *in vitro* model of human TMPC differentiation.

Methods
Human primary TM cells (PTM) were isolated from the TM tissue of donated cadaver globes. The TMPCs isolated from the PTM utilising a sphere culture assay and were further differentiated to TM cells (DTM) on ECM derived from TM cells in the presence or absence of TGF-β-1 and -2 (5ng/ml) for up to 5 days. Phase contrast microscopy, mRNA and protein expression were evaluated at days, 1, 3 and 5 post differentiation with qPCR, immunofluorescence and western blotting for stem cell and known differentiated TM cell markers.

Results
TMPCs proliferated, formed spheres, and could differentiate into TM cells in the presence or absence of TGF-β-1 and -2. TM sphere differentiation and outgrowth area was increased in all donors (n=3) by day 5 in the presence of TGFβ1 or TGFβ2 spheres compared to ECM alone. TM progenitor cell markers (SOX2, FOXC1, SPARCL1, PDGFRA, ANKG and KDR) mRNA expression was reduced in TMPCs differentiated in the presence of either TGF-β-1 and -2 compared to ECM only controls. TGFβ1/2 treated groups had a higher expression of TAGLN and SPARC or compared to non-treated groups. Expression of the cell contractility related markers α-SMA and CTGF were upregulated in the TGFβ1 (α-SMA: p=0.06; CTGF: p= p=0.032) and TGFβ2 (α-SMA: p=0.07; CTGF: p=0.016) treated groups compared with the ECM control group.

Conclusions
This study found that the TGFβ1/2 could promote the differentiation of the TM progenitor cells by upregulating the TM cell markers and downregulating the TM progenitor cell markers. Elevated levels of TGFβ1/2 in the aqueous humour of the glaucomatous eyes may promote the differentiation of the TMPCs, which may lead to the depletion of the TM progenitor cells observed in POAG eyes.

P-209

LOCAL ADENOVIRAL DELIVERY OF VASCULAR ENDOTHELIAL GROWTH FACTOR C INDUCES LYMPHANGIOGENESIS IN THE CONJUNCTIVA IN RABBITS

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Purpose
The purpose of this study was to determine if conjunctival lymphangiogenesis can be induced using adenoviral delivery of VEGF-C.

Methods
Seven White New Zealand rabbits received a subconjunctival injection containing $3.5x10^7$ plaque forming units of an adenoviral vector containing the gene encoding VEGF-C (Ad-VEGF-C). The contralateral eye was used for control experiment (the same volume of either saline or an empty vector). After two weeks the animals were examined with trypan blue conjunctival lymphangiography and the eyes were harvested for histology and immunohistochemistry (podoplanin and CD31).

Results
Trypan blue conjunctival lymphangiography revealed significantly more extensive conjunctival vessel network in the Ad-VEGF-C group compared with control: 1.13±0.50 versus 0.37±0.22 vessel length / analysed area (P=0.0104). This finding was confirmed with immunohistochemistry where a significant increase in the number of lymphatic vessels was found compared to control, 34±9 per mm^2 versus 13±8 per mm^2 (P=0.0019). There was furthermore a significant increase in lymphatic cross-sectional area; 32500±7900μm^2 per mm^2 versus 17600±9700μm^2 per mm^2 (P=0.0149). Quantification of blood vessels revealed no significant difference in blood vessel density between Ad-VEGF-C and control, 19±9 per mm^2 versus 14±8 per mm^2 (P=0.1971). There was no significant difference in total blood vessel area, 13200±7600μm^2 per mm^2 versus 7100±3000 μm^2 per mm^2 (P=0.0715). Eyes treated with an adenoviral vector (VEGF-C or empty vector) responded with a reactive cellular response, predominantly lymphocytes, towards the vector.

Conclusions
The study demonstrates the feasibility of inducing conjunctival lymphangiogenesis with a single subconjunctival injection of Ad-VEGF-C. Future studies will explore how this can be used with a therapeutic purpose.

P-210

THE EXPRESSION OF RNA-BINDING PROTEIN WITH MULTIPLE SPLICING (RBPMS) IN EX VIVO GLAUCOMA ANIMAL MODEL THROUGHOUT THE AGEING

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Purpose
Glaucoma, a complex group of multifactorial neurodegenerative diseases, is characterized by progressive loss of the retinal ganglion cells (RGCs) as well as their axons. High intraocular pressure (IOP) and aging are significant risk factors for glaucoma. RNA-binding protein with multiple splicing (RBPMS) is a protein-coding gene that is expressed in RGCs and is associated with ageing. Due to the limited knowledge of RBPMS, our study aimed to analyze the changes and role of RBPMS in the ageing process in mice and retinal explants of experimental glaucoma models.

Methods
Retinal explants were prepared from 8-week, 22-week, and 60-week-old male C57BL/6J mice (n=6/age group) and incubated at high pressure (60 mmHg) for 6 hours or with the addition of 300 µM H_2O_2 at normal atmospheric pressure for 3 hours and 24 hours. RGC were labeled by Brn3a and RBPMS in flat mounts and subsequently quantified. Changes in RBPMS and stress granule (TIA1, G3BP1) expression and distribution were analyzed by immunohistochemistry in cryosections (n = 6 per group). The fluorescence images were scanned by Leica SP8 confocal laser-scanning microscope. Z-stack images (a total of 20 layers) were reconstructed into 2D images and analyzed by ImageJ2 2.3.0.

Results
RBPMS labeled more RGCs than Brn3a ($p<0.05$). The density of RGCs decreased with aging ($p < 0.01$). The survival rate of RBPMS+RGCs was significantly reduced under elevated hydrostatic pressure and oxidative stress ($p<0.001$). The RBPMS in RGCs age-dependent and experimental glaucoma-induced loss realized an eccentric change, *i.e.*, a greater loss in the peripheral region of the retina than in the central. Localization of RBPMS did not change with aging. RBPMS translocation from the ganglion cell layer (GCL) to the inner plexiform layer (IPL) occurred after oxidative stress and not under elevated hydrostatic pressure. Oxidative stress injury resulted in a significant increase in the expression of TIA1 and G3BP1 in the retina ($p<0.05$), with the increase occurring mainly in the GCL ($p<0.001$).

Conclusions
RBPMS was more sensitive to age-related and experimental glaucoma-injury changes in RGC than Brn3a. RBPMS reacts to the damage through translocation and the increasing of stress granules after oxidative stress. This is, to the best of our knowledge, the first study to show the different expressions of RBPMS and Brn3a in different parts of the retina throughout aging, hydrostatic pressure, and oxidative stress.

P-212

PROFILING OF MYOCILIN PROCESSING AND GLOBAL UBIQUITYLOME OF TRABECULAR MESHWORK CELLS IN A GLAUCOMA MODEL

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Purpose

Dysregulation of Trabecular Meshwork Cells (TMCs) metabolism is involved in glaucoma pathogenesis, but the molecular mechanisms are largely unknown yet.

Ubiquitin (Ub) conjugation by E1-E2-E3 enzymes (the E3-ligase confers substrate-specificity) is a major post-synthetic modification that finely regulates the degradation (by proteasome) and biological properties of proteins and global metabolism, indeed.

Processing of glycoprotein myocilin (MYOC/TIGR gene) through Ub-proteasome was first found impaired in a primary human TMCs (hTMC) strain challenged with dexamethasone (dexa) [a model of steroid-induced glaucoma *in vitro*].

Hence, this study aims at: 1) Identifying the myoc:E3-ligase pair; 2) Profiling of the TMCs ubiquitylome and its perturbations;

Methods

A hTMC strain has been challenged with 500 ng/mL dexa or vehicle (4 days) and the proteasome inhibitor epoxomicin (epox) delivered to enrich Ub-proteins and to monitor their turnover.

Native-gel electrophoresis, Western blotting (Wb) and RT-PCR have been applied to follow protein content/expression. Bioinformatic (UbiBrowser) and proteomic studies have been used to identify candidate myoc-E3-ligase pairs. Delivery of 27-mer siRNAs has been used to silence E3-ligase expression. A proteomic workflow (*i.e.*, diGLY proteomics) is being completed (work in progress) to profiling the first TMCs ubiquitylome.

Results

Differently from untreated cells, dexa-treated TMCs show no accumulation of myoc either free or associated with intact proteasome particles after epox delivery (Wb and native-gel, *p<00001, one-way ANOVA).

Bioinformatic and proteomic studies suggest that synoviolin (SYVN1) and CHIP E3-ligases may conjugate Ub to myoc.

CHIP, but not SYVN1, is downregulated by dexa in TMCs and CHIP silencing induces myoc accumulation even in the absence of dexa (RT-PCR and Wb, *p<0.0001, one-way ANOVA).

Pilot diGLY proteomic studies highlight perturbations of global ubiquitylome in dexa-treated TMCs.

Conclusions

Myoc accumulation in dexa-treated TMCs may originate also from impaired proteasome turnover;

CHIP likely is the E3-ligase of myoc and is downregulated by dexa; Identification of E3-ligases-substrate pairs and ubiquitylome profiling is expected to introduce molecular insights on TMC metabolism and glaucoma pathogenesis.

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P-213

EXCITATORY - INHIBITORY BALANCE ALTERATIONS IN THE INNER RETINA OF AN ANIMAL MODEL OF GLAUCOMA

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Purpose

Glaucoma causes progressive dysfunction of the retina, ultimately leading to blindness. Animal models have shown that synapses between bipolar and ganglion cells are being dismantled early after IOP elevation. We mapped synaptic content of the inner plexiform layer (IPL) as well as connectivity of alpha retinal ganglion cells (aRGCs), and density of excitatory (E) and inhibitory (I) synapses in specific bipolar cell types to understand whether degeneration differentially impacts retinal circuits responsible for scotopic and photopic vision.

Methods

Transient IOP elevation was induced by photocoagulation of the episcleral and limbal vessels in adult CD1 mice. Retinal whole mounts were immunolabeled for the excitatory and inhibitory synaptic proteins PSD95, RibeyeA, Gephyrin and VGAT. Individual bipolar cell types were immunolabeled using PKC-alpha and Synaptotagmin-2 antibodies, while RGCs and their postsynaptic sites were labeled by biolistic transfection of PSD-95 and Gephyrin tagged with fluorescent proteins.

Results

The average density of inhibitory and excitatory synapses in the IPL of lasered eyes was reduced compared to control eyes, but loss was non-uniform across the IPL. Axons of rod bipolar cells lost ribbons and gephyrin, while Type-6 ON cone bipolar axons preserved density of both. In contrast, Type-2 OFF cone bipolar axons preserved their ribbon density, while increasing inhibitory inputs. ON-S alpha RGCs lost a disproportionately high fraction of inputs from Type-6 bipolar cells to gain direct input from rod bipolar cells, while OFF-S alpha RGCs only transiently lost connectivity with Type-2 bipolar cells to re-establish their original connectivity ratio over time. In both individual RGCs and across the IPL loss of inhibitory synapses is observed after loss of excitatory synapses.

Conclusions

Excitatory and inhibitory synapses are unevenly disassembled in the inner retina, with inhibitory synapses loss occurring after loss of excitatory synapses. Within the IPL, specific bipolar cell types are either unaffected, equally affected, or asymmetrically affected in their E/I balance. These findings underscore the capability of the adult retina to rearrange its connectivity in the face of degeneration, and identify potential targets to test early functional impairments in glaucoma.

P-214
R28 CELLS: IS THIS THE BEST CELL LINE FOR GLAUCOMA STUDIES?

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Purpose
Although RGC-5 cell lines have been traditionally utilized in glaucoma research, various issues have hindered their current use, and suitable alternative cell lines are still being sought. However, there is growing recognition of the role of microglia in neurodegenerative processes. R28 cells are embryonic retinal precursor cells, with expression of both neuronal and astrocytic characteristics. However, a comprehensive assessment of microglial characteristics in R28 cells has not, to our knowledge, been performed. The aim of the present study is to determine whether R28 cells exhibit microglial characteristics and explore the potential future use of R28 cells in glaucoma research.

Methods
R28 cells (Kerafast, Massachusetts) were cultivated in Dulbecco's modified Eagle's medium containing 10% foetal bovine serum and 100 U/ml penicillin-streptomycin. This medium was changed up to every three days and cells were passaged when they reached a confluency of 80% to a 96-well plate. For cellular insults, the cultures were incubated for 24 hours in media containing 0.5mM H_2O_2 or 40nM staurosporine. After these treatments, assessment with IHC was performed using RBPMS (RNA-binding protein specific to retinal ganglion cells), IBA1 (Ionized calcium binding adaptor molecule 1 as a marker for microglia) and GFAP (glial fibrillary acidic protein as a marker for activated astrocytes).

Results
The expression of RBPMS, Iba1, and GFAP was observed in healthy R28 cells. Previous reports have demonstrated that staurosporine can promote terminal differentiation in RGC-5 cells. Insults with H_2O_2 and staurosporine induced changes in R28 cell morphology and intracellular staining patterns. In healthy cells, the staining pattern for each antibody was uniform, but after insults, the staining pattern for each component within the cells changed alongside morphological features.

Conclusions
R28 cells exhibit multi-phenotype features of both glial (astrocytes and microglia) and neuronal characteristics. Cellular insults alter the terminal phenotype in R28 cells. These results suggest the importance of R28 cells in future *in vitro* studies of glaucoma, and the translational ability of the results.

P-216

CROSS-SECTIONAL STUDY OF ADMINISTERED TESTS IN PANDEMIC AT AUTHORITATIVE ELECTROPHYSIOLOGY LABORATORY

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Purpose
The aim of this study is to carry out a cross-sectional study on the demographics, reasons of resort and administered tests & characteristics of this patient cohort that was suspected of functional visual impairment resorted to Ankara Şehir Hastanesi Authoritative Electrophysiology Laboratory.

Methods
Patients that were administered tests in between January 2020 and December 2020 at electrophysiology lab were investigated. Physical examination results, reasons of delegation to the laboratory, completed tests and results were registered via accessing patient records retrospectively. In accordance with the International Society for Clinical Electrophysiology of Vision (ISCEV) standards, the patients were tested with Metrovision brand monpack model visual electrophysiology device.

Results
224 VEP, 80 ERG and 10 EOG were administered on 274 patients, who provided accessible data in the pandemic period. Median of age was 36.5±19.1 (2-103) and female to male ratio was 106/168.

Diagnosis of the patients who were administered the tests were as follows:

%46 Retinal diseases (Maculopathy, myopic degeneration, diabetic retinopathy, retinal decollement and macula degeneration due to aging)

%11 Hereditary retina dystrophy

%12.5 Optic nerve diseases

%8 Amblyopia

%40.9 of the patients were directed from Health Committee, which assigns status of disability to patients.

Conclusions
Following the evaluation at ED laboratory, it was observed that the number of tests and petitions at pandemic period decreased when not obligatory. The most prevalent request causes were distinguishing functional visual impairment and determining objective visual acuity for patients which cannot be assigned visual acuity values at Health Committee examinations, which assign disability status to the patients.

Subsequently,request were made with the aim of disease diagnosis and observation of treatment for optic nerve and retinal pathologies.

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P-217

DIAGNOSTIC TECHNIQUE FOR MEASURING LIGHT SCATTERING IN INTRAOCULAR LENSES TO CORRECT CORNEAL COMA

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Purpose

Cataract surgery with inserting of an artificial intraocular lens (IOL) in the lens capsular bag is one of the world's most common surgeries. That is, the intraocular lens replaces a natural lens of eye that exhibits very high levels of light scattering. Light scatter in IOL may be a significant factor in quality of vision for patients implanted with these lenses. Herein, we present a new scheme of diagnostic technique as a portable device to measure the light scattering of intraocular lenses that allows for easy centration and greater surgical flexibility

Methods

In the presented technique, a light of laser beam is passed through new and artificially IOLs to measure the light scattering from the lens in one plane at azimuthal angles. In this connection, the beam should be constant in angle if the subsurface scatter is small related to the laser wavelength. For comparison, the light scattering was measured in new and artificially IOLs after some requirements and conditions in optical regime (more details will be presented).

Results

The light scattering in artificially aged IOL was observed high and increased compared to the one of new IOL. The behavior of the measured light is in agreement with the subsurface droplets. The total of light scatter does not appear to be sufficient to impair vision. In addition, it was found that even with severely aged IOLs, the level of increase did not appear to be sufficient to impair vision.

Conclusions

A new scheme of diagnostic *in vitro* technique was presented to measure the light scattering from new and artificially aged IOLs. This technique can lead to design new generation of promising intraocular lens with improved optical quality.

P-218

PRIMARY OPEN ANGLE GLAUCOMA PATIENTS HAVE LOWER SYSTEMIC MITOCHONDRIAL FUNCTION, ASSOCIATED WITH LOWER NAD LEVELS, COMPARED TO CONTROLS

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Purpose

Many patients with primary open angle glaucoma (POAG) deteriorate despite intraocular pressure(IOP) reduction, suggesting other factors confer susceptibility. Evidence from our group and others implicates systemic mitochondrial (mt) function in glaucoma pathogenesis. Changes related to NAD metabolism havebeen proposed to play a significant role in neurodegeneration. We aimed to establish whether systemic mtfunction and total cellular NAD levels are reduced in POAG

Methods

Mt function parameters (Basal, ATP-linked, Maximal and Reserve), expressed as oxygen consumptionrate (OCR) pmol/min/100,000 cells (XFe24 Analyzer), were measured in lymphocytes of 168 treated white-European POAG patients and 48 age-similar Controls. Total cellular NAD levels (pg NAD / µg of Protein) weremeasured using the Promega NAD/NADH-Glo™ Assay in lymphocytes in a subset of 27 POAG and 25Controls. We used a multivariable model to assess the relationship between total NAD levels and mt functionparameters. Covariates selected included: age, statins, number of systemic diseases, alcohol consumptionand diabetes

Results

HTG and, more so, NTG patients had lower mt function compared to healthy subject. NTG patients had lower basal OCR ($p<0.001$) and ATP-linked OCR ($p<0.001$) than HTG (Fig. 1a). Total cellular NAD levels were significantly lower in the NTG ($p<0.001$) and HTG group ($p<0.05$) compared to the Control group (Fig.1b). There was a strong association between higher NAD levels and higher Basal and ATP-linked OCR(estimate [SE]): Basal OCR 2.45 [0.60] pmol/min/100,000 cells per 100 pg NAD / µg of Protein increase ($p<0.001$) and ATP- linked OCR 2.12 [0.53] pmol/min/100,000 cells per 100 pg NAD / µg of Protein increase ($p<0.001$). NAD levels were weakly, but not statistically significantly, associated with Maximal OCR and ReserveCapacity (Fig 1c). None of the other covariates were associated with mitochondrial function in the entire cohortand Control group alone

Image

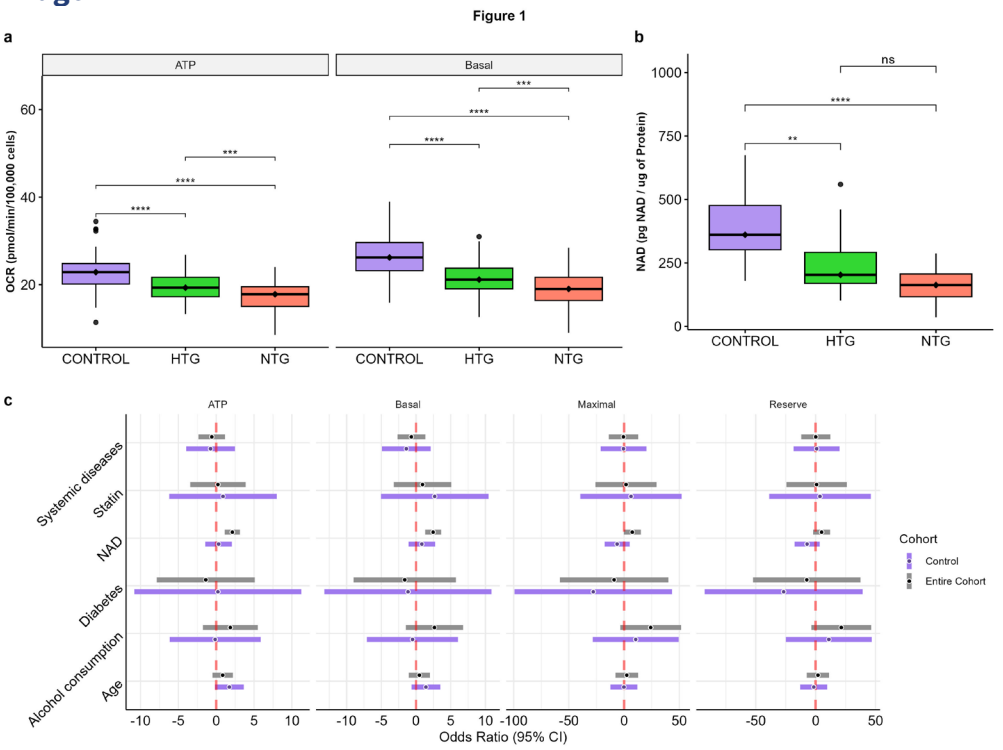


*Figure 1a and 1b: Boxplots comparing OCR and NAD levels. One-way ANOVA, post hoc Tukey's HSD. Figure 1c: Forest plots for factors associated total NAD levels.Dots and bars indicate point estimates and 95% confidence intervals, respectively Estimates are intended for 1-unit increase, unless specified otherwise (NAD 100-unit increase, Age 10-unit increase) NS: P > 0.05, * P ≤ 0.05, ** P ≤ 0.01, *** P ≤ 0.001, **** P ≤ 0.0001*

Conclusions

Our data provide evidence for lower total cellular NAD in POAG patients which was stron-glyassociated with lower systemic mitochondrial function. This supports replenishing NAD levels as a potential

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P-219

THE EFFECTS OF VALPROIC ACID ON BLEB MORPHOLOGY IN AN ANIMAL MODEL OF MINIMALLY INVASIVE BLEB SURGERY

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Purpose

To determine the effect of valproic acid (VPA) on bleb morphology and scar characteristics in a rabbit model of minimally invasive bleb forming surgery (MIBS).

Methods

A rabbit model of MIBS incorporating the PreserFlo MicroShunt (PMS) was treated with high dose MMC (0.4mg/ml), combination therapy of low-dose MMC (0.1mg/ml) and VPA, subconjunctival VPA and subconjunctival PBS. Bleb morphology was examined by slit-lamp biomicroscopy and *in vivo* confocal microscopy. Postoperative day 28 tissues were examined by immunohistochemical evaluation and label-free multiphoton microscopy to visualise the collagen matrix, by terminal deoxynucleotidyl transferase dUTP nick-end labelling assay and immunofluorescent labelling for Ki67 expression to detect apoptosis and cell growth, and by real-time quantitative PCR

Results

High-dose MMC obliterated the vasculature, combination therapy vastly improved the postoperative tissue morphology by maintaining the vasculature without increased vascularization, altered collagen morphology and reduced encapsulation of the PMS distal end. VPA-treated blebs were detectable on day 28, while the PBS-treated blebs were not detectable by day 14. VPA-treated blebs were diffuse, extended posteriorly with near normal conjunctival vascularity and featured a combination of reticular/blurred stromal pattern with evidence of relatively large stromal cysts. Instead of the deposition of thick, disorganised collagen fibres characteristic of the PBS bleb, the VPA bleb contained conspicuously thinner collagen fibres which were associated with similarly thinner fibronectin fibres. Multiphoton quantitation indicated that the combination therapy significantly reduced collagen density and fiber dimensions compared with monotherapy. At the molecular level, combination therapy significantly reduced Vegfa, Vegfc, and Vegfd expression and inhibited Col1a1 upregulation from baseline levels, all of which low-dose MMC alone was unable to achieve. Notably, COL1A1 protein levels appeared more consistently suppressed by combination therapy and VPA alone compared with highdose MMC alone.

Conclusions

Compared with high-dose MMC, combination therapy was less toxic by sparing the vasculature and potentially more effective in reducing scarring via the regulation of collagen content and organization. The application of VPA on its own to enhance bleb morphology was also associated with good bleb function in MIGS with no apparent cytotoxicity.

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P-220

THERAPEUTIC EFFECT OF EXOSOMES DERIVED FROM RETINAL ORGANOIDS ON RETINAL GANGLION CELL SURVIVAL IN A RAT MODEL OF CHRONIC OCULAR HYPERTENSION

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Purpose
Several previous studies have investigated therapeutic effects of exosomes derived from many different cell type on retinal ganglion survival in optic nerve injury models. Howevere, there has been no study investigating the therapeutic effects of three-dimensional (3D) retinal organoid (RO) derived exosomes (Exo-ROs) on RGC survival, especially in chronic ocular hypertensive model. This study aims to investigate the therapeutic effects of Exo-ROs on RGC survival in a chronic ocular hypertensive (COH) rat model.

Methods
3D ROs were formed from hiPSC-derived aggregates. We collected RO-conditioned medium at day 60 of RO differentiation to isolated exosomes released from ROs. COH model was achieved by conducting circumlimbal suture in Spraque-Dawley rats. Intravitreal injection of Exo-ROs was performed immediately after the suture placement. BRN-3a+ cell counting was perfomred in retinal whole-mounts. Exosomal RNA seq profiling was conducted to analyze miRNA content in Exo-ROs. Expression of targeting signaling pathway were assessed by both Western Blot analysis and immunohistochemistry after Exo-RO treatment.

Results
Exo-ROs were successfully extracted from RO-conditioned medium, which expressed exosomal markers CD9, CD63, and CD81. Intravitreal injection of Exo-ROs resulted in significantly enhanced RGC survival compared to vehicle injected COH eyes ($p < 0.001$). Exosomal RNA seq profiling revealed the genes in Exo-ROs were mainly involved in MAPK signaling pathway. Western blot analysis and immunohistochemistry for MAPK family members showed significant decrease in Exo-RO-treated COH eyes compared to vehicle-treated COH eyes, suggesting that Exo-ROs rescue RGCs in COH through inhibition of MAPK pathway.

Conclusions
The results of our study showed neuroprotective effects of Exo-ROs on RGCs in a rat model of COH. This pro-survival effects of Exo-ROs on RGCs seem to be mainly achieved by inhibiting MAPK pathway.

P-221

AIBP PROTECTS RETINAL GANGLION CELLS AGAINST MITOCHONDRIAL DYSFUNCTION AND INFLAMMATORY RESPONSES IN GLAUCOMATOUS NEURODEGENERATION

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Purpose

ApoA-I binding protein (AIBP), encoded by the APOA1BP gene, is a secreted protein that serves as a selective regulator of cellular cholesterol metabolism, targeting inflammatory cells via its binding to Toll-like receptor-4 (TLR4). AIBP plays a critical role in glaucomatous neuroinflammation. This study aims to investigate the effect of AIBP on mitochondrial structure and function in retinal ganglion cells (RGCs) and Müller glial cells in response to glaucomatous neuroinflammation and neurodegeneration.

Methods

Retina tissues were prepared from wild-type (WT, C57BL/6J) and AIBP knockout (Apoa1bp$^{-/-}$) mice. Five-month-old pre-glaucomatous DBA/2J (D2) mice were intravitreally transduced with recombinant adeno-associated virus (AAV) constructs, including AAV2-Null or AIBP for 5 months. Each 10-month-old D2 mouse used in this study had a single intraocular (IOP) measurement. RGC survival and its axon preservation were assessed by cell counting using RBPMS immunohistochemistry and electron microscopy analyses. TLR4 and interleukin 1 beta (IL-1b) expression, as well as mitochondrial dynamics and oxidative phosphorylation were measured by Western blot analysis and immunohistochemistry. Spatial visual function was assessed on a virtual optomotor system, and preservation of the central visual pathway was measured in the superior colliculus by cholera toxin subunit B labeling.

Results

We demonstrated that elevated IOP significantly decreased AIBP in RGCs but resulted in upregulation of TLR4 and interleukin 1 beta (IL-1b) expression in Müller glial endfeet. Apoa1bp$^{-/-}$ mice had impaired visual function, and Müller glia were characterized by upregulated TLR4/IL-1b activity, impaired mitochondrial network and function, increased oxidative stress, and induced inflammatory responses. Also, AIBP deficiency compromised the mitochondrial network and function in RGCs and exacerbated RGC vulnerability to elevated IOP. Restoring sustained AIBP expression by a single intravitreal injection of AAV-AIBP reduced cholesterol accumulation, attenuated TLR4 and IL-1β expression, protected RGCs, and promoted retinal projection to the brain in glaucomatous D2 mice.

Conclusions

These findings suggest the therapeutic potential of AAV-AIBP in protection against RGC loss against mitochondrial dysfunction and glia-driven neuroinflammation.

PLB-012

COMPARISON OF AQUEOUS HUMOUR COMPOSITION IN INDIVIDUALS WITH AND WITHOUT PSEUDOEXFOLIATION SYNDROME

N Balakrishnan

Purpose

To compare the composition of Aqueous humor in Pseudo exfoliation and nonpseudo exfoliation patients undergoing cataract surgery to understand the role of the biochemical components in disease pathology and complications.

Methods

Prospective case control study wherein 44 patients undergoing cataract were divided into 2 groups with and without pseudo exfoliation by a single trained ophthalmologist and aqueous tap done during cataract surgery enables us to get samples that are subjected to metablic testing. The group without pseudoexfoliation served as a control population. Metabolites were isolated from AH using high performance liquid chromatography and compared between the groups. We looked at cysteine, methionine, arginine and proline levels in both groups were tested

Results

Patients with XFS showed lower levels of 7 metabolic derivatives of cysteine, methionine, arginine and proline with p-value < 0.05 as compared to the control population.

Conclusions

Reduced levels of key amino acid metabolites in AH play a key role in pathogenesis of XFS which is linked to accelerated cataract formation and secondary open angle glaucoma

Laser Therapies

P-222

THE ASSOCIATION OF INFERONASAL VERSUS SUPERIOR LASER PERIPHERAL IRIDOTOMY WITH DYSPHOTOPSIA IN ASIAN EYES

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Purpose

To investigate the association of inferonasal versus superior Laser Peripheral Iridotomy (LPI) with dysphotopsia in Asian eyes.

Methods

This comparative cohort study involves 169 eyes from 80 Primary Angle Closure Suspect (PACS) patients who underwent inferonasal (4 to 5 o'clock in the right eye; 7 to 8 o'clock in the left eye) or superior (11 to 1 o'clock in either eye) sequential argon-Nd:YAG LPI were recruited from a tertiary eye centre within Singapore. A standardised interviewer-administered questionnaire was used and slit-lamp examination was performed by an ophthalmologist. Primary outcome measure was post-operative dysphotopsia. Secondary outcome measure includes location and patency of LPI, extent of eyelid coverage over LPI and intra-operative or post-operative complications.

Results

Amongst the 80 patients, 45 patients underwent bilateral superior LPI while 34 patients underwent bilateral inferonasal LPI and one patient underwent unilateral inferonasal LPI. All superior LPI(s) were completely covered by the eyelid and all inferonasal LPI(s) were fully exposed. Comparing inferonasal versus superior LPI(s), there was no significant difference in intra-operative pain, intra-operative complications or post-operative complications. After bilateral superior LPI, 9 patients reported post-operative dysphotopsia in both eyes while none of the patients with inferonasal LPI reported any post-operative dysphotopsia. Majority of the patients (n=6, 66.7%) with post-operative dysphotopsia had the symptoms transiently. The difference in post-operative dysphotopsia was significant when comparing difference in patients ($p = 0.004$) or eyes ($p < 0.001$) by location of LPI.

Conclusions

Fully exposed, inferonasal placement of LPI was safe, effective and associated with reduced risk of post-operative dysphotopsia in subjects that predominantly were of Asian origin.

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P-223

OUTCOMES OF MICROPULSE LASER TRABECULOPLASTY COMPARED TO SELECTIVE LASER TRABECULOPLASTY FOR 12 MONTHS

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Purpose
The purpose of this study is to evaluate the efficacy and safety of micropulse laser trabeculoplasty (MLT) compared to selective laser trabeculoplasty (SLT) in the treatment of open angle glaucoma (OAG).

Methods
Japanese OAG patients who underwent MLT and SLT from August 2019 to August 2020 at the University of Tokyo Hospital and Yotsuya Shirato Eye Clinic (Tokyo, Japan) were reviewed retrospectively for 12 months.

MLT of 360-degree of the trabecular meshwork (TM) was applied using a 300µm spot size, 300 ms duration, 1000 mW power, and 15% duty cycle (IQ 577TM Laser System, Iridex Corporation, CA, USA).

SLT of 360-degree of TM was applied using a 400 µm spot size, 3 ns duration, 0.5-1.0 mJ power (TangoTM, Ellex Medical Pty Ltd., SA, Australia).

IOP and medication score (MS) were measured at baseline, 3, 6, and 12 months after MLT and SLT. The occurrence of complications including postoperative IOP spike was also analyzed.

Results
46 MLT-treated patients and 64 SLT-treated Japanese OAG patients were included.

The IOP at baseline, 3, 6, and 12 months after MLT was 17.8±2.7, 14.9±2.3, 15.2±2.5, and 15.2±3.2 mmHg, respectively (paired t-test, $p<0.001$).

The IOP at baseline, 3, 6 and 12 months after SLT were 18.1±2.1, 15.6±2.0, 15.7±2.5, and 16.4±2.8 mmHg (paired t-test, $p<0.001$), respectively. Both MLT and SLT resulted in significant reductions of IOP from baseline, but IOP reduction was not significantly different between MLT and SLT.

The MS at baseline, 3, 6, and 12 months after MLT was 3.6±1.4, 3.6±1.4, 3.7±1.4, and 3.6±1.6 mmHg, respectively (paired t-test, $p>0.05$).

The MS at baseline, 3, 6, and 12 months after SLT was 3.2±0.7, 3.2±0.7, 3.2±0.8, and 3.2±0.8 mmHg, respectively (paired t-test, $p>0.05$). In MS, there were no significant differences from baseline in MLT and SLT.

No postoperative complications such as decreased visual acuity, anterior chamber hemorrhage, IOP spikes, or corneal disfunction occurred.

Conclusions
MLT and SLT significantly reduced IOP, and had almost same efficacy and safety in OAG for 12 months. MLT may be an alternative to SLT for Japanese OAG.

P-224

RETROSPECTIVE REVIEW OF THE CLINICAL OUTCOME AND CASE SELECTION OF TRAN-SCLERAL CYCLODIODE LASER PATIENTS AT ROYAL LIVERPOOL UNIVERSITY HOSPITAL, UK

P Popova, M Dinsdale, H Muntasser

Purpose

To report the safety and efficacy of Trans-scleral Cyclodiode laser photocoagulation (TSCP) in cases of refractory glaucoma.

Methods

Retrospective review of patients , who had undergone TSCP between March 2018-2022 at Royal Liverpool University Hospital. The study included every type of glaucoma(primary open and closed angle,neovascular, secondary open and closed angle). Clinical data was anonymized and extracted from the electronic medical record. The primary outcomes were intraocular pressure (IOP) and IOP-lowering medications pre-TSCP and post-TSCP at 3,6 and 12 months, post-operative complications and need for further surgical intervention. Complete and qualified success was defined as IOP ≤21 mmHg without and with medications respectively,while failure was defined as IOP≥ 21mmHg requiring surgical intervention.

Results

61 eyes underwent TSCP over the study period, of whom 24 (39%) had rubeotic glaucoma,18 (30%) secondary glaucoma,11(18%) angle closure glaucoma,8(13%) open angle glaucoma. The mean IOP pre TSCP was 42.5±SD12.9 mmHg while post-operative mean IOP was 25.3± SD13.4 at 3 months ($p < 0.0001$) ,19.9 ±SD12.9($p < 0.0001$) at 6 months and 18.9±SD12.6 ($p < 0.0001$) at 12 months. The number of topical medications was reduced from mean of 3.1 to 2.0 agents at 12 months post-TSCP ($p < 0.001$). At 12 months, the proportion of patients achieving complete success, qualified success and failure were 19 %,63%, 18% respectively. Sub-analysis showed best response in 92% of eyes with rubeotic glaucoma and 82% of primary angle closure glaucoma.Only 61% of secondary glaucoma eyes responded to TSCP. 18% of patients required further surgical intervention: trabeculectomy with anti-scarring agent or glaucoma drainage implant. There were three (5%) enucleations, two of which were secondary to pain due to ocular ischaemia despite controlled IOP and one case due to underlying pathology of choroidal melanoma.

Conclusions

Transscleral cyclodiode laser therapy was associated with significant IOP reduction in a majority of patients with refractory glaucoma at 3, 6 and 12 months,with a progressive decline in mean IOP observed over these time points and less topical glaucoma drops required. Those that required further surgery, most were listed within 3 months of TSCP. The majority of failed TSCP cases were secondary glaucoma eyes. TSCP is effective in achieving IOP control without further filtration surgery in refractory glaucoma, especially in rubeotic or angle closure glaucoma.

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P-225
EFFICACY OF LPI FOR PEACH (PEDIATRIC EVERSIONAL ANGLE CLOSURE WITH HEADACHE)

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Purpose
Pediatric Eversional Angle Closure with Headache, or PEACH syndrome, is a childhood variant of intermittent angle-closure glaucoma that can cause protracted headaches and optic nerve damage. Consistent findings of recurrent severe frontal headache, concentric iris folds with profound iris laxity, and visual field loss are observed in patients presenting with PEACH syndrome[1]. The purpose of this study is to assess the change in symptoms and visual fields following YAG laser peripheral iridotomy (LPI).

Methods
Observational cohort study of PEACH patients treated with LPI, n=99 (53 patients, age 7-18y). Incidence of headaches was self-reported by each patient. Severity of symptoms and visual fields were assessed by modified faces pictogram survey (MFP) and FDT perimetric mean deviation (MD) respectively. Outcomes were compared to baseline annually up to 4 years following treatment by paired t-test.

Results
Headache frequency, severity, and visual function drastically improved following treatment with LPI compared to baseline levels. Prevalence of headaches fell from >93% to <20% post-LPI ($p<0.0001$). Severity of headache decreased from a mean of 5.74 (MFP “severe”) to a mean of 0.70 (MFP “no pain”) ($p<0.0001$). Pre-LPI FDT MD (base 4-log attenuation scale) improved from baseline cohort range -7.15 to -7.75 (SEM range ± 0.74-1.08) decibels (moderate visual field loss), to -3.98 ± 0.56 (mild) at 12mo ($p<10-5$), -2.05 ± 0.54 (mild) at 24mo ($p<10-8$), -1.82 ± 0.64 (mild) at 36mo ($p<10-6$), and -0.93 ± 0.71 (normal) at 48mo ($p<10-5$).

Image

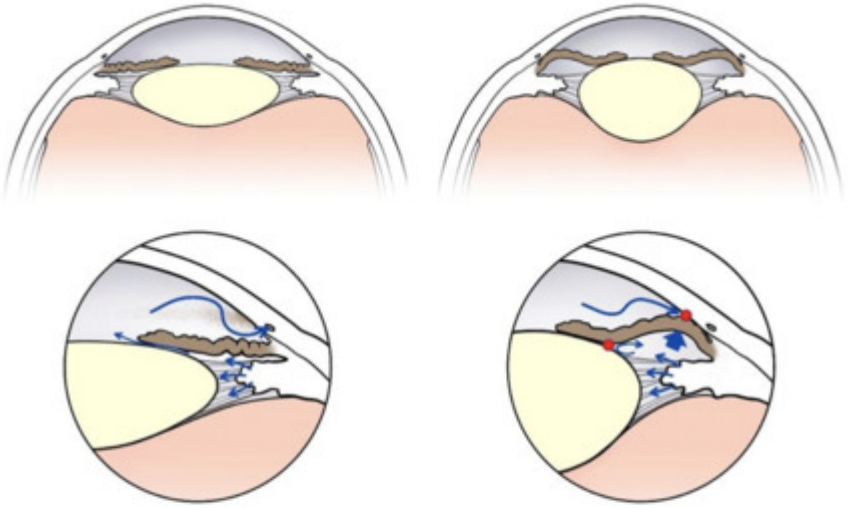


Figure 1. Graphical depiction of PEACH eye. The left images depict a semi-dilated pupil in distance fixation, with tension on the circumferential zonular fibers maintaining a thinner lens, allowing free aqueous outflow. The top-right image shows dynamic changes that accompany sustained near-focus in the eyes of children with PEACH Syndrome; pupillary constriction and axial thickening of the lens during accommodation produces a hermetic seal of the lens/iris diaphragm, causing aqueous flow obstruction and resultant forward bowing of the iris, blocking off the trabecular meshwork. The bottom-right image shows the effect these anatomic changes have on aqueous flow.

Conclusions

Pediatric intermittent angle closure occurs rapidly during accommodation and miosis. Severe progressive glaucomatous damage can accompany the associated pathognomonic recurrent frontal headache[2]. This condition can be readily treated via laser iridotomy, eliminating headaches and allowing for dramatic visual field recovery.

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P-226
DIRECT SELECTIVE LASER TRABECULOPLASTY: FIRST RESULTS

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Purpose
To evaluate the safety and efficacy of direct selective laser trabeculoplasty (DSLT) in lowering intraocular pressure (IOP) in patients with open-angle glaucoma and ocular hypertension.

Methods
A prospective case series of 28 eyes of 14 patients with open-angle glaucoma and ocular hypertension were treated with DSLT. The IOP was measured at baseline and at follow-up visits on day 1, and 1-month post-treatment. All complications and adverse reactions were documented.

Results
The mean IOP at baseline was 22.4 mmHg. At the 1-month follow-up visit, the mean IOP was significantly reduced to 17.3 mmHg ($p<0.05$). All of the patients showed a reduction in IOP of at least 20% without additional topical glaucoma medication. No serious adverse events or complications were reported.

Conclusions
DSLT is a safe and effective treatment reducing the IOP in patients with open-angle glaucoma and ocular hypertension. The procedure resulted in a significant reduction in IOP at the 1-month follow-up visit, with a high success rate and great safety profile. Further prospective randomized studies, with more extended follow-up periods, are needed to determine the long-term efficacy and safety of DSLT.

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P-227

THE RCOPHTH UK 'PACS PLUS CRITERIA': A RETROSPECTIVE COHORT REVIEW OF 600 CONSECUTIVE PATIENTS TREATED WITH BILATERAL YAG PERIPHERAL IRIDOTOMIES

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Purpose

With an ageing population and better life expectancy, the prevalence of angle closure disease is expected to increase by 20% per decade[1]. In 2022, the Royal College of Ophthalmologists (RCOphth) United Kingdom (UK) issued a guideline on managing angle closure disease[2]. Hospital eye service(HES) referral and prophylactic treatment are recommended only for primary angle closure suspect (PACS) with "Plus" features only. We aimed to examine patients previously treated with YAG peripheral iridotomies (YAG PI) for the presence of "PAC Plus" features.

Methods

A retrospective cohort study of consecutive patients treated with YAG PI between 2015 to 2019 at a tertiary referral NHS eye centre was reviewed. Cases were examined to identify and classify patients into Primary Angle Closure (PAC), PACS, and Primary Angle Closure Glaucoma (PACG). Patients with PACS were studied for "Plus" features.

Results

Six hundred and twelve patients with gonioscopy-confirmed angle closure (defined as a minimum 180 degrees iridotrabecular contact) treated with YAG PI from years 2015 to 2019 were included in the analysis. The mean age of patients presenting with angle closure disease was 68.5 years (SD 11.3). There were 390 (63.7%) patients with PACS, 102 (16.6%) with PAC and 120 (19.7%) with PACG. Of the PACS patients, 159 (40.8%) patients had no "Plus" features. 181 (40.2%) patients had 1 "Plus" feature, 37 (9.5%) had 2 "Plus" features and 13 (3.3%) patients had 3 "Plus" features.

Conclusions

In our cohort, a considerable proportion (40.8%) of PACS patients treated with YAG PI did not have Plus features and therefore that would not meet the proposed criteria for HES referral and YAG PI. With the proposed guidance, we expect a considerable reduction in HES referrals. Nonetheless, community optometry services should be supported and trained to provide monitoring for patients with PACS not referred to the HES.

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P-228

TRAN SCLERAL DIODE LASER CYCLOPHOTOCOAGULATION (TSCPC) WITH AND WITHOUT TRANSILLUMINATION IN ADULTS WITH REFRACTORY GLAUCOMA: SHORT-TERM RESULTS

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Purpose

This study aimed to compare the outcomes of TSCPC done with and without transillumination in a subset of adult patients with refractory Glaucoma.

Methods

This was a retrospective, observational study at a tertiary care centre in northern India. Records of adult patients (>18 years) diagnosed with refractory Glaucoma who underwent diode laser TSCPC with or without trans-corneal transillumination between January 2019-January 2021 with a minimum follow-up of 6 months were reviewed. Transillumination was done using a pen torch kept on the cornea's surface, following which a gentian violet marker pen was used to mark the ciliary body (noted as the junction of the illuminated and the opaque sclera). Outcome measures were the decrease in intraocular pressure (IOP) and the number of anti-glaucoma medications(AGM), percentage IOP reduction and complications (if any). Success was defined as an IOP < 21 and>5 with and without AGM.

Results

A total of 75 patients who underwent TS-CCP during the study period were analysed, out of which 32 underwent TS-CPC with (Group 1), and 43 underwent without (Group 2) transillumination. There was no statistically significant difference between mean energy, quadrants treated, the mean IOP at baseline and the percentage of patients on acetazolamide. Group 1 had a lower mean IOP (17.68±7.75 vs 26.5±10.20; p=0.0001), less need for AGM (2.31±0.92 vs 2.89 ±0.73; p= 0.005, more significant percentage IOP reduction (42.5% vs 21.7%) and higher success rate(78.12% vs 32.5%; p=0.0001) at the six months follow up. At one year, the mean IOP in group 1 (n=18) in comparison to Group 2 (n=25) was still significantly lower (17.72± 7.54 vs 27.16 ±11.60 mm Hg, p=0.004), less number of AGM (2.16± 0.92 vs 2.6±1.11;p=0.176), more significant percentage IOP reduction (39.5% vs 11.35%) and higher success rate (77.77% vs 44%). Only one patient in Group 1 developed hypotony post-TSCPC,which resolved with conservative management.

Image

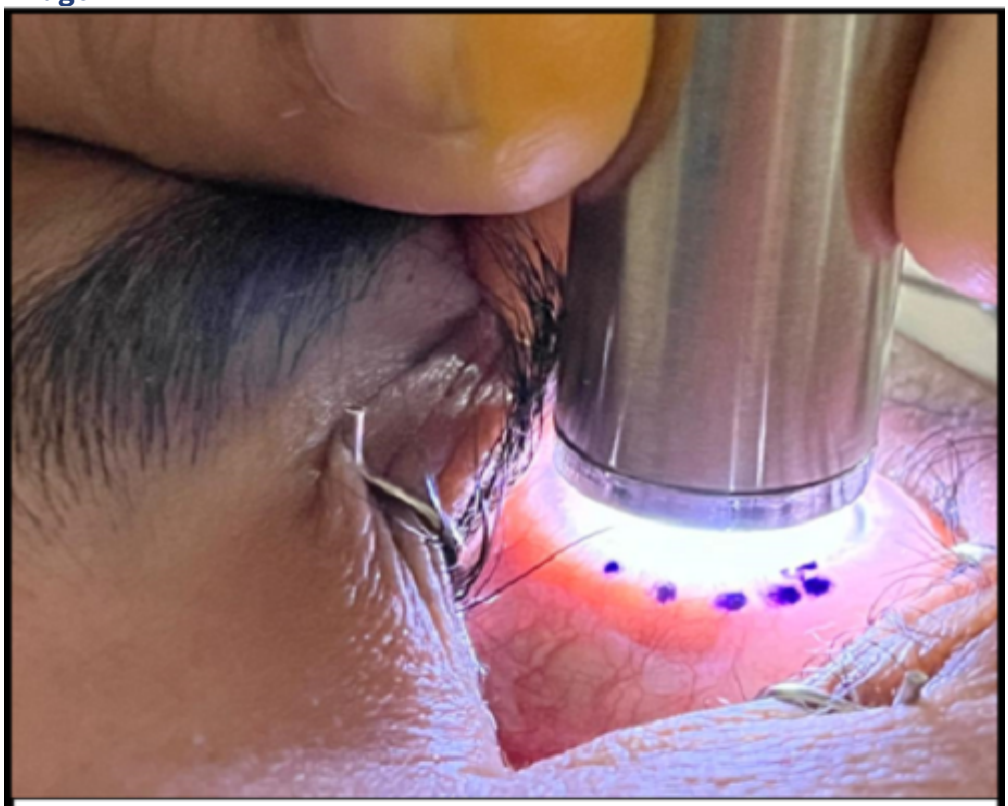


Figure: Image showing trans corneal trans illumination being done with a pen torch; arrow points to the markings done with a gentian violet marker at the junction of illuminated and opaque sclera

Conclusions

TSCPC directed at a standard distance from the corneoscleral limbus may not be ideal in all subjects. The actual position of the ciliary body may vary according to axial length, quadrant of the eye, and in-between individuals, not just in a paediatric population.[1] To the best of our knowledge, this is the first study that compares the outcomes of TSCPC with and without transillumination in adults. This study shows that TSCPC with trans illumination improves the outcomes in adult patients with refractory Glaucoma without significant complications.

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P-229

TWO-YEARS EFFICACY AND SECURITY OF SELECTIVE LASER TRABECULOPLASTY (SLT) AS INITIAL, SUBSTITUTIVE, OR ADJUVANT THERAPY

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Purpose

To compare the real-life efficacy of SLT treatment in three different scenarios: SLT as an initial (IT) or adjuvant treatment (AT) in patients with glaucoma who required IOP lowering, and a third group in which SLT would function as a substitute for topical treatment (ST).

Methods

A real-world, retrospective, single-center study of patients undergoing SLT was performed. Baseline information was registered, as well as IOP and topical treatment, on every follow-up visit. The mean percentage IOP reduction on IT and AT after SLT treatment was compared using the student-T and Welch tests. Logistic regression models were fitted to recognize modifiers. Survival analyses considering a 20% decrease in IOP with the same or less medication was estimated using Kaplan-Meier, and statistical analyses were performed by log-rank tests and Cox regression. The mean number of hypotensive medications that could be withdrawn in the ST group was measured with paired samples Wilcoxon test. For survival analyses on the ST group, survival was defined as a reduction of medication with the same or less IOP.

Results

183 eyes (120 patients) were analyzed for a mean follow-up time of 33.0 months (SD=5.9). Mean IOP reduction at 24 months was higher in the IT group (19,2% (SD=14.9)) compared to AT group (10,8% (SD=15.3)) with a p-value of 0.026. IT group showed a median survival time of 12 months and a 24-month survival of 28.6% of the treated eyes, compared to the AT group, with a median survival of 3 months and a 24-month survival of 13.9% of treated eyes (p=0.04). On a Cox regression model, higher baseline IOP was associated with higher IOP reduction. In the ST group, 45,9% of patients were able to reduce at least one medication at 3 months, increasing to 57.1% of eyes at 24 months.

Conclusions

SLT is moderately effective as an initial and adjuvant treatment to reduce IOP and can be used as a substitutive treatment in those patients with drug intolerance or low compliance.

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P-230

DIODE LASER CYCLOPHOTOCOAGULATION WITH AND WITHOUT TRANSCORNEAL TORCHLIGHT TRANSILLUMINATION IN REFRACTORY PAEDIATRIC GLAUCOMA

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Purpose

To study Diode Laser Cyclophotocoagulation (DLCP) with and without transcorneal torchlight transillumination (TI) in refractory paediatric glaucoma.

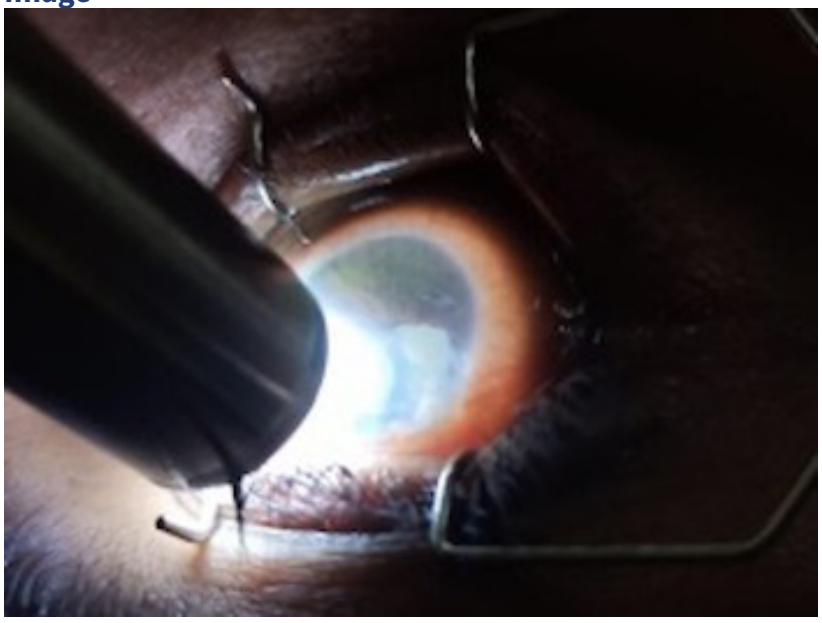
Methods

This retrospective study included children < 16 years, with refractory glaucoma who underwent DLCP with torchlight transillumination and completed a one-year follow up, compared to historical controls without TI. Transillumination was performed using a pen torch brought close to the cornea and marking the shadow of the ciliary body. The power per spot was titrated according to the audible 'pops' indicating tissue micro-explosion. The mean laser energy delivered, post-laser intraocular pressure (IOP) reduction, number of antiglaucoma medications (AGM), complications, and requirement for additional treatment was compared in both groups.

Results

A total of 73 eyes of 56 children (31 eyes with TI and 42 eyes without TI) were studied. The mean total energy delivered was 1184.6+323.6 mW with TI and 1358.7+396.6 mW without TI (p=0.01). The mean pre-intervention IOP was 25.3±7.4 and 28.7±8.5 mmHg in children with and without TI, respectively, which significantly decreased to 19.43±3.9 and 19.1±5.9 mmHg respectively at the one-year follow-up (p=0.0007 and 0.0001). There was a more significant decrease in the number of AGM in children with TI (0.86±0.8 vs. 0.41±0.6 (p=0.01). Additional intervention to control glaucoma was needed in 9 and 15 children with and without TI respectively. No hypotony was noted in any patient in either group.

Image



Conclusions

DLCP with low-cost torchlight transillumination resulted in requirement of lower energy, lesser number of AGM, and a lesser need for further intervention in our paediatric glaucoma cohort.

P-231

MICROPULSE TRANSSCLERAL DIODE LASER PHOTOCOAGULATION IN REFRACTORY GLAUCOMA:SHORT TERM SAFETY&IMPACT OF SURGICAL HISTORY ON OUTCOME OF THE PROCEDURE

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Purpose

To assess the short-term efficacy and safety results of micropulse transscleral diode laser-cyclophotocoagulation (MP-TSCPC) in the management of refractory glaucoma and to compare outcomes based on prior surgical interventions in these eyes at a tertiary Eye Hospital in Eastern India.

Methods

Retrospective case sheet review of refractory glaucoma cases undergoing MP-TSCPC using the Iridex Cyclo G6 (Mountain View, CA) laser with standard parameters and laser duration at the discretion of the treating physicians.

Results

Probability of postoperative success was estimated by the Kaplan-Meier method. Success parameters included intraocular pressure ≤ 21 mm Hg with or without topical antihypertensive therapy, 20% or more IOP reduction from baseline for any 2 consecutive visits at a minimum of 3 postoperative months, and no subsequent glaucoma surgery.Adverse events post procedure were analysed and the success rate based on prior surgical interventions was also examined.

32 eyes of 32 patients (mean age, 62.2 ± 5.6 years) were included.Baseline IOP was 35.6 ±5.8 mmHg, and mean postoperative follow-up time was 5.2 ± 2.2 months(range, 3- 9 months.) Postoperative IOP at the final follow up was 28.4 ± 2.2 mmHg (P < 0.01),corresponding to a reduction of approximately 7.2 mmHg (20.2%). Most eyes (71.8 %) underwent at least 6 months of follow-up. Short-term probability of success was 66 % at 3 months and 48.4 % at 6months. Eyes that had undergone prior traditional glaucoma surgery (trabeculectomy or tube shunt procedure) demonstrated a higher probability of success (56.6%) compared with eyes that had not.Eyes that had undergone corneal (keratoplasty) or vitreo-retinal surgery procedures recorded a lower success rate (42.2 %)). The most common complication was mild transient postoperative inflammation which was observed in 10% of the cases. Three patients had hypotony which subsequently recovered and two patients had a loss of best-corrected visual acuity which eventually recovered back to the pre-procedure level within one month.

Conclusions

Micropulse transscleral diode laser cyclophotocoagulation has a short-term ocular hypotensive effect and an extremely favorable safety profile in eyes with refractory glaucoma. The probability of successful outcome was greater in eyes that had undergone prior traditional glaucoma surgery but was lower in eyes which had undergone prior corneal or vitreo-retinal surgeries

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P-232

SAFETY AND EFFICACY OF MICROPULSE TRANSSCLERAL LASER THERAPY IN A LATIN-AMERICAN GLAUCOMA COHORT FOLLOWING CONSENSUS BASED PARAMETERS AND TECHNIQUE

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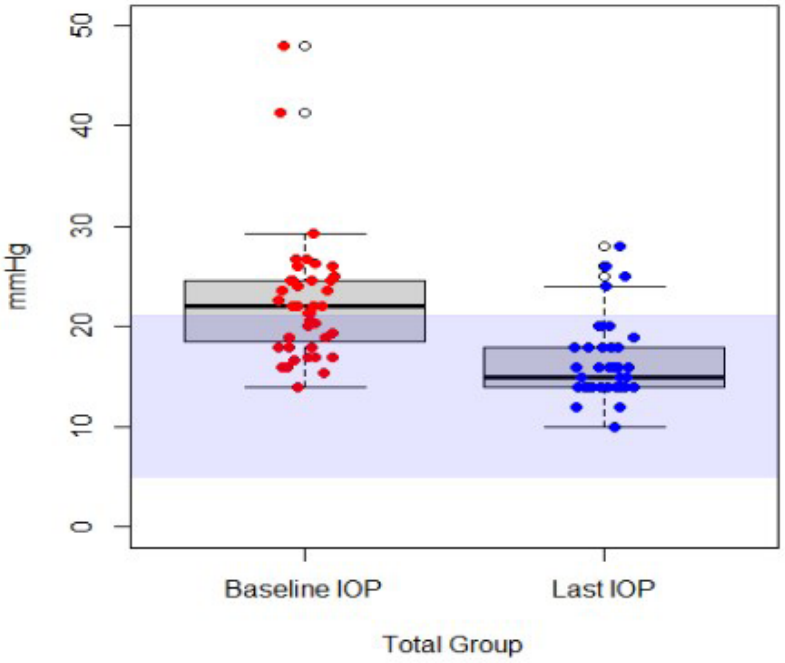
Purpose
To describe the mid-term efficacy and safety of Micropulse Transscleral Laser Therapy (MPTLT) combined or not with cataract surgery following consensus based starting parameters and technique1 in a Latin-American cohort of patients with real life heterogeneous clinical glaucoma scenarios.

Methods
Retrospective consecutive case series of 43 eyes from 30 adult patients, 19% were treated as combined procedures with cataract surgery. Published consensus starting parameters were 4 to 5 20s sweeps per hemisphere, power 2.5W and duty cycle of 31.3%1. All procedures were done with the second generation probe. Success criteria A equals an IOP reduction >20%, 5 mmHg<IOP< 21 mmHg, no reoperation, no severe complications. More restrictive success criteria B is: IOP reduction >20%, 5 mmHg <IOP<=18 mm Hg, no resurgery, no severe complications.

Results
Mean IOP decreased from 22.6±6.2 to 16.3±3.8 mmHg (7.8±3.7 months of follow up, 27% reduction) (P<0.0001). There was not a significant difference in IOP reduction between standalone and combined surgeries.

Sixty percent had moderate/advanced glaucoma. Thirty seven eyes underwent 4 sweeps per hemisphere and 6 underwent 5 sweeps. Success rates were 60% (A) & 56% (B). Medication decreased from 3.7±1.1 to 2.4±1.2 (P<0.0001). Both standalone and combined subgroups showed a significant decrease in the number of medication (P<0.0001 and P<0.05 respectively). There was a significant difference between pre and postoperative BCVA for the group that underwent combined surgery (n=8, P<0.05) while the group that underwent standalone MPTLT showed none. Overall, thirty nine eyes (91%) had equal or better BCVA at last follow-up compared to baseline, of which 17 eyes (40%) had strictly better BCVA at last follow-up. Four eyes (9%) had a decrease in BCVA of 2 lines or less at last follow-up; one of them because of a worsening epiretinal membrane. Three eyes (7%) required reoperation because of treatment failure. Twenty four eyes (56%) had baseline IOP>= 22 mm Hg. In this subgroup IOP decreased from 26.2±6.2 to 17.5±4.1 (33% reduction) (P<0.0001). Success rates were 71% (A) and 62% (B).

Image



Conclusions

Using consensus based conservative parameters, MPTLT is an effective and safe technique to lower IOP in a Latin-American glaucoma cohort that represents the whole spectrum of disease severity including moderate/advanced glaucoma, both as a standalone procedure or combined with cataract surgery. Furthermore, significant medication reduction was seen in the standalone subgroup.

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P-233

SAFETY AND EFFICACY OF SLOW SWEEP SPEED MICROPULSE TRANSSCLERAL LASER THERAPY (MTLT) FOR TREATMENT OF GLAUCOMA

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Purpose

To evaluate the efficacy and safety of a standardized slow sweep speed micropulse transscleral laser therapy (mTLT) technic in glaucomatous patients.

Methods

This prospective interventional case series comprised 40 consecutive eyes with glaucoma who underwent laser treatment with Micropulse Transscleral Laser Therapy (MTLT). Patients received a standard 360-degree mTLT diode laser treatment 3000 mW, 31.33% duty cycle, total duration 180 seconds, sweep speed 30 seconds per 180 degrees. All procedures were doen with the second generation probe. Patients were treated with topical steriods for one month. Medications were tapered as possible at post-opertaive visits. They were followed for up to 18 months to assess intraocular pressure (IOP), number of medications, and complications. The main outcome measures were intraocular pressure (IOP) reduction, glaucoma medication use, visual acuity and complications. Absolute success was defined as an IOP 6-21 mm Hg and at least 20% IOP reduction, with equal or less number of IOP medications. Qualified success was a reduction in number of IOP medications. Repeat MTLT was also a qualified success. Failure was defined as the need for incisional glaucoma surgery.

Results

The rate of absolute success was 62.5% at last follow-up. Mean IOP was reduced by 30.1% at last follow-up (28.6 ± 8.5 mm Hg at baseline; 20.0 ± 5.1 mm Hg at follow-up, $p < 0.01$). Medication use decreased from 3.8 ± 1.1 at baseline to 2.1 ± 1.2 at follow-up ($p<0.01$). Six patients (15%) experienced transient vision loss of ≥2 lines after the procedure. No patients had persistent visual loss. No ocular complications were noted in 85%. Incisional surgery was required in four (10%) of eyes due to inadequately controlled eye pressure. Repeat MTLT was performed in 8 (20%) of patients. There were no serious complications or mydriasis in any case.

Conclusions

MTLT is a safe and effective treatment for glaucoma. Use of the new probe with standard slow sweep speeds and settings appears to be efficacious without any increase in adverse events compared to lower energy settings used in prior studies.

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P-234

COMPARISON OF SAFETY AND EFFECTIVENESS OF MICROPULSE TRANSCLERAL CYCLOPHOTOCOAGULATION AND SLOW COOK DIODE LASER IN OAG PATIENTS

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Purpose

To compare the safety and effectiveness in intraocular pressure reduction between micropulse cyclophotocoagulation (MP-TSCP) and “slow cook” (SC-TSCP) diode laser transscleral cyclophotocoagulation in patients with open angle glaucoma.

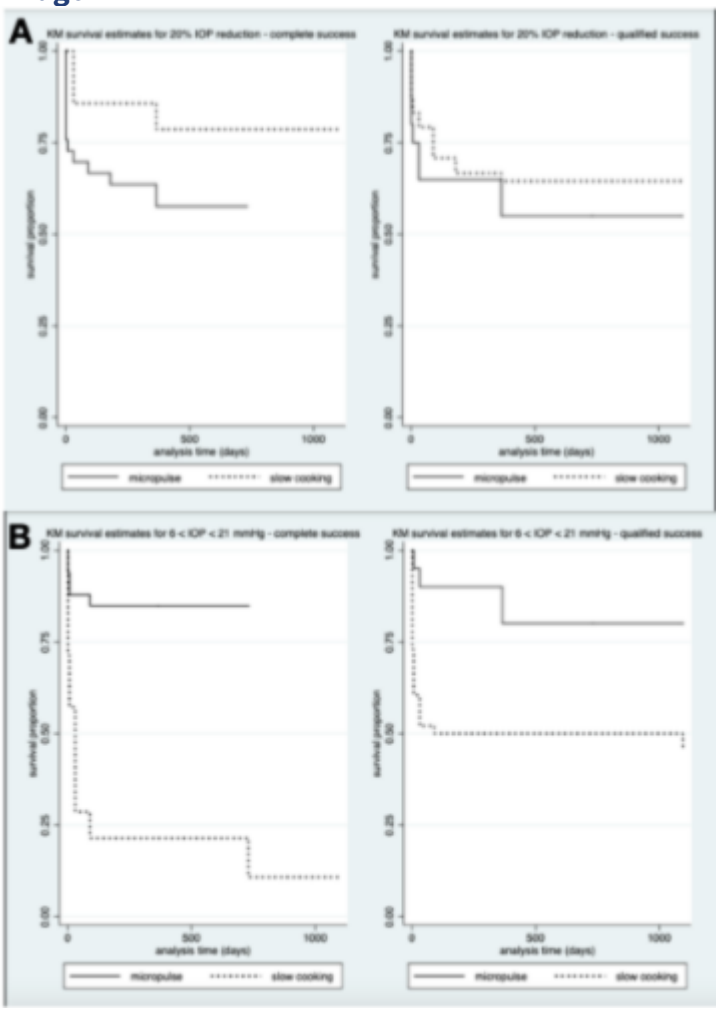
Methods

Longitudinal retrospective cohort, multicenter study. Patients with open angle glaucoma with at least 12 months of follow-up. Patients were treated by different glaucoma specialists from 4 different sites. Data on preoperative characteristics, surgical procedure(s) performed, and postoperative outcomes were collected and analyzed. Were also evaluated intraoperative and postoperative complications, intraocular pressure, visual acuity, need for additional procedures (glaucoma surgery or laser retreatment) and number of topical medications. Success was defined as a decrease of more than 20% of preoperative intraocular pressure (IOP) (Criterion A) and/or IOP measuring between 6 and 21 mmHg at the last visit (Criterion B), without medication (complete success) and with or without medication (qualified success).

Results

A total of 128 eyes with open angle glaucoma were included. Preoperative mean IOP was 25.53 ± 6.40 mmHg in MP-TSCP group vs. 35.02 ± 12.57 mmHg in SC-TSCP. The mean IOP was reduced significantly to 14.33 ± 3.40 mmHg in the MP-TSCP vs. 15.37 ± 5.85 mmHg SC-TSCP at last follow-up. The mean preoperative eye drops were 3.44 drugs in MP-TSCP and 2.89 in SC-TSCP group. The mean eye drops at the end of the study was 1.02 in the MP-TSCP and 2.06 in the SC-TSCP group. Figure 1A and 1B depicts the demonstration of Kaplan-Meier plot for the probability of complete and qualified success of criterion A and B, respectively.The eyedrops reduction variation was 2.38 ± 1.55 in the MP-TSCP group and 0.82 ± 1.68 in the SC-TSCP group. Median preoperative logMAR visual acuity was 0.52 ± 0.69 in the MP-TSCP group and 1.75 ± 1.04 in the SC-TSCP. The mean visual acuity variation was -0.10±0.35 in the MP-TSCP group and -0.074±0.16 in the SC-TSCP. The most frequent complication was corneal decompensation, two in the MP-TSCP vs. seven in the SC-TSCP. The incidence of serious complication as phthisis was 1.61% only in the SC-TSCP group.

Image



Conclusions

Both techniques were safe and effective procedures for intraocular pressure reduction. These laser techniques have been shown to be efficient for extending the indications of cyclophotocoagulation also in glaucomatous eyes with better functional prognosis.

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P-235
LIGHT BEFORE THE END OF TUNNEL

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Purpose
Aim: To investigate the safety and efficacy of the SubCyclo laser procedure for glaucoma patients (subliminal transscleral cyclophotocoagulation [TSCPC]).

Methods
Method: Retrospective study carried out over a period of 2 years included 57 eyes of 52 glaucoma patients who were given subliminal TSCPC. The SubCyclo laser treatment was performed by a single surgeon under local anesthesia. 3–5 mL of 2% lignocaine hydrochloride 100 mg/5 mL was injected in the peribulbar space. The power was set at 2000 mW, and the duration of laser delivery was 120 sec each hemisphere. The duty cycle was set at 31.3% ("on" time, 0.5 ms; "off" time, 1.1 ms). Therefore, the energy delivered to each eye was tailored for each patient. Patients were followed up 1 week, 1 month, and 6 months following the laser. On each visit, bestcorrected visual acuity, slit lamp biomicroscopy, IOP measurement by applanation tonometer, fundus examination, and number antiglaucoma medications were recorded.

Results
Following subliminal TSCPC treatment, 57 eyes were monitored for up to six months. 57 eyes of 52 glaucoma patients treated with subCyclo laser had mean age of 56.78 (±15.21) years. The mean IOP dropped significantly ($p < 0.05$) from baseline 23.41 (±9.78mmHg) to 16.47 (±8.69) at 1 week, 20.49 (±9.36) at 1 month and 21.64 (±8.18) at 6 month follow up with single laser session. Average number of medications significantly decreased from 3.38 to 2.8 after treatment (Paired t-test $p<0.05$). The mean IOP reduction was 29.64% at 1 week, 12.47% at 1 month and 7.56% at 6 months follow up from the baseline. BCVA remained stable by the end of the follow-up. 15.15% reduction in the medications was noted. No serious complications (Persistent hypotony, cystoid macular edema and phthisis bulbi) or anatomic modifications were found after subCyclo laser.

Conclusions
This study's findings suggest that a low-risk SubCyclo laser procedure can successfully reduce IOP in the early postoperative visits. A safe and efficient method for lowering IOP in cases of refractory glaucoma, subliminal cyclophotocoagulation with a 31.3% duty cycle appears to be safer than traditional transscleral cyclophotocoagulation. To the best of our knowledge, this is India's first large-scale measurement of the subcyclo laser's effectiveness and safety.

P-236

SELECTIVE LASER TRABECULOPLASTY VS MEDICAL MANAGEMENT AS PRIMARY THERAPY FOR OPEN ANGLE GLAUCOMA - A RANDOMIZED CASE CONTROL STUDY

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Purpose

To study and compare the intraocular pressure (IOP) reduction from baseline, between the topical Anti Glaucoma Medications (AGM) Vs SLT groups, when used as primary treatment modality in Open Angle Glaucoma (OAG).

Methods

A prospective randomized controlled trial was conducted at the Glaucoma department of PBMA's H. V. Desai Eye Hospital, India. OAG diagnosis was done by- recording IOP (Applanation tonometry), Pachymetry. Gonioscopy. Glaucomatous disc damage (90D lens) and Visual field analysis (Humphrey automated perimetry). 135 patients fulfilling all inclusion and exclusion criteria were selected and randomly allocated to AGM arm (65 patients) and SLT arm (70 patients). Total 96 eyes, 48 in each arm continued through the 12-month period. Patients failing to achieve target IOP with initial therapy were augmented with the same therapy (second step) failing which were given the opposite treatment modality (third step) indicating absolute failure of the particular therapy.

Results

IOP decline from the baseline was found to be 31.56 % and 32.26 % in AGM and SLT arms respectively at 6 months and 35.71 % and 34.83 % at 1 year. At 6 months SLT showed better IOP control compared to AGM, but this effect was lost at 1 year follow up. Difference in IOP reduction from baseline in AGM Vs SLT eyes as 1 year was statistically insignificant.

AGM arm – of 48 patients; 32 achieved target IOP. 19 with monotherapy, 13 with dual therapy (second step). Mean AGM at 1 year = 3.20 AGM. In 7 patients target IOP not achieved despite maximal medical treatment, hence SLT done (third step). Eventually 2 required Glaucoma filtration surgery (GFS).

SLT arm – of 48 patients; 27 achieved target IOP with initial SLT, 21 required repeat SLT (second step), 10 patients did not respond to repeat SLT and required AGM (third step). A Mean number of 1.38 AGM was added in exclusive SLT arm, still significantly less than AGM arm. 3 patients required eventual GFS.

Conclusions

360 degree SLT can be successfully used as primary therapy in OAG cases. It reduces total number of AGM required, thus has a better safety profile as well as reduced cost of treatment. Hence SLT can be advocated in managing Chronic diseases such as glaucoma where long term compliance to treatment is the most important factor in disease management.

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P-237

SELECTIVE LASER TRABECULOPLASTY AS AN ADD-ON TREATMENT IN GLAUCOMA PATIENTS NOT CONTROLLED WITH MEDICAL THERAPY: A ONE-YEAR FOLLOW-UP STUDY

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Purpose

To evaluate the role of selective laser trabeculoplasty (SLT) as an add-on treatment in glaucoma patients not sufficiently controlled or intolerant to medical therapy and determine its ability to maintain stable intraocular pressure (IOP) over a long time.

Methods

84 patients (152 eyes) with different glaucoma types treated by SLT for insufficient IOP control were included in this prospective study and followed for one year. Patients received SLT in a standard protocol, followed by 125 mg of acetazolamide (ACZ) orally within one hour posttreatment. Data were recorded on the 0th day (before SLT), one hour, the 1st, the 3rd, the 6th month, and one year after SLT. SLT success was defined as an IOP reduction of ≥ 20% after one year without needing further medication, laser, or surgery. Factors associated with success/failure, age, type of glaucoma, and the number of medications were analyzed.

Results

No significant differences were observed in the IOP values before and after SLT between different types of glaucoma. Before SLT, the mean IOP in all eyes was 20.61±3.96 mmHg, the number of glaucoma medications was 3 (2-4), and 16.9% of patients were treated with oral ACZ. One year after SLT, the mean IOP in 89 eyes who ended the study decreased to 16.59±3.79 mmHg ($p<0.001$), of which 53 (59.6%) eyes had more than 20% reduction in IOP, 22 (24.7%) less than 20%, and in 14 (15.7%) IOP increased. Generally, IOP decreased by 5 mmHg (26,3%). The most significant reduction of IOP was in the 1st month after SLT ($p<0.001$), and after, it remained stable for one year without differences between measurements ($p>0.05$). A reduction in IOP was also found 1 hour posttreatment ($p=0.002$). However, one year after SLT, the number of medications reduced marginally to 3 (0-4) ($p=0.056$), while the percentage of patients receiving oral ACZ decreased significantly to 10.8% ($p=0.001$). The one-year IOP reduction was positively correlated with age ($p=0.048$), pretreatment IOP ($p<0.001$), and pretreatment cataract surgery ($p=0.047$), while the IOP increase was associated with male gender ($p=0.044$) and presence of cataract ($p=0.036$).

Conclusions

SLT as an add-on treatment significantly reduces IOP and the need for local and systemic medications, it maintains a stable reduction of IOP over a long time, with no difference between different types of glaucoma.Therefore, it might be considered as a safe and effective method for the treatment of different types of adult glaucoma.

P-238

THE EFFICACY AND SAFETY OF MICROPULSE CYCLOPHOTOCOAGULATION IN JAPANESE REFRACTORY GLAUCOMA FOR 12 MONTHS

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Purpose
The purpose of this study is to evaluate the efficacy and safety of Micropulse transscleral cyclophotocoagulation (MP-CPC; MicroPulse® P3 Glaucoma Devise, IRIDEX©, USA) in patients with Japanese refractory glaucoma.

Methods
We retrospectively investigated patients who underwent MP-CPC approved by the institutional review boards of the University of Tokyo from July 2017 to November 2019. MP-CPC procedure was delivered with 2000 mW applied for 80 seconds in each hemisphere (total 160 seconds) with P3 Rev 1. The duty cycle was 31.3 %, which translated to 0.5 msec of “on time” and 1.1 msec of “off time. IOP, medication score and complication were measured at baseline and at 1 week, 1, 3, 6, 9 and 12 months after the treatment. We also evaluated complications after MP-CPC. All data were expressed as the mean ±standard deviation. The paired sample t-test was used for analyzing before and after MP-CPC.

Results
Eighty-seven patients with refractory glaucoma underwent MPCPC. The mean age of patients was 69.6 ± 14.6 years. The mean IOP was 36.2 ± 9.4 at baseline. After the treatment the mean IOP was 32.8 ± 8.2 at 1 week, 30.7 ± 11.4 at 1 month, 26.8 ± 12.5 at 3 month, 26.5 ± 6.5 at 6 months, 28.8 ± 7.3 at 9 month, 29.4 ±6.6 at 12 months ($P<0.05$, paired t-test). The medication score before the treatment was 4.2 ± 0.7 and decreased to 3.6 ± 2.0 at 12 months. Serious complications such as phthisis, vitreous hemorrhage, and severe inflammation did not occur.

Conclusions
In Japanese refractory glaucoma, MP-CPC significantly reduced the IOP and medication score for 12 months with safety. MP-CPC may be a good option for IOP reduction for refractory glaucoma.

P-241

CLINICAL EFFICACY OF TWO MODALITIES OF SELECTIVE LASER TRABECULOPLASTY IN THE TREATMENT OF OPEN-ANGLE GLAUCOMA OR OCULAR HYPERTENSION

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Purpose

This study aims to compare clinical efficacy of 180-degree selective laser trabeculoplasty (180° SLT) with 360-degree SLT (360° SLT) in the treatment of different types of open-angle glaucoma (OAG) or ocular hypertension (OHT).

Methods

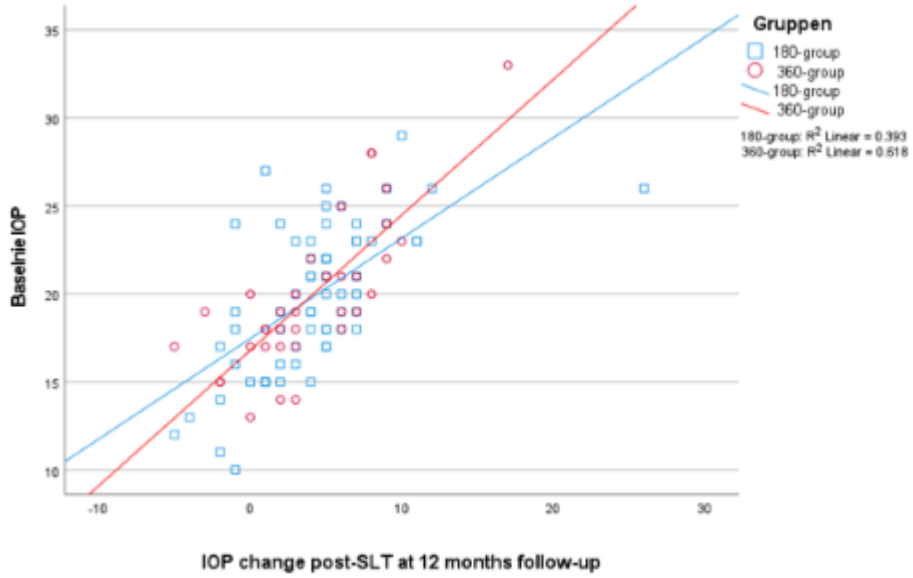
Retrospective chart review of 78 patients (105 eyes) with different types of OAG (72.4% - primary open angle; 17.1% - pseudoexfoliation glaucoma) and OHT (10.5%) was performed. 50 patients (70 eyes) underwent 180° SLT, 28 patients (35 eyes) - 360° SLT. IOP was evaluated before and at 3, 6 and 12 months after SLT. Study outcomes were IOP change in the treated eye and the number of topical IOP-lowering medications after SLT during follow-up.

Results

The mean age of patients in two study groups was 69.3±10 years and 72±11 years, respectively. 30.5% eyes were pseudophakic, while 64.8% were naïve to any previous ocular surgery. The median pre-180° SLT and post-180° SLT IOP in the treated eye at 3, 6 and 12 months were 20 (17.75-23) mmHg, 16 (14-18) mmHg, 16 (14.5-18) mmHg and 16 (13-17) mmHg, respectively. The median IOP change in the treated eyes at 3, 6 and 12 months after 180° SLT was -6 mmHg (p<0.001), -4.8 mmHg (p<0.001), and

-6 mmHg (p<0.001), respectively. The median pre-360° SLT and post-360° SLT IOP in the treated eye at 3, 6 and 12 months were 19 (17-22) mmHg, 16 (14-17) mmHg, 17 (14-18.75) mmHg and 16 (13-17) mmHg, respectively. The median IOP change in the treated eyes at 3, 6 and 12 months after 360° SLT was -4.7 mmHg (p<0.001), -3.8 mmHg (p<0.001), and -4.1 mmHg (p<0.001), respectively. The higher the pre-SLT IOP was in the treated eye, the larger was the IOP-lowering effect after SLT 180° and SLT 360° at different follow-ups (0.63 and 0.7, p<0.001; 0.61 and 0.65, p<0.001; 0.62 and 0.78, p<0.001; at 3, 6 and 12 months, respectively). We have not found any statistically significant difference between IOP reduction after 180° SLT and 360° SLT during the follow-up, while 34.3% of patients after 360° SLT vs. 18.6% of patients after 180° SLT needed no IOP-lowering medications at 12 months follow-up.

Image



Conclusions

This study shows a statistically significant IOP reduction in 3, 6 and 12 months after both modalities of SLT. The higher the pre-SLT IOP in the treated eye, the larger the IOP-lowering effect after SLT at different follow-ups. The 180-degree SLT is clinically as effective as 360-degree SLT for IOP reduction, although 360-degree SLT is associated with the reduction of topical IOP-lowering medications at 12 months follow up.

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P-242

MICROPULSE TRANSSCLERAL LASER THERAPY (MP-TLT) AS A NEW TREATMENT OPTION FOR PATIENTS WITH GLAUCOMA - OUTCOMES OF A NINE MONTHS OBSERVATION

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Purpose

The purpose of the study was to evaluate the efficacy and safety of MP-TLT for the treatment of glaucoma in various patients in nine-month observation period.

Methods

Patients with various stages of glaucoma and insufficiently controlled intraocular pressure despite maximally tolerable antiglaucoma medications were selected to the study. We included 83 adult patients with various glaucoma subtypes, without prior glaucoma surgeries except SLT, LPI, and / or uneventful cataract phacoemulsification. All of them underwent MP-TLT between January and June of 2021 and had at least 9-months of follow-up period. Patients were treated with the Micropulse P3 device powered by the CYCLO G6 (Iridex, Mountain View, CA, USA) at 2500 mW for a duration of 50 seconds per hemisphere (five 10 seconds swipes) with 31,3% duty cycle. Both hemispheres were treated. Patients were followed up 1 day, 2 weeks, 1, 3, 6 and 9 months after surgery. After the procedure we assessed the post-operative IOP, BCVA, the number of adverse events and complications and the number of antiglaucoma medications. The qualified success was determined as an IOP between 6-21 mmHg or ≥20% reduction of IOP from the baseline without additional surgeries, with or without the use of anti-glaucoma medications.

Results

The percentage of qualified success of the MP-TLT in the entire group (Kaplan-Meier survival analysis) was 29% at 9 months after surgery. There were no significant differences ($p=0.5$) in survival functions representing the probability of qualified success during the follow-up period between patients with POAG, PACG and PEXG. There was a significantly higher ($p=0.0001$) probability of qualified success during the follow-up period in patients with baseline IOP > 21 mmHg compared to those with baseline IOP ≤ 21 mmHg (comparison of the survival function). Significant reduction ($p<0.05$) in mean IOP values at month 9 after surgery were observed both for the entire group and in the subgroups of patients with: PACG, baseline IOP > 21 mmHg. No decrease in BCVA and no severe complications were observed.

Conclusions

MP-TLT appears to be a safe and effective treatment for glaucoma in all stages of the disease. The probability of qualified success is higher in patients with higher baseline IOP. Further studies are required to assess the long-term effect and late postoperative complication rate.

P-243
EFFICACY OF MICROPULSE LASER TRABECULOPLASTY IN ASIAN PATIENTS AT 12 MONTHS

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Purpose
To report the efficacy of Micropulse Laser Trabeculoplasty (MLT) in Asian patients as 12 months.

Methods
Patients with ocular hypertension (OHT) or open angle glaucoma (OAG) undergoing MLT over a 12-month period between July 2020 and July 2021 at a single eye unit in Malaysia (International Specialist Eye Centre, Kuala Lumpur) were included in this retrospective study. Patients with a prior history of laser trabeculoplasty or glaucoma surgery were excluded.

MLT was performed in a 360 degree fashion with the IQ 577nmTM yellow laser (Iridex Corp, Mountain View, CA, USA) following instillation of proparacaine and brimonidine 0.1%. Laser settings were 1000mw, 15% duty cycle, 300 millisecond duration and 300 µm spot size.

Patients were seen at week 1, weeks 4-6, 6 months and 12 months. Treatment success was defined as IOP reduction ≥ 20% or ≥ 3mmHg from baseline1.

Statistical analysis was performed using JASP v.0.16 (JASP Team 2021).

Results
66 eyes of 43 patients were included in this study.

Mean age was 60.5 (±12.7) years, with a 1:1 male to female ratio. 72.9% of patients were Chinese, with Japanese (14.0%), South Indian (11.6%) and South Korean (2.3%) patients also included.

Mean baseline IOP was 22.1mmHg with a mean of 2.00 glaucoma drops.

At 1 week, there was a mean IOP reduction of 23.7% from baseline (n=53, p<0.001). IOP reduction at 4-6 weeks was 23.1% (n=54, p<0.001), 26.9% at 6 months (n=44, p<0.001) and 28.0% at 12 months (n=42, p<0.001). No IOP spikes were noted within the first month.

37 of 66 (56.1%) eyes achieved a reduction in IOP ≥ 20% or ≥ 3mmHg from baseline at 12 months.

Mean glaucoma drops reduced from 1.91 at baseline to 1.50 at 12 months (p=0.003).

10 of 66 (15.2%) eyes required further glaucoma surgical intervention.

Conclusions
MLT is effective in reducing IOP and number of glaucoma drops in Asian patients with OHT or OAG.

IOP reduction is noticeable as early as week 1 post laser and appears to be sustained at 12 months. Our results are comparable with previous published data in a similar patient population2.

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P-246
REAL-WORLD LONG-TERM OUTCOMES OF SELECTIVE LASER TRABECULOPLASTY

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Purpose
Selective laser trabeculoplasty (SLT) has been increasingly recognised as an effective treatment strategy in IOP reduction with proven good quality of life and cost effectiveness compared to topical treatment (1). There is however limited real-world data on the long-term outcomes of a large cohort of patients treated with SLT.

Methods
This was a retrospective study of 409 eyes of 224 patients treated with SLT between 2014-2018 in a UK tertiary referral centre. A standard protocol of 360° SLT was performed in all patients. Patients with ocular hypertension, primary and secondary glaucoma of varying severity were included. SLT was used as the first-line treatment or adjunctive therapy. Baseline pre-SLT IOP and IOP measured within time windows of <3 months post-SLT and yearly thereafter were recorded. Failure of SLT was defined as any one/more of the following: the need for initiation/increase of IOP lowering medication, repeat SLT or glaucoma surgery. Final outcome, including IOP and need for any additional treatment, was recorded at the last follow up visit.

Results
A total 224 patients (n=409 eyes) were included, with a mean±SD follow up of 62.2±23.3 months. There were 194 (47%) treatment naïve eyes compared to 215 (53%) eyes on medical treatment before SLT. The number of ocular hypertension eyes were 169 (41%) compared to 240 (59%) eyes with established glaucoma. Mean pre-treatment IOP was 25.6±5.9 mmHg. The mean percentage reduction in IOP at 6-8 weeks post SLT treatment was 25%. The number of eyes defined as no-response (requiring treatment change at <3months) was 35 (9%). Survival analysis showed treatment success in 82%, 74%, 64%, 55%, 47%, 43%, 37%, 30% of eyes at year 1, 2, 3, 4, 5, 6, 7, 8 post SLT respectively. The highest proportion of eyes requiring treatment change occurred at year 3. Excluding non-responders, mean±SD time to treatment change is 3±1.82 years. At the last follow up, 192 (47%) patients was medication free whereas 195 (48%) required medication and 28 (7%) had IOP-lowering surgery. SLT success was not significantly associated with pre-SLT IOP >21 (P = 0.85) or use of IOP-lowering medication pre-SLT (P = 0.21).

Conclusions
In this real-world study, we demonstrated that SLT, both as first line treatment and adjunctive therapy, is an effective IOP reduction strategy with long-term effects lasting up to 8 years. There is a gradual decline in treatment success over the follow up period, with the highest proportion of patients requiring treatment change at year 3.

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P-247

FACTORS PREDICTING SUCCESSFUL SELECTIVE LASER TRABECULOPLASTY TO PREVENT GLAUCOMA PROGRESSION TO SURGERY

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Purpose
To investigate the factors predicting successful selective laser trabeculoplasty (SLT) to prevent glaucoma progression to surgery in patients whose intraocular pressure (IOP) is not controlled with medications.

Methods
This retrospective chart review included 102 eyes of 92 glaucoma patients who underwent SLT between 2018 and 2020. Success was defined as the prevention of glaucoma surgery for at least 1 year with an IOP less than 21 mmHg or no progression of retinal nerve fiber layer thinning. Kaplan–Meier survival analysis and the Cox proportional hazard model were used for the analysis.

Results
A low pretreatment IOP, good visual acuity, and a smaller visual field defect were significantly correlated with success. When the other eye underwent glaucoma surgery or its SLT treatment failed, the success rate of SLT was lower. As the pretreatment IOP increased by 1 mmHg, the SLT failure rate increased by 1.376 times and when the SLT for the other eye failed, it increased by 19.577 times. When the mean deviation of the visual field increased by 1 dB, the SLT failure rate decreased by 0.928 times ($p<0.05$).

Conclusions
SLT is more effective in early glaucoma patients with an IOP lower than 25 mmHg, smaller visual field defect, and good visual acuity to prevent glaucoma progression to surgery.

P-248

SELECTIVE LASER TRABECULOPLASTY IS SAFE AND EFFECTIVE IN ALL STAGES OF GLAUCOMA: EXPERIENCE FROM A LATIN AMERICAN ACADEMIC CENTER

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Purpose

The aim of this study was to determine the response rate, safety, and predictors of success of selective laser trabeculoplasty (SLT) in a Latin American population with various stages of open-angle glaucoma (OAG) or ocular hypertension (OHT) from an academic ophthalmology center.

Methods

We performed a retrospective chart review on all patients diagnosed with OAG or OHT who underwent SLT at the Tecnologico de Monterrey in Mexico between 2018 and 2022. The response was defined as a 20% reduction in intraocular pressure (IOP) in two consecutive visits 4 to 8 weeks after SLT compared to baseline. The baseline IOP was calculated as the average of the previous two IOP measurements.For group comparisons, analysis was performed using student t-test, Mann-Whitney U test, or chi-squared test as appropriate. Odds ratios (OR) were assessed using the logistic regression analysis.

Results

A total of 83 eyes from 47 patients were included, 53 (63.9%) women and 30 (36.1%) men. The median age at SLT was 62 (19-86) years. The median follow-up was 9 (3-55.43) months. The most frequent diagnosis was primary OAG (72.3%) followed by OHT (9.6%), pseudoexfoliative glaucoma (8.4%), and pigmentary dispersion syndrome (4.8%).The majority of eyes (60%) presented at an advanced stage, 20% at a moderate stage, and 20% at an initial stage. SLT was indicated in 48.2% of cases as adjunctive therapy due to disease progression, 39.8% as first-line therapy, and the remaining 12% as replacement therapy. Response to treatment was identified in 79.5% of eyes with a mean IOP reduction of 5.8+8.16 mmHg from baseline. No complications or adverse events were reported. At the last follow-up, the median IOP significantly decreased after SLT (21mmHg vs. 14mmHg, $p<0.001$). A significant reduction in the number of topical medications was also observed after the intervention (median 2 drugs vs. 0 drugs, $p<0.001$).The previous use of topical medication and the stage of the disease were not identified as risk factors for failure.

Conclusions

The results of SLT in reducing intraocular pressure in Latin American patients are comparable to those reported in other populations. Prior usage of topical therapy and disease stage were not predictive of failure. SLT is a safe and effective treatment for patients with OAG and OHT.

P-249

DIFFERENCES IN CLINICAL OUTCOMES BETWEEN 10- AND 20-SECOND ONE-WAY SWEEPS OF MICRO-PULSE TRANSSCLERAL LASER THERAPY

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Purpose
To evaluate the differences of clinical outcomes of micro-pulse transscleral laser therapy (MP-TLT) between 10- and 20-second one-way sweeps for 6 months.

Methods
A retrospective chart review was performed on refractory glaucoma patients who underwent MP-TLT with 10- and 20-second one-way sweeps approved by the institutional review boards of the University of Tokyo Hospital from September 2020 to June 2022. MP-TLT is a procedure that utilizes repetitive pulses of 810nm light generated by the Cyclo G6® Laser (Iridex Corporation, Mountain View, CA, USA). The laser setting was 2500mW (power) and 80 seconds (duration) in each hemisphere. The patients treated with MP-TLT were classified into two groups depending on the time of sweep: 10-second one-way sweep group (10-sec group) and 20-second one-way sweep group (20-sec group).The demographics, intra-ocular pressure (IOP), medication score (MS), and best-corrected visual acuity (LogMAR) were measured at baseline, 1, 3 and 6 months after the treatment. We also evaluated complications after MP-TLT.

Results
Forty-two eyes with 10-sec group and 38 eyes with 20-sec group were enrolled in the current study, including 22 and 18 primary open angle glaucoma, 8 and 4 pseudoexfoliation glaucoma, 4 and 5 secondary open angle glaucoma, 4 and 6 neovascular glaucoma, and 4 and 5 other glaucoma, respectively.The mean IOPs in 10-sec group at baseline, 1, 3 and 6 months were 28.8±9.8, 20.6±9.1, 21.9±9.6 and 21.1±11.9. There was significant reduction. (paired t-test, $p<0.001$) The mean IOPs in 20-sec group at baseline, 1, 3 and 6 months were 30.5±9.9, 16.3±5.6, 17.8±6.0, and 16.0±4.7. There was also significant reduction. (paired t-test, $p<0.001$) In addition, IOP was significantly lower in 20-sec group than in 10 sec group. (unpaired t-test, $p<0.05$) The MS before MP-TLT was 4.8±1.0 and 4.7±0.9. It significantly decreased to 3.8± 1.4 and 3.9±1.4 at 6 months, however there was no difference between 10-sec group and 20-sec group (unpaired t-test, $p>0.05$). LogMAR was no significant change at 6 months and no difference between 10-sec group and 20-sec group. (unpaired t-test, $p>0.05$) Nor were any serious complications in 10-sec group and 20-sec group observed.

Conclusions
In refractory glaucoma, MP-TLT with 20-second one-way sweep was more effective in IOP reduction than 10-second one-way sweep, however there were no differences in MS and LogMAR changes. The same safety was confirmed between two procedure for 6 months after MP-TLT.

P-251

TRANSSCLERAL CYCLOPHOTOCOAGULATION WITH STANDARDIZED PROTOCOL TO REDUCE IOP IN EYES AFFECTED BY GLAUCOMA, FIRST RESULTS OF A PRELIMINARY STUDY

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Purpose
To evaluate the efficacy and safety of transscleral cyclophotocoagulation (TSCPC) as intraocular pression (IOP) lowering therapy, administrated both in micropulsed (MPTSCPC) and in continuous wave (CWTSCPC) modalities, to treat patients affected by primary or secondary glaucoma.

Methods
In this study, 36 eyes of 22 patients, with a mean age of 64.84 ± 12.8 years were included, they were affected by progressive glaucoma, defined as IOP > 18 mmHg with maximum medical therapy and/or worsening of visual field evaluated by standardized automated perimetry. Before laser treatment, patients had a mean best visual acuity with correction of 0.44 ± 0.36 LogMAR, a mean IOP of 24.33 ± 7.6 mmHg and they assumed a mean of 3.04 ± 1.11 topical IOP lowering molecules, moreover 6 patients needed also acetazolamide tablets. Both CWTSCPC (8 eyes) and MPTSCPC (28 eyes) were performed using the Iridex Cyclo G6 device with the MP3 handpiece (IRIDEX, Mountain View, USA) using a standardized protocol under peribulbar anaesthesia. Patients were checked at day 1, week 1, 1 month and 3 months follow up. Paired Student T test was used to check the differences after TSCPC.

Results
No adverse reactions were recorded in every treatment performed. At 1 month follow up, a significant ($p= 0.001$) reduction mean IOP 16.02 ± 2.18 (ranging from 12 to 21 mmHg) was obtained. No change in topical therapy was prescribed during first month, other than acetazolamide tablets that was discontinued in every patient. At 3 months follow up, a mean IOP of 15 ± 2.44 mmHg (ranging from 10 to 20 mmHg) with a significant reduction ($p<0.001$). No visual lines lost have been recorded in the included patients. The number of IOP lowering molecules significantly ($p<0.01$) dropped to a mean of 2.12 ± 0.64 (ranging from 0 to 4) an no patients were still assuming acetazolamide tablets.

Conclusions
Even if preliminary data observed in this study need to be confirmed in further ones with larger population and longer follow up, results obtained suggest that both CWTSCPC and MPTSCPC could be effective and safe options to reduce IOP in patients not well compensated with maximum therapy but also in ones with secondary glaucoma related to previous diseases. In particular, this kind of tool could be an interesting option to manage patients affected by secondary glaucoma due to diseases that required previous multiple surgeries, in which a classic IOP lowering surgical approach has high rate of failure.

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P-252

TO EVALUATE THE EFFECT OF SELECTIVE LASER TRABECULOPLASTY ON VISUAL FIELD STABILITY IN PATIENTS AFFECTED BY OPEN ANGLE GLAUCOMA

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Purpose

Selective laser trabeculoplasty (SLT) is a well known effective intraocular pressure (IOP) lowering treatment but little is known about the long term effects on visual filed (VF) defect of patients affected by primary open angle glaucoma (POAG). This study is going to evaluate the stability of VF after SLT in these patients.

Methods

In this retrospective study, 62 eyes of 31 patients affected by POAG were included, the mean age was 56.9 ± 10.44 years. Every patient was routinely followed at our glaucoma office and underwent periodical complete eye visit every 6 months with standardized automated perimetry (SAP) using a Humphrey Field Analyzer (HFAII, Carl Zeiss Meditec, Dublin, CA, USA). Before treatment, the patients included had a mean IOP of 17.05 ± 3.63 mmHg (ranging from 13 to 30 mmHg), they assumed a mean of 1.65 ± 0.76 (ranging from 1 to 3) topical molecules to lower IOP and they had a mean MD of -4.77 ± 4.95 dB (ranging from -17.7 to -0.5 dB). SLT was performed in both eyes, a 360° approach was adopted for every case. IOP was checked at 1 week and at 1 month, then patients underwent routine follow up with complete eye visit and SAP every 6 months. Values of IOP, MD, eventual progression of the defect detected by SAP and medical therapy were recorded at every follow up and compared with ones before SLT. Paired Student T test was used to check the differences before and after treatment.

Results

No adverse reactions to the treatment were observed in every patient included. At 30 months follow up mean IOP was 14.8 ± 1.26 mmHg (ranging from 11 to 17 mmHg) (p= 0.034), with a mean MD of -5.02 ± 3.68 dB (ranging from -18.7 to 1.6 dB) (p= 0.06) and no significant progression of SAP defects detected by automated software of the device used. At 42 months follow up, 16 eyes of 8 patients (25.8%) showed a significant reduction of MD (-1 dB compared to the previous one) and /or visual filed defects progression requiring additional treatments (medical, surgical or laser ones), whereas the other eyes included in the study showed a stable clinical situations.

Conclusions

Even if the data observed in this study need to be confirmed in further ones with larger populations, the results detected suggest that SLT is effective reducing the visual field defects progression. Meanwhile, it is important to remind that these eyes need to be constantly monitored because it is possible to observe an IOP rising and/or visual filed defects progressions after years too.

P-253

SELECTIVE LASER TRABECULOPLASTY EFFECTIVENESS IN PATIENTS WITH OPEN-ANGLE GLAUCOMA AND OCULAR HYPERTENSION: REAL-LIFE EXPERIENCE IN UKRAINE

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Purpose

To assess the effectiveness of selective laser trabeculoplasty (SLT) in patients with open-angle glaucoma and ocular hypertension.

Methods

Retrospective analysis of patients, who were treated by SLT in the private clinic «Shevchyk Vasyl Eye Microsurgery» (Chernihiv, Ukraine) in the 2022, was performed. The SLT results of 200 eyes (182 patients): 135 eyes (67%) with open-angle glaucoma and 65 eyes (33%) with ocular hypertension were analyzed. The efficacy of SLT was evaluated by the IOP level before laser treatment, after 1 month, after 2 months, after 6 months and after 1 year using the perimetric MD index. The criterion of complete success was target IOP achievement and IOP-lowering efficacy of ≥ 20% from baseline without any additional interventions. Only patients with complete medical records at 1-year follow-up visits were included in this study.

Results

Mean intraocular pressure (IOP) before SLT was 29.05 ± 2.04 mmHg. After 1-month follow-up, mean IOP was 15.32 ± 2.41 mmHg ($p < 0.01$). Overall, an IOP-lowering efficacy of ≥ 20% from baseline was elicited in 171 eyes (86 %) at 6 months and in 162 eyes (81 %) at 1 year. SLT retreatment was performed in 20 eyes (10 %). Noncomplete IOP control with necessity of additional interventions was noted in 10 eyes (5 %): trabeculectomy (n = 5) and transscleral cyclophotocoagulation (n = 5).

Conclusions

SLT is effective and safe method of IOP reduction in these cohort of patients. Target IOP was achieved and evidenced with stabilization of retinal sensitivity by standard automated perimetry in majority of cases. Our study also emphasizes the necessity of a further regular follow-up of these patient groups.

P-254

TOSCA'S TRANS OCULAR SUBTHRESHOLD CYCLO ACTIVATION DUAL WAVELENGTH LASER (1,475NM AND 810NM)

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Purpose

To elucidate TOSCA's complementary dual treatment modes: 1) transscleral perilimbal hyperthermia to lower IOP and 2) transpupillary panmacular photothermal-stimulation to protect from the onset/progression of neurodegeneration.

Methods

1) We analyzed the mechanisms of all IOP lowering techniques that use different laser types, wavelengths, emissions, and interactions to determine the safest, most practical technique for modern glaucoma management with laser first-line treatment, PRN retreatments (LiGHT trial) or periodic therapy (COAST trial). 2) We analyzed the effect of subthreshold nondamaging laser panmacular photothermal-stimulation as potential neurotrophic aid in glaucoma eyes.

Results

1) The main IOP lowering mechanism of each technique is not the imputed biomechanical effect (plasty, selective thermolysis, coagulation, etc.), but the biological response to a mild thermo-acoustic injury, which is nonspecific to laser type or treatment location. Each technique laser-tissue interaction activates a common trabeculoplasty-like response that results in comparable IOP reduction, altered mainly by patients' factors: age, race, pigmentation, pre-op IOP, glaucoma type, etc. Among all laser-tissue interactions, TOSCA's transsclerally induced hyperthermia has proven practical, safe, and effective at activating trabeculoplasty-like response in the phase1 of a prospective study where the treatment of blind or poorly sighted eyes of patients in comfortable supine position resulted in a mean IOP reduction of 7.3 mmHg (23.6% from baseline) that reached statistically significance at 90 days.

2) In in an observational retrospective study with 88 eyes of 48 consecutive patients with glaucomatous optic neuropathy (GON) panmacular photostimulation with subthreshold 810nm micropulse laser was found to significantly improve optic nerve function on visually evoked potential VEP P1 amplitudes ($p = 0.001$), on mesopic VA ($p < 0.0001$), and on mesopic automated perimetry ($p < 0.0001$).

Conclusions

TOSCA's perilimbal hyperthermia activates trabeculoplasty-like mechanisms subliminally, with no iatrogenic damage, thus PRN repeatable. Panmacular photostimulation with 810nm micropulse laser significantly improves optic nerve function in GON patients. TOSCA is well suited for modern glaucoma management that optimizes patients' disease-related quality of life with laser first-line treatment, PRN retreatments, periodical therapy, and neuroprotection.

P-255
CLINICAL ANALYSIS OF SLT REPETITION IN PATIENTS WITH PSEUDOEXFOLIATIVE GLAUCOMA

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Purpose
Selective laser trabeculoplasty (SLT) is a procedure used to lower intraocular pressure (IOP). Its effect is thought to be related to increased drainage of aqueous humor through the trabecular meshwork and tends to decrease over time. This work aims to characterize the group of patients with pseudoexfoliative (PEX) glaucoma who underwent more than one SLT treatment.

Methods
A retrospective study that evaluated the clinical files of all patients with PEX glaucoma who underwent more than one SLT between 2012-2021 at Centro Hospitalar Universitário São João. Patients who had already undergone surgery to lower IOP or those in whom there was no clinical record of pre- or post-procedure IOP were excluded. The following variables were evaluated: gender, age at first treatment, number of hypotensive drugs before the first SLT (1SLT), IOP before 1SLT, IOP after 1SLT, number of drugs after 1SLT, the time between 1SLT and second SLT (2SLT), IOP before 2SLT, IOP after 2SLT, number of drugs after 2SLT and need for filtering surgery. Possible complications of the procedure were also identified. Response to treatment was defined as a decrease in IOP ≥ 20%. The sample was divided into group A (responded to 1SLT) and group B (did not respond to 1SLT).

Results
Sixty-one eyes of fifty patients were identified, 50% were female and eleven patients underwent more than one SLT in both eyes. Fifteen eyes underwent three SLTs and two eyes four SLTs. Group A consisted of thirty-six eyes and group B of twenty-five eyes. Age before 1SLT was not different between groups A and B ($p>0.05$), IOP before 1SLT was higher in group A compared to group B ($U=717$; $p<0.001$) and the interval 1SLT-2SLT was not different between groups A and B ($p=0.907$). It was also found that the greater the IOP drop in the 1SLT, the greater the IOP drop after the 2SLT (Spearman ρ coefficient= 0.410; $p=0.001$). Of the twenty-five patients who did not respond to 1SLT, fourteen responded to 2SLT. No major complications were recorded during or after the first or second SLT.

Conclusions
This study showed that SLT is a procedure that reduces IOP and that, as shown in the literature, tends to be more effective the higher the initial IOP. Fourteen patients (out of 25; 56%) who had not responded to 1SLT responded to 2SLT. The SLT is another therapeutic weapon in the treatment of PEX glaucoma. In the future, remains to be discovered which clinical features predict a better response to treatment.

P-256

ONE-NANOSECOND SELECTIVE LASER TRABECULOPLASTY IN PATIENTS WITH OPEN-ANGLE GLAUCOMA AND OCULAR HYPERTENSION

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Purpose

To evaluate the clinical outcomes of the one-nanosecond (ns) selective laser trabeculoplasty (SLT) in patients with primary open-angle glaucoma (POAG) or ocular hypertension (OHT).

Methods

This prospective observational study occurred at Altino Ventura Foundation, Recife, Brazil. Patients aged 18 years or older, with POAG or OHT diagnosis by wide gonioscopy, two reliable computerized field measurements in the last year (mean deviation better than -12), and distance visual acuity better than or equal to 20/150 with best correction were enrolled. Those with a history of eye surgery in the last year, except cataract surgery, other types of glaucoma, and vitreous cavity with silicone oil, were excluded. Trabeculoplasty was performed using Opto SLT Nano (Optovision) device as follow: laser pulse of 1 ns, energy of 0.8-1.1 mJ, and spot size 400 µm. One-hundred non-overlapping shots were done at 360° of trabecular mesh. Reduced baseline IOP (bIOP) by ≥ 20% was defined as success. Visual acuity, IOP, gonioscopy, biomicroscopy, fundoscopy, Humphrey campimetry, retinography, OCT, pachymetry, and specular microscopy were evaluated by a glaucoma specialist pre and post-SLT (7, 30, and 90 days).

Results

Nineteen patients (33 eyes; 15 [78.9%] female) with a mean age of 60.6 ± 12.7 (34 – 86) years were assessed. The mean IOP significantly decreased from 18.1 ± 4.4 (10 - 28) mmHg at baseline to 14.1 ± 2.9 (10 - 20) at 90 days post-SLT ($p<0.001$). Approximately 79% of the participants had more than a 20% reduction in bIOP; those with bIOP above 21 mmHg have a higher IOP reduction ($p=0.003$). No statistical significance was observed in visual acuity, cup-to-disk ratio, specular microscopy, and pachymetry between pre and post-SLT. Corneal endothelium presented morphological and quantitative changes, but they were transient. At 7 days post-SLT, 4 patients had keratitis, 3 had cels, and 2 had hyperemia, which were solved by 30º day.

Conclusions

The one-ns SLT reduced significantly the IOP, especially in patients with IOP > 21 mmHg, with no clinical impact on the cornea and no serious or long-term adverse effects.

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P-257
"SELECTIVITY" OF SELECTIVE LASER TRABECULOPLASTY

G Ahmadova, M Pirmatov

Purpose
To study the efficacy of selective laser trabeculoplasty in primary open angle glaucoma patients with different degrees of angle pigmentation.

Methods
The study included 37 patients (74 eyes) with primary open-angle glaucoma with IOP 21-30 mm Hg who were prescribed combination of Timolol and Brinzolamide.SLT was performed on Nd:YAG-laser (532 nm) (Lumenis Selecta II; U.S.A) using a 400 µm spot size, 3 ns duration, 0.1-2.0 mJ power. These patients were observed at 3-,6- and 12-months.Patients were divided into 3 groups: The first group included 16 patients (32 eyes) with 90˚ anterior chamber angle pigmentation; the second group-18 patients (36 eyes) with 180˚ anterior chamber pigmentation and the third group-3 patients (6 eyes) with 360˚ pigmentation.

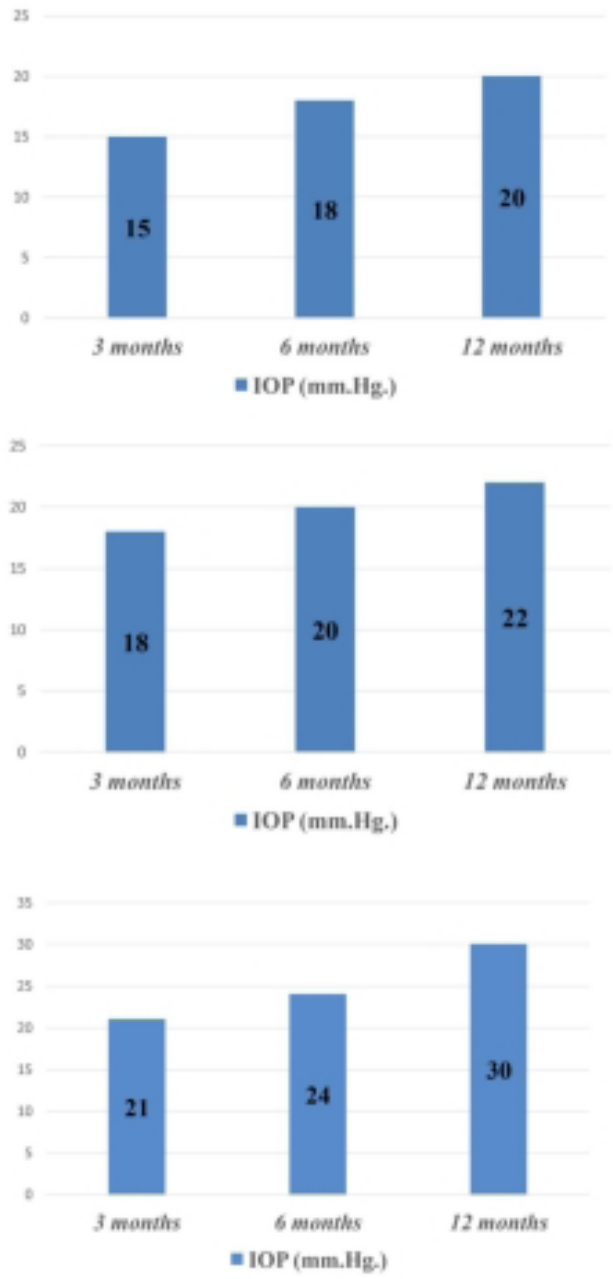
Results
I Group– 16 patients (32 eyes) – 90˚ anterior chamber angle pigmentation

II Group- 18 patients(36 eyes) – 180˚ anterior chamber pigmentation

III Group - 3 patients (6 eyes) – 360˚ anterior chamber pigmentation

During 1-year follow-up after selective laser trabeculoplasty in primary open-angle glaucoma patients: IOP stabilization was observed in 100% of patients with 90˚ anterior chamber angle pigmentation and in 72% of patients with 180˚ anterior chamber angle pigmentation. In 28% (5 patients - 10 eyes) repeated SLT was performed.IOP stabilization was not observed in patients with 360˚ anterior chamber angle pigmentation. After 6 months, 100% of cases underwent repeated SLT. Since IOP was not stable after 1 year (30 mm Hg), all patients of this group underwent antiglaucoma surgery.

Image



Conclusions

During the conducted scientific research, the high effectiveness of SLT was found in 100% cases of 90˚ pigmentation of the anterior chamber angle and in 72% cases of 180˚ pigmentation. According to the study, it should be noted that there is no clinical significance of performing SLT during 360˚ pigmentation of the anterior chamber. Other types of antiglaucoma treatment are recommended for these patients.

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P-258
OUTCOME OF SELECTIVE LASER TRABECULOPLASTY IN SUDAN

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Purpose
The study was conducted to assess the outcome of Selective Laser Trabeculoplasty in Sudan.

Methods
This is an interventional prospective study from September 2022 to January 2023. SLT was performed using LightLas Deux SLT/YAG Combo Selector Deux laser in 39 eyes in Shami Eye Center. Laser was delivered through two mirror contact lens and all patients received topical pilocarpine 2%, 15 minutes before the procedure. IOP was measured 1 hour after the procedure and in one week, one month and three month follow ups.

Results
55% of the treated eyes had IOP spike one hour after the procedure and were given a short course of oral acetazolamide. 41% of the treated eyes had an anterior chamber reaction post SLT, only 21% had severe reaction and most of them were treated successfully with topical non-steroidal anti-inflammatory. IOP was reduced in 69% of the treated with eyes in the first month. We defined SLT success by more than 20% reduction in IOP. SLT was successful in 62% of the treated eyes, 85% didn't require further intervention and surgery, and we were able to decrease number of medications in 8% of patients. The successful cases were in eyes with POAG 38%, ocular hypertension 38%, pigmentary glaucoma 15% and pseudoexfoliation glaucoma 7%. Total energy delivery had no association with procedural success and IOP spike.

Conclusions
We concluded that SLT is an effective safe procedure and we recommend that it should be offered for all patients with POAG, ocular hypertension, pigmentary and pseudoexfoliation glaucoma as a primary treatment. Also further follow up results should be documented to predict its long term effect.

P-260

MINIMALLY INVASIVE APPROACH FOR MALIGNANT GLAUCOMA IN PSEUDOPHAKIC EYES : A CASE SERIES

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Purpose

The Purpose of presenting this case series is to highlight a minimally invasive approach for a serious sight threatening condition ie laser treatment for malignant glaucoma in pseudophakic eyes.

1) Early diagnosis of malignant glaucoma is important.

2) Sometimes medical treatment (atropine) is though effective, has to be discontinued due to allergic reaction

3) **Site** of Laser hayaloidotomy is very important (should be outside the optic edge) it should create a communication between vitreous and anterior chamber

4) To confirm that laser anterior hyaloidotomy is a **definitive** treatment , as in these particular cases there was no recurrence of malignant glaucoma in 5 year follow up.

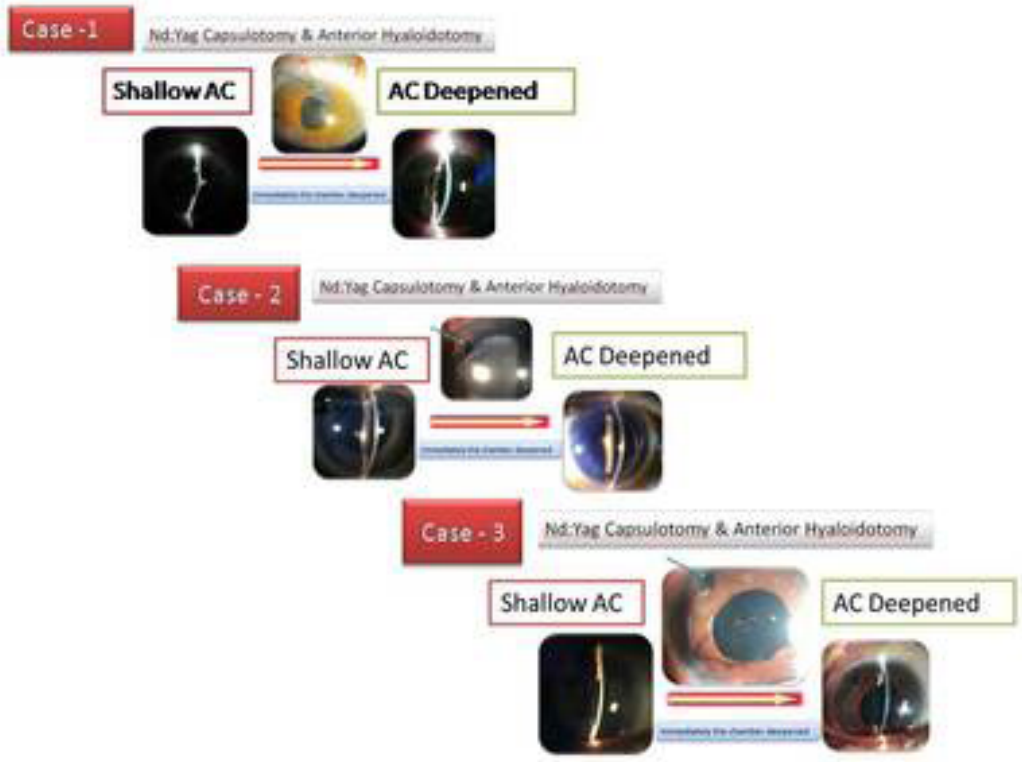
Methods

In these cases we ruptured posterior capsule to make communication between vitreous and anterior chamber at places which are outside the OPTIC EDGE as shown in picture attached. It is important to make communication between vitreous and anterior chamber. laser behind the IOL serves no purpose,as IOL optic acts as a barrier for flow of aquous from posterior to anterior chamber and results in failure.

Results

In all cases our approach of laser treatment done outside the optic edge has resulted in immediate deepening of anterior chamber and control of intraocular pressure.Till recent follow up there wes no recurrence of shallowing of anterior chamber

Image



Conclusions

These cases illustrate some of the important features and problems that may be encountered during the management of malignant glaucoma. surgical treatment, either a needle aspiration of vitreous through the pars plana or pars plana vitrectomy involves cost, discomfort and risk of complications.Direct incision of Hyaloid face using Nd:YAG laser is a less complicated and Definitive intervention in the presense of a posterior capsule with a posterior chamber intraocular lens.

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P-261
LASER PERIPHERAL IRIDOTOMY IN SECONDARY ACUTE ANGLE CLOSURE AFTER PARS PLANA VITRECTOMY: A CASE SERIES

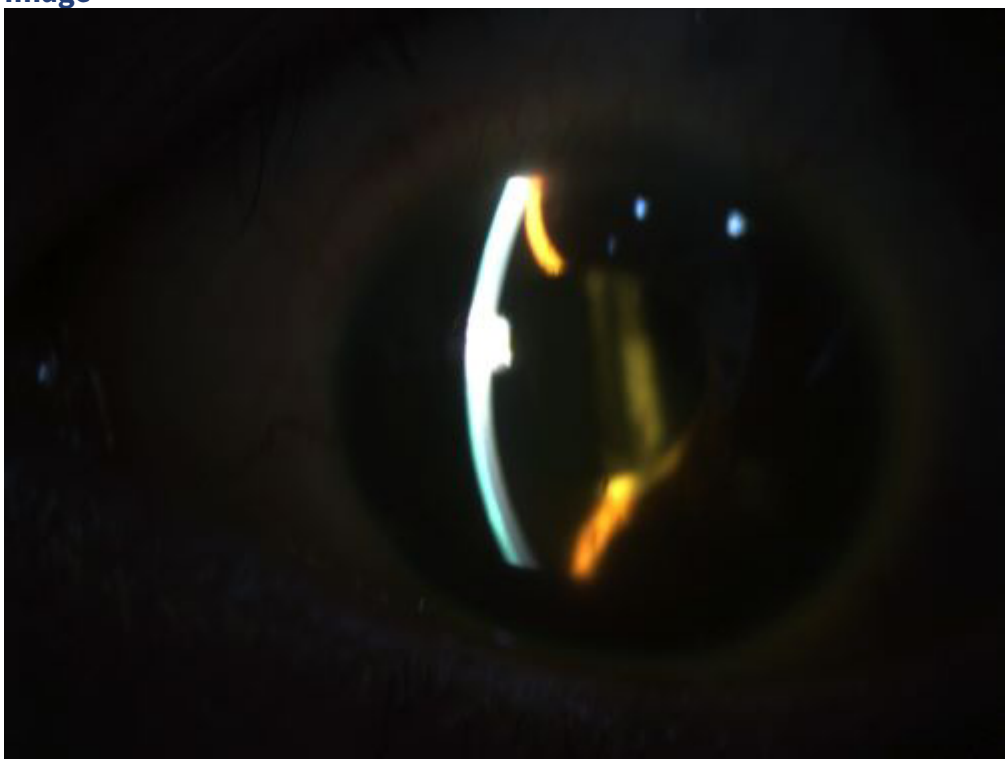
A Akbar

Purpose
To report the effectiveness of laser iridotomy (LI) in secondary acute angle closure (AAC) glaucoma following pars plana vitrectomy (PPV).

Methods
A case series. Two patients developed AAC after PPV several weeks previously. Both patients were young adult patients, a male and a female, 27 and 33 years old, respectively. They underwent PPV with silicone oil (SO) for retinal detachment. Cataract extraction was also performed in the first case. The latter case had subsequent cataract extraction with SO evacuation 4 months after PPV and intravitreal gas SF6 3 days afterwards. On admission, both patients had painful, red eye. The first case had these symptoms 2 weeks after PPV and the second case 1 month after SF6 injection. The intraocular pressure (IOP) were > 60 mmHg. There were low grade of inflammation cells in anterior chamber (AC), posterior synechiae and shallow AC due to iris bombe. Emulsified SO was found in the AC of the second case.

Results
Laser iridotomies were done on both cases. Prior to the procedures, the patients were given anti glaucoma medication to lower the IOP. After the IOP were reduced to below 20 mmHg, LI were performed. Argon laser and subsequent Nd:YAG laser were used in both cases. The power setting for argon laser was 700 mW, duration 10 ms, 50 µm and for Nd:YAG laser was 4.2-4.8 mJ. Topical prednisolone acetate were given every 3 hours after the procedures. The procedures created a patent iridotomy on both cases which relieve the pupillary block and deepened the AC. Nonetheless, 1 week after the procedures both cases developed fibrin around the iridotomy and starting to block the aqueous flow. Top up laser iridotomy laser were performed on both eyes to release the fibrin and enlarge the iridotomy. On the follow up of the second case, 5 months after LI, the IOP was 15 with 1 topical antiglaucoma, the AC was deep and the iridotomy was patent. The first case only had 1.5 months follow up, the IOP was 7 without glaucoma medication and the iridotomy was considered patent.

Image



Conclusions

Secondary AAC glaucoma can develop after PPV due to excessive inflammation reaction in the AC. A patent iridotomy is needed in these cases to relieve the pupillary block and manage the AAC. Although surgical iridectomy is usually preferred in AAC due to inflammation such as uveitis, LI could be an alternative modality in AAC after PPV. In these cases, the patients usually had several previous intraocular procedures and may benefit from a minimally invasive treatment such as LI.

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P-263
KARACHI SELECTIVE LASER TRABECULOPLASTY (SLT) STUDY

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Purpose
To evaluate the efficacy and safety of SLT in different types of Glaucoma in South Asian population of Karachi

Methods
Prospective analysis of Patients undergoing SLT. special proforma used to enter the baseline as well as follow up data. Study was conducted in two centres where SLT was avialable. Different types of Glaucoma was idenetifies before induction into the study. Also other details were documented such as pigmentation in the angle and number of drops used for IOP control

Results
Overall 59 eyes underwent SLT (37 patients). Mean age was 49.3 years (SD=12.6). average follow up time was 52 days after the SLT procedure.No difference was noted in best corrected visual acuity before and after the SLT procedure, 0.15 and 0.15, pre and post procedure respectively.No significant difference was noted in number of drops pre and post either with pre SLT mean number of drops of 2.32 and post SLT mean number of drops were 2.35. There was significant reduction in IOP baseline. Mean IOP was reduced from 18.31 pre SLT to 12.8 post laser. No significant spikes were noted post SLT in any patient, Nor any complications were noted.

Conclusions
SLT seems to fairly effective in South Asian population with reduction of Mean IOP of around 4.5 mm. It is very safe procedure in all forms of Glaucoma. Further study data needed to be avaluated to assess the retention of efficacy period.

P-264
RETROIRIDIAN CYSTS MANAGEMENT WITH ND:YAG LASER-PUNCTURE, A CASE REPORT

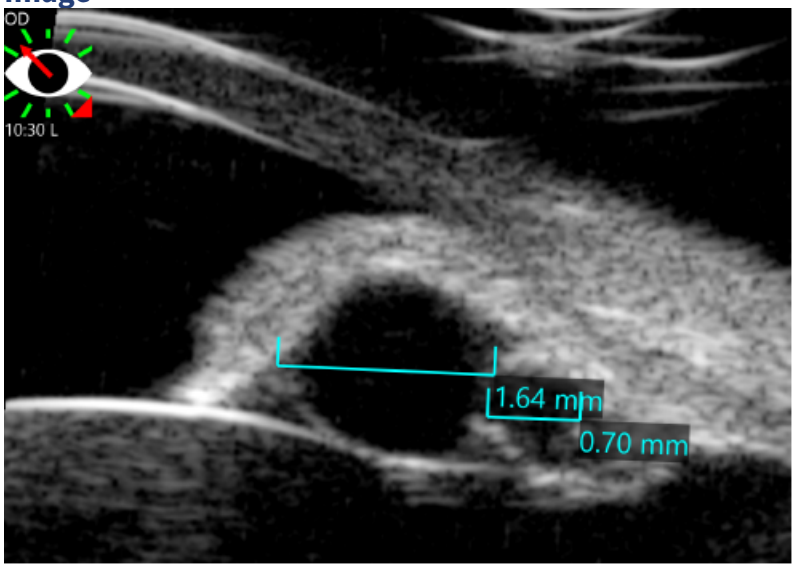
C Macario Godínez[1]
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Purpose
To report a case of retroiridian primary cyst presenting as primary angle closure suspect, managed with Nd:YAG laser-puncture.

Methods
Informed consent was obtained.

A 25-year-old woman presented with a history of long-standind blurred vision in her right eye. Her initial visual acuity was 20/40, and intraocular pressure was 12 mmHg OU. Slit-lamp biomicroscopy showed shallow anterior chamber and convex bowing of iris. Gonioscopy showed 270° angle closure. The anterior chamber was quiet and findings in the posterior segment were unremarkable bilaterally. Ultrasound biomicroscopy revealed a retroiridian iris cysts and secondary angle closure. Nd:YAG laser- puncture was done to drain cysts and relieve the angle closure.

Results
Laser treatment resulted in the collapse of the cysts, confirmed by ultrasound biomicroscopy. Currently, the structural and functional tests of optic nerve are normal.

Image


Conclusions
A retroiridian cysts are a rare presentation. They can present with a primary angle closure suspect as in our case report. Correct diagnosis and managment bring about a desirable result.

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P-265

TO ASSESS THE SHORT TERM EFFICACY AND SAFETY OF MICROPULSE TRANSSCLERAL DIODE LASER CYCLOPHOTOCOAGULATION(MPTSCPC) PROCEDURE IN REFRACTORY GLAUCOMA

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Purpose

To assess the short term efficacy and safety of micropulse transscleral diode laser cyclophotocoagulation(MPTSCPC) procedure in refractory glaucoma in a group of patients from Eastern India.

Methods

Prospective interventional study in a series of 32 consecutive patients with refractory glaucoma, who underwent micropulse transscleral diode laser cyclophotocoagulation from March 2022 to October 2022. A successful MPTSCPC procedure was defined as (1) intraocular pressure < 21 mmHg; (2) IOP reduction ≥ 20% from baseline intraocular pressure; (3) no decrease in vision due to complications or change in intraocular pressure; and (5) no need for additional glaucoma surgery or cyclodestructive procedure.

Results

Mean age was 62.2 ±5.6 years. Mean follow-up was 5.2±2.2 months. The preoperative intraocular pressure was 35.6 ± 5.8 mm Hg which significantly decreased to 24.2± 2.4 mm Hg at 1 month, 26.6 ± 2.1 mm Hg at 3 months and 28.4±2.6 mm Hg at 6 months($p < 0.01$ at all time points). The mean number of preoperative glaucoma medications (4.7) decreased to 3.2 at 1 month ($p <0.05$), 3.5 at 3 months ($p < 0.05$) and 3.9 at 6 months ($p < 0.05$). At 6m, the success rate was 48.4 % with a mean intraocular pressure lowering of 20.2 %. One patient had hypotony which subsequently recovered and two patients had a loss of best-corrected visual acuity which eventually recovered back to the preprocedure level after 3 months. Mild transient postoperative inflammation was observed in 10% of the cases.

Conclusions

Using a standardized procedure, micropulse transscleral diode laser cyclophotocoagulation allows a mild intraocular pressure decrease with a low rate of complications and thus can be a valuable tool for the treatment of patients with refractory glaucoma in Indian eyes.

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P-266

OUR RESULTS WITH DIODE TRANSSCLERAL CYCLOPHOTOCOAGULATION AND TRANSSCLERAL SUBCYCLOPHOTOTHERAPY TREATMENT: COMBINE TECHNIQUE. PRELIMINARY RESULTS

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Purpose

To evaluate the effect on Intraocular Pressure (IOP) using a technique that combines Diode Transscleral Cyclophotocoagulation (TCP) and Transscleral SubCyclophototherapy (TSCP) for the treatment of different types of glaucoma.

Methods

This study is a prospective interventional case series. Patients recruited needed to be older than 18 years old and have IOP ≥ 21 mmHg previous to the procedure. All of them were treated with maximum medications, had some impediment for glaucoma surgery or surgery was believed to be too risky for the patient, making laser treatment one of the best options.

A standardized technique was used, which consisted in applying TSCP on superior and inferior quadrants combined with TCP on inferior quadrants. The laser (VITRA 810 Quantel Medical) was set to subcyclo mode at 2W of 810nm, offering a duty cycle of 31.3%. Laser energy was delivered for a total of 80 seconds. Secondly, the TCP was carried out. For this, discrete pulses of 2.0W for 2 seconds per spot were used.

IOP was measured 1 week and 1 month after the intervention. As this is an ongoing study, results will be recruited also at 3 and 5 months of follow- up.

Results

To the present, 9 eyes (9 patients) with refractory glaucoma were included in our protocol. 6 of them were diagnosed with Primary Open - Angle Glaucoma (POAG), 1 with Pseudoexfoliative Glaucoma (PG), 1 with Neovascular Glaucoma (NVG) and 1 patient had neovascular and pseudoexfoliative glaucoma. The average IOP before the intervention was 33.33 mmHg. 1-week after the procedure the average IOP was 14.56mmHg (SD 4.14), and 1-month later it was 16.33 mmHg ($p < 0.01$; SD 10.03), representing a 49 % decrease from the basal average IOP. In regards to the complications, only 1 patient developed a hemorrhagic membrane in the anterior segment and 1 patient persisted with 40 mmHg at 1- month follow- up.

Conclusions

TCP and TSCP are non- invasive treatment alternatives.

Due to the risk of hypotony, vision loss, and phthisis bulbi, associated especially with TCP, they are often used as a last resort.

This study portrays the substantial decrease of IOP achieved by a combined technique using TCP and TSCP. However, the significant variability of the results should be taken into consideration.

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P-268
STUDY OF THE EFFICACY OF SELECTIVE LASER TRABECULOPLASTY IN OCULAR HYPERTENSION AND GLAUCOMA

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Purpose
The main objective is to determine the degree of efficacy maintained over time, of selective laser trabeculoplasty (SLT) evaluated by lowering intraocular pressure (IOP). A secondary aim is to assess the change in the number of intraocular hypotensive drugs.

Methods
Retrospective study, consecutive sampling. 106 patients (165 eyes) who underwent SLT with a minimum follow-up period of three months.

The variables analyzed were age, sex, previous surgeries, retreatment with SLT, ocular hypotensive drugs before and after treatment (3 months) and IOPs before and after treatment (1, 3, 6, 12 months).

An analysis of quantitative variables (age, IOP, number of active ingredients) was performed with Student's t test for paired data or non-parametric test if a normal distribution was not followed. Analysis of qualitative variables (sex, previous surgeries, active ingredients) using the Chi-Square or Fisher test according to the normality of the sample. Comparison of mean IOP and number of hypotensive drugs before and after laser treatment using the Wilcoxon statistical test. A p value less or equal to 0.05 is considered a statistically significant difference.

The success rate of the procedure was assessed with the help of the Kaplan–Meier analysis. Success was defined as IOP ≤18 mmHg and ≥20% reduction in IOP with or without medication compared with baseline values.

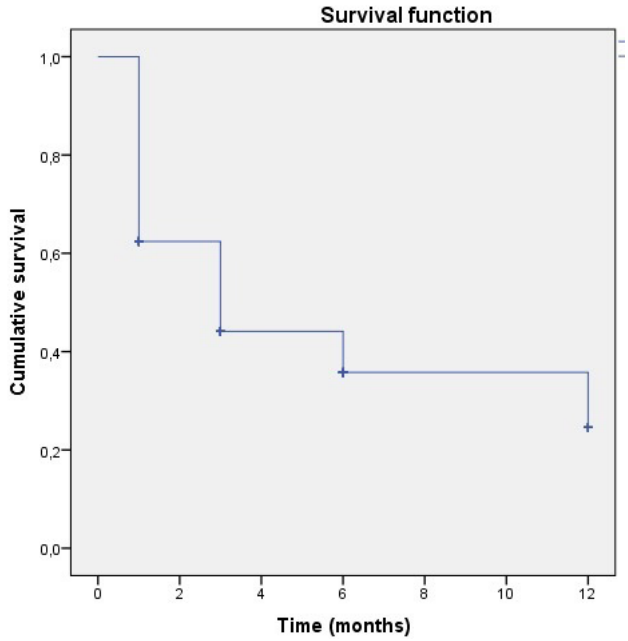
Results
Data analysis showed a mean age of 69.38 ± 12.5 years, 41.5% of the eyes were from female patients, 47.6% of the eyes had not undergone previous surgery.

A statistically significant difference was found between the mean IOPs before (mean value 19.57±4.262 mmHg) and after SLT (15.75±3.166 mmHg). The difference between the mean of active ingredients before (1.52±1.008) and post SLT (1.08±1.026) was also statistically significant, a decrease was observed in the number of drugs necessary to maintain a controlled IOP in 74 of the eyes studied (47.43%), with all drugs being withdrawn in 46 of the eyes in our sample (29.48%).

Thirty-five patients underwent a second SLT session (22.58%).

In our sample, the SLT presents a success rate of 24.6% at 12 months.

Image



Conclusions

Selective laser trabeculoplasty can be useful to reduce IOP and also to reduce the number of drugs for its control. In our study we found a decrease in efficacy over time that raises the possible need for retreatment.

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P-269
"SELECTIVITY" OF SELECTIVE LASER TRABECULOPLASTY

G Ahmadova, M Pirmatov

Purpose
To study the efficacy of selective laser trabeculoplasty in primary open angle glaucoma patients with different degrees of angle pigmentation.

Methods
The study included 37 patients (74 eyes) with primary open-angle glaucoma with IOP 21-30 mm Hg who were prescribed combination of Timolol and Brinzolamide.SLT was performed on Nd:YAG-laser (532 nm) (Lumenis Selecta II; U.S.A) using a 400 µm spot size, 3 ns duration, 0.1-2.0 mJ power. These patients were observed at 3-,6- and 12-months.Patients were divided into 3 groups: The first group included 16 patients (32 eyes) with 90˚ anterior chamber angle pigmentation; the second group-18 patients (36 eyes) with 180˚ anterior chamber pigmentation and the third group-3 patients (6 eyes) with 360˚ pigmentation.

Results
I Group– 16 patients (32 eyes) – 90˚ anterior chamber angle pigmentation

II Group- 18 patients(36 eyes) – 180˚ anterior chamber pigmentation

III Group - 3 patients (6 eyes) – 360˚ anterior chamber pigmentation

During 1-year follow-up after selective laser trabeculoplasty in primary open-angle glaucoma patients: IOP stabilization was observed in 100% of patients with 90˚ anterior chamber angle pigmentation and in 72% of patients with 180˚ anterior chamber angle pigmentation. In 28% (5 patients - 10 eyes) repeated SLT was performed.IOP stabilization was not observed in patients with 360˚ anterior chamber angle pigmentation. After 6 months, 100% of cases underwent repeated SLT. Since IOP was not stable after 1 year (30 mm Hg), all patients of this group underwent antiglaucoma surgery.

Conclusions
During the conducted scientific research, the high effectiveness of SLT was found in 100% cases of 90˚ pigmentation of the anterior chamber angle and in 72% cases of 180˚ pigmentation.According to the study, it should be noted that there is no clinical significance of performing SLT during 360˚ pigmentation of the anterior chamber. Other types of antiglaucoma treatment are recommended for these patients.

P-270

CLINICAL OUTCOMES OF SELECTIVE LASER TRABECULOPLASTY IN OPEN ANGLE GLAUCOMA PATIENTS ALREADY UNDER FULL ANTI-GLAUCOMA MEDICATION

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Purpose
To investigate the clinical outcomes of selective laser trabeculoplasty (SLT) in open angle glaucoma (OAG) patients already under full anti-glaucoma medication and the association between angle structure and clinical outcomes of SLT.

Methods
In this retrospective study, we enrolled patients who were diagnosed as OAG and already under full anti-glaucoma medication. We evaluate the clinical outcomes at 6 months and 12 months after SLT, including intraocular pressure (IOP) reduction, reduction of anti-glaucoma medication, incidence of post-SLT IOP spikes (> 5 mmHg), repeated SLT requirement, and surgical requirement. SLT treatment success is defined as achieving IOP reduction > 20% or anti-glaucoma medication reduction more than 1 type. The angle structural details were also documented, including Shaffer grading, trabecular meshwork pigmentation, iris configuration, and iris insertion. The association between angle structure and clinical outcomes was also investigated.

Results
Fifty eyes from 34 patients were enrolled from a tertiary referral center. Major diagnosis of the eyes was primary open angle glaucoma (n= 34 eyes, 68%), followed by uveitic glaucoma (n= 5, 10%), normal tension glaucoma (n=4 eyes, 8%), steroid responder (n=2, 4%), pigmentary glaucoma (n=2, 4%), trauma (n=2, 4%), and NVG (n=1, 2%). As for the SLT treatment outcomes at 6 months, 28 eyes (56%) achieved SLT success, by IOP reduction > 20% (n= 14, 28%) or by glaucoma medication reduction (n=16, 32%). As for the SLT treatment outcomes at 1 year, 24 eyes (48%) achieved SLT treatment success, by IOP reduction > 20% (n= 11, 22%) or by glaucoma medication reduction (n=15, 30%). Nineteen eyes (38%) encountered post-SLT IOP spike. Nine eyes (18%) received repeated SLT treatment within the first year, but 6 of them had once achieved SLT success and SLT was repeated for further IOP reduction. Five eyes (10%) still received glaucoma surgery within the first year after SLT. As for angle structure, convex iris configuration is associated with higher incidence of IOP spike (p=0.005) and angle with scattered peripheral anterior synechia is associated with lower SLT successful rate (p=0.03).

Conclusions
SLT may be an alternative treatment for OAG patients already under full anti-glaucoma medication. Within the first year, nearly half of the eyes can benefit from SLT either by IOP reduction or anti-glaucoma medication reduction.

P-271

ACUTE PRIMARY ANGLE CLOSURE ATTACK; LONG TERM CLINICAL OUTCOMES OVER A 3 YEAR PERIOD

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Purpose
To study long term outcomes of acute primary angle closure attack (APAC).

Methods
Retrospective study of 31 subjects with APAC & followed up for 3 yrs. IOP, BCVA, Number of AGMs were recorded at presentation & subsequent visits. Time from presentation to Laser Iridotomy was recorded. Number of patients with uncontrolled IOP after LPI &requiring intervention was noted.

Results
Primary angle closure glaucoma forms almost half of all adult primary glaucoma's seen in a hospital setting in India. Risk of primary angle-closure glaucoma is high among women, elderly and hyperopic group. Total 31 patients (24 Females (77.4%) and 7 Males (22.6%)) with mean age of 55.81±9.0 included in study. Mean IOP at presentation was 51.06±13.7mmHg, 17.35±10.9mmHg at 6months, 16.19±7.6mmHg at 1year &15.45±5.4mmHg at 3 years (P<0.001). Mean BCVA was logMAR 1.0 at presentation,0.30 at 6months,0.18 at 1yr &0.18 at 3 years (P<0.001).Mean number of AGM were 4.65±1.2 at presentation, 1.06±1.2 at 6months,0.94±1.1 at 1year & 0.94±1 at 3years (P<0.001). 74.2% patients underwent LPI immediately out of which 29% did not require surgery. 26 patients (83.9%) developed progression of cataract while remaining 5 (16.1%) had stable lens. 71% required surgery out of which 63.6% underwent Trabeculectomy, 31.8% Phacoemulsification and 4.5% Combined Phacoemulsification-Trabeculectomy surgery. Mean IOP in fellow eye was 16.47±9.3mmHg. Fellow eyes of 10 patients required cataract extraction (9.7%) and anti-glaucoma medications (22.6%) for controlling intraocular pressure.

Conclusions
Early treatment is designed to control intraocular pressure while monitoring changes in anterior chamber angle and optic nerve head. Ideally treatment begins with pressure lowering agents. Early surgical intervention holds promising outcomes & LPI is effective in controlling IOP in fellow eye

P-273

ARE OCULAR HYPOTENSIVE DRUGS ESSENTIAL TO PREVENT INTRAOCULAR SPIKES FOLLOWING ANTERIOR SEGMENT LASER PROCEDURES?

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Purpose
Apraclonidine was a standard drug used to prevent Intraocular pressure (IOP) spikes following anterior segment laser procedures. This drug was withdrawan from Indian market due to problem of tachyphylaxis. In an effort to find out next best agent, a randomized trial was done. However, the results suggested that ocular hypotensive drugs were not required in routine patients undergoing anetrior segment laser procedures viz. Nd:YAG laser capsulotomy (YLC) and Nd:YAG laser iridotomy (YLPI). This prompted us to undertake further studies to confirm our findings in different energy levels and among different kind of patients.

Methods
Four sequential studies were performed to understand changes in Intraocular pressure in early post laser period following anterior segmant laser procedures. The efficacy of all ocular hypotensive groups of medicines, available at that time, except prostaglanding analogues, were studied.

Results
All the studies showed little or insignificant rise of Intraocular pressure following Laser iridotomy (YLPI) or capsulotomy (YLC) performed using Nd:YAG laser (Ziess laser model VISULAS II plus), unless very high energy was used. Superiority of any drug over others in preventing IOP rise could not be established. The amount of IOP rise as well as duration of raised IOP, whenever happened, following YAG laser anterior segment procedures, was directly proportional to the amount of energy used.

Conclusions
No ocular hypotensive drugs are required following anterior segment laser procedures, unless very high energy is delivered or unless patient had high IOP before laser procedure is performed or unless, probably, patient had pre-existing advanced glaucoma. Although IOP rise following all anterior segment laser procedures is low, YLC, in general, causes higher rise of IOP compared to YLPI. The amount of rise of IOP, if any, following anterior segment laser procedures is dependent on the amount of energy delivered.

P-274
LASER PERIPHERAL IRIDOPLASTY – TO PERFORM OR NOT TO PERFORM?

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Purpose
Iris plateu syndrome is a rare condition, and iris plateu configuration is often diagnosed and recognized only after IOT (intraocular pressure) elevation after peripheral iridotomy. We present case series of 8 patients with iris plateu configuration confirmed by gonioscopy and UBM (ultrasound biomicroscopy), with different treatment approaches and results.

When Argon laser or Iris diode laser are not available, Trion laser has so far showed to be safe and efficient alternative for peripheral iridoplasty. There are no strict guidelines when to perform the procedure and when to monitor the patient closely and we suggest it is justified to perform laser iridoplasty prior to peripheral iridotomy in confirmed cases of iris plateau configuration + elevated IOT and/or visual field/OCT (optical coherent tomography) changes.

Methods
Three patients, in whom iris plateau configuration was diagnosed by gonioscopy and confirmed by UBM, were so far treated by peripheral iridoplasty. All of them had either high IOT values or visual field/OCT changes. One patient (one eye) was previously treated by peripheral iridotomy for angle closure. The used parameters were: 532 nm wawelength, 550 ms exposition, 500 µm size spot and 240-280 mW strength.

Results
Laser iridoplasty was performed in 3 patients, with excellent IOT lowering results both one week and one month and 3 months post iridoplasty and so far no complications were observed. Four patients had normal IOT values at first presentation with normal visual field and OCT results and are only being monitored. In the last patient, trabeculectomy was performed (due to eye comorbodities), also with excellent postoperative IOT results.

Conclusions
Trion laser has shown to be safe and effective for peripheral iridoplasty in iris plateau configuration. The amount of energy used was lower than reported for Argon laser and Iris diode laser. A study on efficiency and safety outcomes is to be conducted. We wish to discuss if it is necessary to perform laser iridotomy prior to iridoplasty in confirmed cases of iris plateu configuration if it is known it could result in IOT elevation that could cause irreversible damage to the optical nerve fibres.

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P-275
CYCLO G6 LASER AND GLAUCOMA

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Purpose
Glaucoma is a condition of increased intraocular pressure in the eye that may progress to a loss of vision because of damaging of retinal ganglion cells and axons within the optic nerve. If medical management cannot be achieved successfully, additional procedures like laser trabeculoplasty, trabeculectomy can be used to establish better control of IOP. Micropulse TS-CPC employs a fractionated continuous wave diode laser which targets melanin in a non-destructive way in ciliary body tissues, the tissue responsible for production of aqueous humor.

Methods
Micropulse TS-CPC was performed on 52 eyes in the same way. Eye pressure before intervention was from 26 to 35mmHg. Prepared with local anesthesia and laser treatment was applied over the 360 degrees of the eye, sparing the three and nine o'clock position. Eye pressure was monitored for 6 months. The data were statistically processed and the results presented using the Microsoft Excel program.

Results
The obtained results indicate a significant reduction of intraocular pressure by >25% already at the first control without added postoperative antiglaucoma therapy in relation to the preoperative value with full antiglaucoma therapy. At subsequent controls, the intraocular pressure values were stabilized at an average value of 14 mmHg with a standard deviation of +/-3 mmHg with reduced antiglaucoma therapy.

Conclusions
Micropulse transscleral laser is an effective and safe treatment strategy for eyes that have not undergone glaucoma surgery previously. Success was defined by achieving a final intraocular pressure (IOP) between 10 and 20 mm Hg and an IOP reduction of >25%.

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P-276

URRETS-ZAVALIA SYNDROME FOLLOWING IMPLANTABLE COLLAMER LENS SURGERY TREATED WITH SELECTIVE LASER TRABECULOPLASTY: A CASE REPORT

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Purpose

The objective of this case report is to present a case Uretts-Zavalia Syndrome following Implantable Collamer Lens surgery in a young adult patient

Methods

case report

Results

This is a case of a 32 year old Filipino female who underwent same-day bilateral phakic, toric, implantable collamer lens surgery for high myopia with astigmatism on both eyes and developed Uretts-Zavalia Syndrome on both eyes 1 month post-operatively. On examination, a fixed dilated pupil was noted, along with elevated intraocular pressure and intense anterior chamber inflammatory reaction. Inflammation and intraocular pressure were uncontrolled with topical medications, thus warranting explantation of the implantable collamer lens. Post-explantation, intraocular pressure was still persistently elevated even with anti-glaucoma medications hence selective laser trabeculoplasty was offered, which resulted in successful IOP control.

Conclusions

Our case emphasized the importance of a high index of suspicion for Uretts-Zavalia Syndrome as a possible complication of implantable collamer lens surgery, with close IOP monitoring and prompt management in order to prevent irreversible morbidity.

P-278

CLINICAL OUTCOMES OF MICROPULSE TRANSSCLERAL LASER THERAPY WITH REVISED P3 DELIVERY DEVICE

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Purpose
To evaluate the safety and effectiveness of MicroPulse Transscleral Laser Therapy (MP-TLT) using different treatment times and sweep velocities in adults with uncontrolled primary open angle glaucoma (POAG).

Methods
Sixty eyes were prospectively enrolled to undergo MP-TLT with the revised MicroPulse P3 Delivery Device. Eyes were randomly assigned to receive 240 seconds of treatment with 8 sweeps (G1; n=20), 300 seconds of treatment with 10 sweeps (G2; n=21), or 200 seconds of treatment with 10 sweeps (G3; n=19). Changes in pre-operative ciliary body and angle structure were evaluated via ultrasound biomicroscopy (UBM) at 3 months. Changes from baseline in Humphrey visual field mean defects (HVF-MD) were measured at 6 months. Intraocular pressure (IOP), best corrected visual acuity (BCVA), and the need for glaucoma medications were monitored for up to 9 months and statistical significance was assessed using paired t-tests. All eyes achieving an IOP ≤ 21 mmHg and/or reduction of ≥ 20% from baseline on the same or fewer glaucoma medications at last follow-up with no secondary glaucoma re-interventions were considered a success. Eyes which did not meet these criteria were considered a failure.

Results
At last mean follow-up, success was achieved in 100%, 90.5%, and 94.7% of eyes in subgroups G1, G2, and G3, respectively. Mean IOP was significantly reduced ($p<0.001$) by 44% (G1), 51% (G2), and 45% (G3) and medication burdens were significantly reduced by 16% (G1), 13% (G2), and 32% (G3). BCVA was maintained in all eyes. Observed complications included conjunctivitis due to rebound surface inflammation (n=2), worsening of a previously existing cystoid macular edema (n=1), and a steroid response (n=2), all of which resolved by month 3. One eye (G3) required a surgical reintervention following an IOP spike. No changes in ciliary body and angle structure were seen at month 3, and no significant changes in HVF-MD were observed at month 6.

Conclusions
There exists a lack of peer-reviewed publications on the safety and efficacy of the newly designed MicroPulse P3 Delivery Device. Our study indicates that MP-TLT with the revised device is safe and effective in the treatment of uncontrolled POAG, with longer treatment times demonstrating a comparably favorable safety profile and greater IOP-lowering efficacy. We observed that eyes receiving 300 seconds of treatment with 10 sweeps experienced the greatest IOP reductions.

P-279

EFFECT OF MICROPULSE TRANSSCLERAL LASER THERAPY ON CORNEAL ENDOTHELIAL CELL AND CENTRAL CORNEAL THICKNESS

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Purpose

To evaluate the effect of micropulse transscleral laser therapy (MPTLT) on corneal endothelial cell count (ECC) and central corneal thickness (CCT).

Methods

This prospective observational study included glaucoma patients who underwent MPTLT for uncontrolled glaucoma between 2019-2022. Patients with corneal pathologies or history of corneal surgery were excluded from the study. The MPTLT (Cyclo G6® Laser with MicroPulse P3® probe, IRIDEX Corporation, Mountain View, CA) was performed using power of 2000 mW, duty cycle of 31.3%, and duration of 180-280 seconds. Endothelial parameters (including ECC, average area, standard variation, coefficient of variation, hexagonal cells) and CCT were measured at baseline and at post-operative days (POD) 7, 30, and 90. The changes in corneal parameters were assessed using linear mixed-effects regression models.

Results

A total of 51 eyes from 42 subjects were included in the study. The mean age was 57±16 years. Diagnoses were comprised of 18 (35%) secondary glaucoma, 15 (29%) primary open angle glaucoma, 10 (20%) primary angle closure glaucoma, and 8 (16%) childhood glaucoma. The median ECC at baseline, POD 7, 30 and 90 were 2085, 1787, 1947, 1985 cells/mm2, respectively. The average ECC loss was 3% at POD 90. There were no statistically significant changes in all endothelial parameters compared to baseline across all visits (all $p > 0.05$). The median CCT at baseline, POD 7, 30 and 90 were 546, 568, 548 and 538 µm, respectively. The CCT increased significantly at POD 7 ($p < 0.001$), but there were no significant differences between the baseline and POD 30 ($p = 0.46$) and POD 90 ($p = 0.90$).

Conclusions

A transient increase in CCT was observed at the first week after MPTLT, but there no significant changes in the corneal endothelium at 3 months post-operation. MPTLT appears to be safe in terms of its effect on cornea thickness and endothelial parameters.

P-280

PHACOEMULSIFICATION COMBINED WITH ENDOSCOPIC CYCLOPHOTOCOAGULATION VS PHACOEMULSIFICATION ALONE IN PRIMARY ANGLE CLOSURE GLAUCOMA - A RCT

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Purpose

Phacoemulsification combined with endoscopic cyclophotocoagulation vs phacoemulsification alone in primary angle closure glaucoma - a randomised control trial

Methods

A prospective randomised clinical trial in which 30 PACG patients (moderate to advanced PACG) uncontrolled on maximal hypotensive therapy, meeting all inclusion criteria were recruited. Patients were randomized into 2 groups and underwent phaco ECP - Group 1 or Phaco alone - Group 2. The pre-operative and post-operative intraocular pressure (IOP), angle parameters and number of medications were recorded at 3 months and 6 months. Complete success (primary outcome) was defined as IOP≤18 mmHg with/ without any additional medications at the last follow up.

Results

The average age of patients was 55.72±11.50 years and 59.08±9.43 years in Group 1&2 respectively(p=0.18).

Axial length in group 1 was 22.68±0.68mm and group 2 was 22.31±0.79mm (p=0.04), ACD in group 1 was 2.15±0.36mm and group 2 was 2.35±0.33mm (p=0.02). Lens thickness in group 1 was 4.63±0.37mm and group 2 was 4.56±0.44mm (p=0.4) and CCT in group 1 was 509.48±32.9um and group 2 was 473.17±179.68um (p=0.4). Lens vault in group 1 was 0.68±0.23um and group2 was 0.65±0.29um(p=0.7).

The highest baseline IOP in group 1 was 28.52±6.82mmhg and in group 2 was 28.32±7.29mmhg(p=0.9). The mean preoperative IOP was 18.72±6.82 mmHg and 18.3±8.7mmHg, which reduced postoperatively IOP to 13.6±3.37mmHg and 14.29±2.03 at 3 month and to 14.33±2.291 and 16.33±4.04 at 6 months in group1 and 2 respectively. There was a reduction in the number of ocular hypotensive medications post-operatively – group1 (3.33±1.14 to 2±1; p=0.024) and group 2 (3.666±0.924 to 1.88±0.891; p=0.007) respectively at 6 months. Widening of the angle was noted at 3 months and 6 months with an increase as compared to baseline values in AOD500, TIA500 and TISA500. Group 1 showed a significantly greater increase in nasal angle parameters compared to group 2.

Post operative inflammation (AC cells 2 to 3+) was noted in the Phaco-ECP group vs Phaco group (AC cells 1to 2+) which resolved in 2-3 weeks. No other major complication was noted.

Conclusions

Both phaco and phaco-ECP are associated with a significant reduction in IOP along with a noteworthy widening of the anterior chamber angle parameters. At 6mths, the reduction in IOP was more in the phaco-ECP grp

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PLB-013

DYNAMICS OF THE MOLECULAR MARKER OF INTERCELLULAR ADHESION (ICAM-1) IN PATIENTS WITH NEOVASCULAR GLAUCOMA AFTER TRANSSCLERAL LASER CYCLOCOAGULATION

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Purpose

The aim is to analyze the dynamics of the peripheral blood inflammatory biomarker in patients with painful neovascular glaucoma secondary to proliferative diabetic retinopathy after transscleral laser cyclocoagulation (LCC) and long-term local anti-inflammatory therapy.

Methods

51 patients (51 eyes) with painful CVH were examined. Men 25 (54%). Age 63.1±11.67 years. The patients were divided into 2 groups: group 1 - 22 people (22 eyes) and group 2 - 29 (29 eyes). Visual acuity (VA) in group 1 was 0.02±0.02, in group 2 it was 0.03±0.03. IOP in groups 1 and 2 - 37.3±4.07 and 39.3±5.57 mm Hg. with maximum antihypertensive therapy (2.04±0.76 drugs). Pain was present in all patients. The LCC was performed by a Nd laser with λ = 1064 nm, with an energy of 1.1 J, according to the standard technique. To reduce the activity of cyclooxygenase and inhibition of prostaglandin synthesis, a course of non-steroidal anti-inflammatory drugs was prescribed - topical ketorolac: in group 1 for 3 months, in group 2 for 2 weeks.

All patients were examined before, after and after 3 months of treatment. In group 1, the molecular marker of lymphocyte activation ICAM-1 (CD54) was additionally studied - the absolute and relative levels using blood monoclonal antibodies by the immunocytochemical method.

Results

After a course of LCC, the pain syndrome was stopped in 100% of patients. The level of IOP after a course of treatment significantly decreased by 30% and 32% of the initial level in groups 1 and 2, respectively. After 3 months in group 1, the number of patients with IOP<24 mm Hg. was 2.4 times more, and with IOP> 30 mm Hg. 2.3 times less than in group 2. BCVA after 3 months increased by an average of 0.02 (11/22) and 0.01 (10/29) in groups 1 and 2, respectively. Given the high IOP and preserved visual functions in 5 eyes (23%) of the 1st group and in 7 eyes (24%) of the 2nd group, the 2nd course of LCC was performed.

After 3 months in group 1, against the background of local anti-inflammatory therapy, the level of the absolute index of the inflammatory biomarker CD54 in peripheral blood decreased by 44% to 338.8±175.88 cells/ml and the relative index by 23% to 22.7±3.04% (however, they remained 2 times and 1.1 times higher than the normal values, respectively).

Conclusions

A significant and long-term decrease in IOP in patients with secondary neovascular glaucoma secondary to proliferative diabetic retinopathy depends on a decrease in the level of the inflammatory biomarker ICAM-1 in the peripheral blood, against the background of local anti-inflammatory therapy with ketorolac (3 months) after transcleral laser cyclocoagulation.

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PLB-014

LONG TERM EFFECTIVENESS OF REPEATED LOW POWER SELECTIVE LASER TRABECULOPLASTY IN PATIENTS WITH PRIOR TRABECULECTOMY

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Purpose

Trabeculectomy is the most commonly utilised glaucoma surgery but even with modern techniques and use of anti-metabolites, fails in 28% of patients at 3 years. Consequently, thousands of patients are evaluated each year for further incisional surgery or cyclodestructive procedures, which incur significant risk, cost and reduced quality of life.

Selective laser trabeculoplasty (SLT) has increasing evidence of efficacy similar to that of anti-hypertensive drops and is now the recommended first line treatment for all patients with ocular hypertension and primary open angle glaucoma in the United kingdom. Furthermore, it is shown to be effective as adjuvant therapy where IOP control with drops alone is inadequate.

However, the use of Selective laser trabeculectomy (SLT) following trabeculectomy has been studied in limited detail by a handful of authors, who have shown some promising results. In all of these studies, patient numbers are small, maximum follow-up was limited to one year and few evaluated the use of repeat SLT.

This study investigated the use of repeat SLT, with or without glaucoma medications, in the management late trabeculectomy failure.

Methods

A retrospective cohort of eyes with previous trabeculectomy that underwent 360˚ SLT at a single institution by a single consultant operator from 2014-20. All types of glaucoma were included as long as they had minimum 3 years of follow up. Additional glaucoma drops could be started in addition to the SLT. Success was defined as >20% drop in IOP from pre-SLT baseline or IOP<15mmHg. Subgroup analysis was performed in those patients who did not require additional glaucoma drops during the course of follow up.

This study was conducted in accordance with the Declaration of Helsinki, with ethical evaluation and approval from the Research and Development Board of North Middlesex University Hospital, UK.

Results

46 eyes of 36 patients were included. 80% of the patients were Asian or Afrocarribean ethnicity, with 20% Caucasian. Median number of SLT sessions was 3 (range 1-5). At 3 years, 42% of patients had IOP <15mmHg, and 64% obtained IOP reduction >20%.

In the subgroup analysis of 25 eyes (58%) who did not start additional drops, 48% of patients maintained IOP <15mmHg and 64% obtained IOP reduction >20%.

Conclusions

We show that SLT in a single or repeated fashion is efficacious in eyes with prior trabeculectomy surgery in the long term and can help delay the need for additional drops or further surgery for many years. Considering SLT is a painless, non invasive treatment with minimal side effects and an extremely low side effect profile, we propose it to be an effective primary strategy in patients with failing or failed trabeculectomy.

PLB-015
CORNEAL EFFECTS OF SELECTIVE LASER TRABECULOPLASTY

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Purpose
To evaluate the qualitative and quantitative corneal changes after selective laser trabeculoplasty (SLT).

Methods
This prospective cohort study with short-term follow-up included patients over 18 years old, diagnosed with primary or secondary open-angle glaucoma or OHT, who received SLT to 360° of the trabecular meshwork. Slit-lamp examination and specular microscopy were performed before the procedure and 1 hour, 24 hours, and 1 month after SLT.

Results
44 eyes with a mean age of 63,86±13,89 years old were evaluated. Most of them presented OHT (41%) and pseudoexfoliative glaucoma (32%). A significant association between SLT and the presence of epithelial keratitis, corneal edema and endothelial dark spots was observed (p <0,05). There was no statistically difference found between the type of treated pathology and the presence of keratitis (p 0,32), corneal edema (p 0,24) or dark endothelial zones (p 0,53) 1 hour after SLT. All corneal changes returned to the baseline 1 month after the procedure. The endothelial cells count and the percentage of hexagonal cells remained stable in all the controls. A significant decrease in IOP was demonstrated after SLT and in the use of topical hypotensive medication (p <0,05).

Conclusions
SLT is an effective treatment with transient and mild corneal effects.

PLB-016
IMPROVEMENT OF THE QUALITY OF LIFE OF PATIENTS WITH GLAUCOMA OPTIC NEUROPATHY

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Purpose
The aim is to improve the quality of life of patients with glaucomatous optic neuropathy by lowering intraocular pressure to the target level with comprehensive neuroprotection.

Methods
22 patients (24 eyes) with glaucomatous optic neuropathy (GON) are under observation, 12 of them are men (54%). Age 55 - 67 years.

The course of treatment - 10 daily sessions of photobiomodulation (λ=650 nm, W=0.4 mW/cm^2, t=5 min per papillomacular bundle and DZN), then the recommended vitamin-antioxidant complex of the AREDS formula enhanced with ω-3/resveratrol and D3 in 6 months – 2 capsules/day.

Examination of patients before, after and after 6 months of treatment: visometry, tonometry, computer perimetry, ophthalmoscopy, functional examination of the visual analyzer (VA): electrical sensitivity threshold according to phosphene, rheoophthalmography (ROG), OCT, questionnaire NEI VFQ- 25.

Results
The course of treatment improved the BCVA indicator by 14% (BCVA increased by 0,05-0,1 in 12 eyes and by 0,15-0,2 in 9 eyes). After 6 months BCVA remained unchanged. In the study against the background of instillation of latanoprost without preservatives, in the Protriaxin® matrix, we recorded a significant decrease in IOP from the initial 23,2 SD 3,25 mm Hg. to the target level of 17,4 SD 1,54 mm Hg. after 6 months (by 33% of the initial level). In 6 months, a significant improvement in the electrical sensitivity of the visual analyzer by 14% (from 87,4 to 75,2 μA).

The indicator of volume intraocular blood circulation (RQ) according to the ROG of treatment was 2,2 SD 0,5 ‰, which is 31% lower than the age norm of these patients (3,2‰). After 6 months of comprehensive neuroprotection, there was a significant improvement in RQ by 14%.

According to the variance analysis, a significant increase in the overall final assessment of the quality of life after 6 months by 11% to 78,2 was noted; SD 8,5 points.

Conclusions
Reduction of intraocular pressure to the target level using preservative-free latanoprost in the Protriaxin® matrix and complex neuroprotection: photobiomodulation of DZN with a papillomacular beam with vitamin-antioxidant complex of the AREDS formula enhanced with ω-3/resveratrol and D3 in 6 months allowed improving the quality of life of patients with glaucomatous optic neuropathy.

Medical Treatment & Non-Incisional Surgery

P-282

INVESTIGATOR-INITIATED CLINICAL STUDIES TO ASSESS SAFETY, TOLERABILITY, AND OCULAR HYPOTENSIVE EFFICACY OF QLS-111, A NOVEL KATP CHANNEL OPENER

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Purpose

To assess safety, tolerability and efficacy of 3 concentrations and dosing regimen of QLS-111, a novel ATP-sensitive potassium channel opener as a topical ophthalmic intraocular pressure (IOP) lowering agent.

Methods

An investigator-initiated randomized, masked, single center study (Study 1) was performed with 10 heathy subjects dosed once daily QAM in both eyes with 0.5 or 5.0 mM QLS-111 for 14 days. A second investigator-initiated randomized, placebo-controlled, masked, single center study (Study 2) was performed with 21 healthy subjects dosed with 0.5 or 2.5 mM QLS-111, or vehicle QAM for 7 days then twice daily (BID) for 7 additional days. In both studies, subjects were screened on day 0 and followed over 14 days with visits on day 1 (initiation of dosing), day 7, and day 14 (end of study). Safety and tolerability were assessed by adverse events (AE), vital signs, and ophthalmic exams including best corrected visual acuity (BCVA), slit lamp, and ophthalmoscopy. On days 1, 7 and 14, subjects' IOP was measured at 8 AM, Noon and 4 PM by Goldmann (GAT).

Results

Mean age of subjects in both studies was 56.9 years with 73% women and 27% men. Subjects were white and of Hispanic or Latino ethnicity. No significant ocular or systemic AEs were reported. No changes on slit lamp exam and no hyperemia were observed in the 0.5 mM QLS-111 or vehicle cohorts. In study 1 and 2, mild and transient hyperemia following 8 AM dosing occurred in approximately 50% of subjects receiving 2.5 and 5.0 mM QLS-111. Mean baseline diurnal IOP for study 1 was 19.1 mmHg (0.5 mM) and 19.4 mmHg (5.0 mM), and in study 2 was 16.7 mmHg (0.5 mM), 17.0 mmHg (2.5 mM), and 17.2 mmHg (vehicle). In study 1, mean diurnal IOP lowering was -5.0 mmHg (26% decrease) with 0.5 mM and -4.8 mmHg (25% decrease) with 5.0 mM QLS-111 (Table 1). In study 2, mean diurnal IOP lowering was -3.5 mmHg (21% decrease) with 0.5 mM, -2.6 mmHg (15% decrease) with 2.5 mM, and -1.5 mmHg (9% decrease) with vehicle following BID dosing (Figure 1). In study 2, 2.5 mM QLS-111 significantly lowered IOP at 4 PM on Day 7 (QAM) and Day 14 (BID) while 0.5 mM was significant at Noon and at 4 PM (BID) on Day 14 compared to vehicle.

Image

TABLE 1. Study 1: Mean IOP lowering from baseline (mmHg) for QLS-111 (n=10)

	IOP Method	Baseline	Day 1		Day 7			Day 14		
			Noon	4 PM	8 AM	Noon	4 PM	8 AM	Noon	4 PM
5.0 mM	iCare	19.4	-2.86 (-14%)	-3.99 (-20%)	-5.47 (-28%)	-5.64 (-29%)	-5.14 (-26%)	-2.91 (-14%)	-4.79 (-25%)	-4.73 (-24%)
	Goldmann	19.4	-2.90 (-14%)	-4.00 (-21%)	-5.70 (-29%)	-5.40 (-28%)	-5.70 (-29%)	-3.60 (-18%)	-5.30 (-27%)	-5.50 (-28%)
0.5 mM	iCare	19.3	-3.84 (-19%)	-4.65 (-23%)	-4.48 (-22%)	-5.06 (-24%)	-5.02 (-24%)	-4.48 (-22%)	-5.39 (-27%)	-5.03 (-25%)
	Goldmann	19.1	-3.84 (-19%)	-5.67 (-29%)	-4.48 (-26%)	-5.06 (-27%)	-5.02 (-27%)	-4.48 (-22%)	-5.39 (-29%)	-5.03 (-27%)

IOP: intraocular pressure; mM: millimolar; mmHg: millimeters Mercury

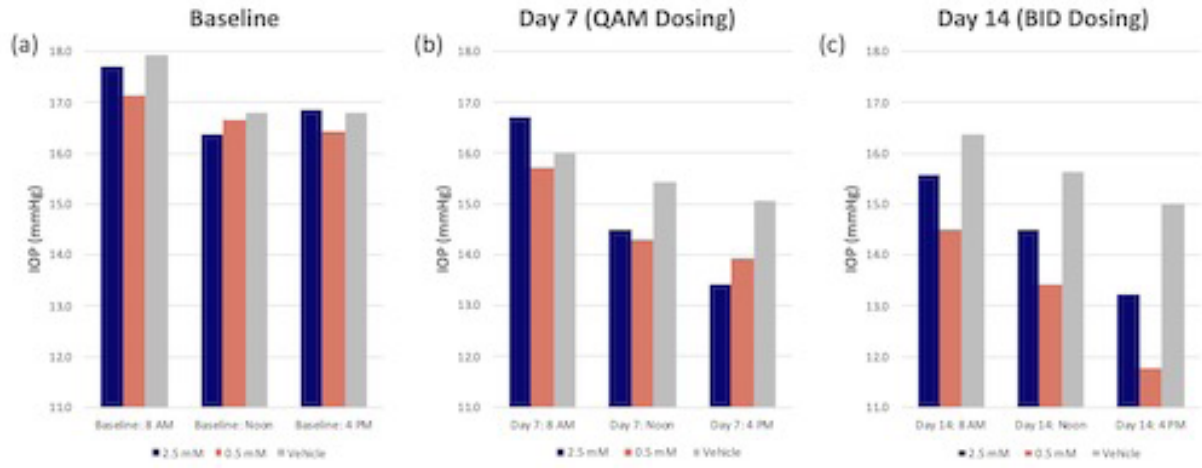


FIG. 1. IOP for QLS-111 (2.5 mM and 0.5 mM) and vehicle control in healthy subjects

(a) Baseline IOP (GAT) pre-dosing OU with QLS-111 or vehicle (n = 7 per arm [14 eyes]); **(b)** IOP measured on Day 7 following QAM dosing for 7 days with QLS-111 or vehicle (n = 7 per arm [14 eyes]); and **(c)** IOP measured on Day 14 following BID dosing for 7 days with QLS-111 or vehicle (n = 7 per arm [14 eyes]).
BID: twice daily dosing; GAT: Goldmann applanation tonometry; IOP: intraocular pressure; mM: millimolar; mmHg: millimeters of mercury; OU: both eyes; QAM: once daily dosing in the morning.

Conclusions

QLS-111 is a well-tolerated efficacious IOP lowering agent in healthy normotensive subjects. With its unique and novel mechanism of action, QLS-111 should be considered for further clinical development.

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P-283

OMIDENEPAG ISOPROPYL (OMDI) 0.002% AND PRESERVATIVE-FREE OMDI (DE-117B) BIOEQUIVALENCE IN PRIMARY OPEN-ANGLE GLAUCOMA OR OCULAR HYPERTENSION (DAISY)

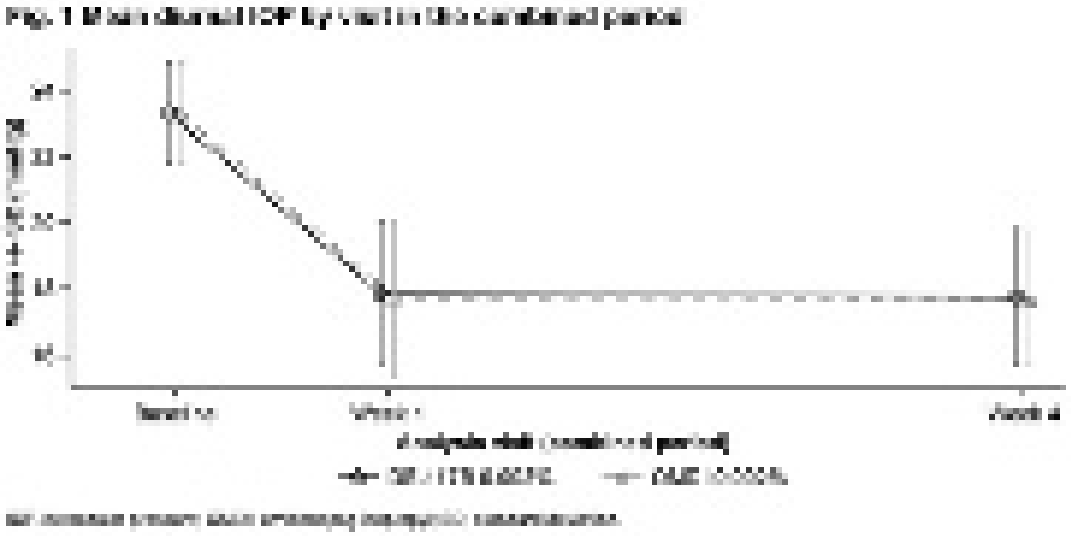
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Purpose
To evaluate the bioequivalence of DE-117B (preservative-free formulation of omidenepag isopropyl [OMDI] 0.002%) and OMDI 0.002% ophthalmic solutions for intraocular pressure (IOP)-lowering effects, and safety in patients with primary open-angle glaucoma (POAG) or ocular hypertension (OHT).

Methods
This was a phase 3, randomized, evaluator-masked, multicenter, crossover study. Following a washout period of up to 4 weeks, patients were randomized (1:1) to either DE-117B or OMDI and treated with one drop once-daily for 4 weeks, followed by a 4-week washout period and crossover to the second 4-week treatment period. Mean diurnal IOP was the average of three timepoints (09:00, 13:00, and 17:00). The primary endpoint was mean diurnal IOP in the study eye at week 4 (visits 4 and 7). Secondary endpoints included mean diurnal IOP in the study eye at week 1 (visits 3 and 6) and change from baseline in mean diurnal IOP at each visit. Bioequivalence was defined as the difference in least squares (LS) mean value using a linear mixed effect model on the full analysis set between the groups at week 4, with a 95% confidence interval (CI) between −1.5 and 1.5.

Results
A total of 74 patients (DE-117B/OMDI, n=38; OMDI/DE-117B, n=36) with a mean age of 60.6 years were enrolled, and a primary diagnosis of POAG (59.5%, n=44) or OHT (40.5%, n=30) in the study eye at baseline. The mean (standard deviation [SD]) diurnal IOP at week 4 (summary statistics) was 17.76 (2.049) mmHg in the DE-117B group vs 17.71 (2.005) mmHg in the OMDI group (Fig 1). The LS mean (standard error) intergroup difference at week 4 (linear mixed model) was −0.02 (0.181) mmHg (95% CI: −0.377 to 0.347). Mean (SD) change from baseline in diurnal IOP in summary statistics for DE-117B vs OMDI was −5.45 (2.250) mmHg and −5.55 (2.196) mmHg at week 1 and −5.55 (2.067) mmHg and −5.58 (1.931) mmHg at week 4, respectively. The incidence of adverse events (AEs) was similar between groups, with 43.8% (32/73) and 45.9% (34/74) of patients experiencing an AE in the DE-117B and OMDI groups, respectively. The most frequently reported AE in both groups was conjunctival hyperemia (34.2% [25/73] in the DE-117B group vs 35.1% [26/74] in the OMDI group). All ocular and non-ocular AEs were mild in severity.

Image



Conclusions

The prespecified bioequivalence threshold was met, with DE-117B showing similar levels of stable IOP-lowering effects and a similar safety profile compared with OMDI.

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P-284

THREE-YEAR RESULTS OF MINIMALLY INVASIVE DEVICE TRABEX+ IN PATIENTS WITH PRIMARY OPEN ANGLED GLAUCOMA

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Purpose
The aim of our prospective study is to present the three-year results of trabecular meshwork excision with the minimally invasive device TrabEx+ in patients with primary open-angle glaucoma (POAG).

Methods
Patients diagnosed with POAG resistant to pharmacological treatment and with visual fields defects were included. Clinical examination included slit-lamp biomicroscopy, Snellen best corrected visual acuity (BCVA), Goldmann applanation tonometry for IOP measurement and fundoscopy. All patients underwent as first non-medical treatment a trabecular meshwork excision with the use of TrabEx+.

Results
60 eyes of 49 patients with POAG (68±12 years, 29 females) were evaluated. Out of them 28 eyes were pseudophakic and 32 were phakic. IOP pressure was not different between the two groups (22±5 mmHg vs. 23±4 mmHg). The use of TrabEx+ resulted in decrease of IOP the first postoperative day (by 9.5 mmHg) and remained decreased after one month (by 8.1 mmHg), three months (by 7.9 mmHg), six months (by 7.8 mmHg), one year (by 7.6 mmHg), two years (by 7.3 mmHg) and three years (by 6.9 mmHg). In phakic eyes, the excisional goniotomy using TrabEx+ was not combined with cataract extraction, because cataract surgery alone may decrease IOP slightly and act as confusing factor. In addition, glaucoma medications were decreased significantly postoperatively (3.5 vs. 2.2, P<0.01). Furthermore, in only 11 out of 60 cases (18.3%) mild hemorrhage was noted as intraoperative complication and in 8 out of 60 cases (13.3%) hyphema was noted as postoperative complication. No severe intra- or postoperative complications were referred. After the second year of follow up, due to increase of IOP at pre-interventional levels, 2 out of 60 eyes (3.3%) underwent trabeculoplasty and in 4 out of 60 eyes (6.7%) the TM excision with the use of TrabEx+ was repeated.

Conclusions
The use of TrabEx+ is associated with a significant reduction of IOP pressure and medication and provides immediate and long term effective results. TrabEx+ minimally invasive surgery is a safe and reliable alternative that could be added in glaucoma treatment.

P-285

ASSOCIATION BETWEEN OCULAR SURFACE ASSESSMENT AND TOPICAL TREATMENT ADHERENCE IN PATIENTS WITH GLAUCOMA

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Purpose

To identify the association between ocular surface disease (OSD) and topical treatment adherence in patients with glaucoma

Methods

A 15-item questionnaire was developed and validated to assess self-reported medication adherence, side effects, and reasons for lack of adherence. It was applied to patients with ocular hypertension or any type of glaucoma diagnosis using topical glaucoma medication for at least 6 months. Patients underwent ocular surface assessment including: Ocular Surface Disease Index Test, Schirmer Test, Tear Break Up Time, conjunctival hyperemia, Oxford staining scheme, Meibomian Gland Dysfunction grading and meibography. The main outcomes were prevalence of OSD, association of number and type of medications with OSD, medical treatment adherence, and association between OSD and medication adherence.

Results

150 patients were included. Median age was 67.5 years. Primary open angle glaucoma was the most prevalent diagnosis. Prostaglandin analogues were the most frequently prescribed medication. Median of applied drops per day was 1.9. Half of the sample had received surgical treatment. 37% referred dry eye symptoms, and only 12% presented a score of moderate to severe OSDI punctuation. 96% showed OSD signs. On the self-reported medication adherence questionnaire, a median of 46 points were obtained (rank of 0-60). POAG diagnosis reported better adherence. Higher OSDI punctuation and longer TBUT correlated with better adherence but stayed as independent factors on a multivariate analysis.

Conclusions

After applying a self-reported adherence questionnaire to patients using topical medication for glaucoma and its association with OSD, we found no correlation with OSD and adherence to treatment, despite a high prevalence of OSD signs, only a longer TBUT correlated with better adherence.

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P-287

ANTI-VASCULAR ENDOTHELIAL GROWTH FACTOR FOR NEOVASCULAR GLAUCOMA: A COCHRANE SYSTEMATIC REVIEW

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Purpose
To assess the effectiveness of intraocular anti-VEGF medications, alone or with one or more type of conventional therapy, compared with no anti-VEGF medications for the treatment of Neovascular Glaucoma (NVG).

Methods
We searched CENTRAL, MEDLINE, Embase, PubMed, LILACS to October 2021. We did not use any date or language restrictions. We included RCTs of people treated with anti-VEGF medications for NVG. Two review authors independently assessed the literature search, extracted data and assessed risk of bias. The critical outcome was the proportion of participants who achieved control of IOP (IOP≤21 mmHg, with or without hypotensive medications), measured at 4 to 6 weeks after treatment. Secondary outcomes include: mean IOP, proportion of participants with improvement in visual acuity (VA), proportion of participants with complete regression of new iris vessels, at different time points. We used the I^2 value to assess the statistical heterogeneity.

Results
We included 5 RCTs (356 eyes of 353 participants, mean age 55 years or older). Two RCTs compared bevacizumab combined with Ahmed and panretinal photocoagulation (PRP) with Ahmed and PRP alone. One RCT compares aflibercept vs placebo at the first visit, followed by non-randomised treatment according to clinical findings after 1 week. Two RCTs randomised participants to PRP with and without ranibizumab.

The anti-VEGF group had a 1.3-fold higher chance of achieving control of IOP at 1 month(RR 1.32, 95% 1.10 to 1.59) than the non-anti-VEGF group. One RCT found achievement in control of IOP in the anti-VEGF group by 3-folds when compared with the non-anti-VEGF group at 1 year (RR 3.00; 95%CI:1.3 to 6.7). Another RCT found an inconclusive result at 1.5 years to 3 years. Anti-VEGFs were effective in reducing mean IOP by 6.37 mmHg (95% CI:-10.1 to -2.6) at 4 to 6 weeks. Anti-VEGFs may reduce mean IOP at 3 months, 6 months, 1 year and >1 year but such effects did not reach statistical significance.

Conclusions
Anti-VEGFs as an adjunct to conventional treatment could help reduce IOP in NVG in short term. However, such an effect seems to be non-significant in longer term. Currently available evidence regarding the short and long-term effectiveness and safety of anti-VEGFs in achieving control IOP, visual acuity, and complete regression of new iris vessels in NVG is insufficient. More research is needed to investigate the effect of these medications compared with, or in addition to, conventional surgical or medical treatment.

P-288

CROSSOVER TRIAL COMPARING FIXED-COMBINATIONS OF 0.1% BRIMONIDINE/TIMOLOL VS 1% DORZOLAMIDE/TIMOLOL AS ADJUNCTIVE THERAPIES TO PROSTAGLANDIN ANALOGUES

M Inatani

Purpose

This multicentre, randomized, comparative, and investigator-masked crossover clinical trial sought to compare the efficacy and tolerability of fixed-combinations 0.1% brimonidine/0.5% timolol (BTFC) versus 1% dorzolamide/0.5% timolol (DTFC) as adjunctive therapies to prostaglandin analogues.

Methods

A total of 110 patients with open-angle glaucoma or ocular hypertension previously treated with prostaglandin analogue monotherapy were randomized to receive either BTFC or DTFC as adjunctive therapy for eight weeks. These patients were then crossed over to the alternative treatment arm for another eight weeks. The intraocular pressure (IOP) reduction (primary outcome), adverse event occurrence, ocular discomfort after instillation, and patient preference (secondary outcomes) were recorded through patients' interviews.

Results

BTFC instillation for eight weeks resulted in IOP reduction by 3.55 mmHg, demonstrating non-inferiority to DTFC instillation (3.60 mmHg; P <0.0001, mixed-effects model). Although adverse effects were rare with both combinations, patients reported greater discomfort with DTFC than with BTFC instillation (P <0.0001). More patients preferred BTFC (P <0.0001) over DTFC, as the former caused minimal or no eye irritation.

Conclusions

As BTFC offers better tolerability than DTFC with comparable IOP reduction, we recommend it as an alternative in patients who experience ocular discomfort with DTFC-prostaglandin analogue combination therapy.

P-289
CLINICAL EFFICACY AND TOLERABILITY OF RHO KINASE INHIBITORS

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Purpose
There is scarcity of longitudinal data regarding the clinical impact of rho kinase inhibitors in different types of glaucoma patients. This multicentric study evaluated the efficacy and tolerability of ripasudil and netarsudil over at least 3 months in patients attending tertiary eye care centres in North India.

Methods
An evaluation of consecutive electronic medical records of all glaucoma patients from 3 tertiary eye care centres was done. All adult glaucoma patients, to whom ripasudil or netarsudil were prescribed, as an addition or switch to their existing glaucoma management, were included in the study. Non-compliant patients and those with concurrent use of any form of steroids were excluded. Intraocular pressure (IOP) was measured at 1 month and 3 months after adding or switching ripasudil and netarsudil. Subjective as well as objective evaluation of side effects was done.

Results
102 eyes of 102 glaucoma patients were evaluated for a period of 3 months. The mean age of the patients was 60.1 ± 16.8 years. 65(63.7%) and 37(36.3%) patients had primary and secondary glaucoma respectively. 46(44.7%) and 56(55.3%) received ripasudil and netarsudil respectively. The median IOP decreased significantly (p=0.001) from 24(17-28) mmHg to 17(14-20)mmHg after 3 months for ripasudil(percentage reduction in IOP of 23.63 ± 23.28 mmHg from baseline). Netarsudil also significantly decreased(p=0.001) median IOP from 21(18-25)mmHg to 16(14-20)mmHg after 3 months(percentage reduction in IOP of 21.65 ± 23.19 mmHg from baseline).There was no significant difference in IOP reduction between patients with primary (median:4, IQR 2-8) and secondary glaucoma(median:8, IQR 3.5-11) at 3 months and also between primary open angle glaucoma (PAOG) (median:4, IQR 0-7) and primary closed angle glaucoma (PACG) (median:6, IQR 2-9) at 3 months. Also, there was no significant difference in extent of IOP reduction when rhokinase inhibitors were added (median:5,IQR 2-9) in comparison to when they were switched (median:3.5, IQR 2-9). Side effects were seen in 13 % patients (11.43% in patients on ripasudil and 14.28% in patients on netarsudil) out of which , conjunctival hyperaemia was most common (10.4%), followed by irritation (1.3%) and subconjunctival haemorrhage (1.3%)

Conclusions
Both ripasudil and netarsudil caused significant and similar IOP reduction in patients with POAG, PACG and secondary glaucoma at 3 months. Both the drugs were relatively well tolerated with minimal side effects.

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P-290

EFFECT OF 365 BREATHING TECHNIQUE ON INTRAOCULAR PRESSURE AND AUTONOMIC FUNCTION IN GLAUCOMA PATIENTS: A RANDOMIZED CONTROL TRIAL

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Purpose

To study the effect of '365 breathing technique' on intraocular pressure and autonomic functions in patients with Primary open angle glaucoma (POAG)

Methods

Eighty patients of mild to moderate POAG were included in the study and randomized into two groups. Forty subjects in group 1 followed "365 breathing" routine (6 breath cycles per min, inspiration done for 5 seconds and expiration for 5 seconds; this process was repeated 3 times a day for 6 weeks) in addition to their pharmacological glaucoma treatment. Forty subjects in group 2 continued only with their pharmacological treatment of glaucoma. Intraocular pressure (IOP), serum cortisol, heart rate variability (frequency domain analysis) and deep breathing test (Delta heart rate & E:I ratio)were recorded at pre intervention and 6 weeks after intervention.

Results

Mean age and gender distribution was comparable in group 1 and 2 (52.3 ± 8.2 vs 52.1±7.2 years, p value- 0.74; 25% vs 30% females, p value-0.64). Mean IOP was comparable at baseline (group1- 18.09±2.80 mmHg, group2-18.80±1.78 mmHg, p value= 0.6) in both the groups. However, at 6 weeks follow up, mean IOP was significantly lower in group1 (16.09±2.24 mmHg) as compared to group 2 (18.38±1.58 mmHg) p =0.03. Though comparable at baseline (group 1-15.42±3.14 mcg/dl, group 2- 15.06±2.80 mcg/dl, p-value 0.45), serum cortisol was significantly lower in group 1 at 6 weeks (group 1-13.20±3.11 mcg/dl, group 2-14.95±2.60 mcg/dl, p =0.03).

In frequency domain analysis, ratio of low-frequency component (indicative of sympathetic activity) to high frequency component (indicative of para-sympathetic activity) was comparable at baseline (1.7 vs 1.79, p value- 0.10) but became significantly lower in group 1 at 6 weeks (1.65 vs 1.79, p-value 0.019) indicating improvement in parasympathetic activity.

There was a significant increase in Delta heart rate (difference between maximal and minimal heart rate during inspiration and expiration, averaged for 6 cycles) (p value 0.019) and E:I ratio (the ratio of longest distance between two r waves (R-R interval) and shortest R-R interval, averaged over 6 cycles) (p value 0.011) in group 1 at 6weeks as compared to baseline values, indicating improved autonomic function with increased parasymapathetic activity.

Conclusions

"365 breathing" is a simple lifestyle intervention that can reduce IOP and improve autonomic dysfunction by increasing parasympathetic activity in POAG patients.

P-291
CATARACT AND OCULAR HYPERTENSION IN CHILDREN UNDER SYSTEMIC CORTICOSTEROID THERAPY

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Purpose

To determine the incidence of posterior subcapsular cataract and ocular hypertension in children under 11 years of age under systemic steroid therapy

Methods

In this prospective study a detailed history regarding the use of corticosteroid therapy was obtained from children attending pediatric reumathology clinic. The presence of cortical lental opacities was recorded together with IOP measures. All those children were re-evaluated regularly every six months in a two year period.

Results

Eighty-seven patient were included in this study. Mean patient age was 6+_ 2 years, and the mean duration of taken corticosteroid therapy was 2+_1 year. Forty six percent of the patients were under corticosteroid therapy for a short period, fifty two percent were taking corticosteroid therapy for a slightly longer time, and only two percent of patient were taking them for a longer period of more than three months. Only 4.2 % of patient had insignificant posterior lental opacities which were un-significant visually. IOP measures were from 10-19 mmHg regardless to the length of used corticosteroid therapy.. None of the children had ocular hypertension or glaucoma. Even after two years there were no significant changes in occurrence of cataract or glaucoma.

Conclusions

This study indicates that the use of corticosteroids in children is relatively safe regarding the possible occurrence of cataract or ocular hypertension.

P-292

EFFECT OF LATANOPROSTENE BUNOD ON OCULAR MICROCIRCULATION MEASURED BY LASER SPECKLE FLOWGRAPHY IN PATIENTS WITH OPEN-ANGLE GLAUCOMA

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Purpose
To evaluate the effect of Latanoprostene bunod (LBN) on microcirculation of optic nerve head using laser speckle flowgraphy (LSFG).

Methods
We enrolled 35 eyes of 20 patients diagnosed with open angle glaucoma. All patients received a baseline LSFG evaluation of optic nerve head microcirculation, then one drop of topical LBN was instilled in the examined eyes at clinic. LSFG measurement were repeated at 30 minutes and 2 hours post-LBN instillation. Patients would continuously use LBN once every night for one month and return to clinic again for another LSFG exam.

Results
The averaged mean blurred rate of vessel area (MBRv) of optic nerve head, which was 100.0 % at baseline, significantly increased at 2 hours (114.36 ± 20.02 %, $p<0.05$) and 1 month (113.91 ± 26.53 %, $p<0.05$) post-LBN instillation. The mean IOP significantly reduced from 17.68 ± 4.11 mmHg at baseline to 12.02 ± 5.31 mmHg after 1 month of LBN use.

Conclusions
Topical Latanoprostene bunod promotes ONH blood velocity. The change in ONH blood velocity may not be only attributable to IOP lowering effect of the medication, but the vasodilatation effect of both latanoprost and nitric oxide.

P-293

REAL-LIFE EXPERIENCE OF MICROPULSE TRANSSCLERAL CYCLOPHOTOCOAGULATION (MP-TSCPC) IN CASES OF SEVERAL GLAUCOMA TYPES

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Purpose

The aim of this study is to demonstrate the efficiency of a standardized protocol of MP-TSCPC in real clinical practice ina wide variety of indications.

Methods

This was a longitudinal, retrospective and multicenter study. Data of records from patients with different types of glaucoma, that underwent MP-TSCPC, with an IRIDEX Cyclo G6 MP3 laser, with at least 12 months of follow-up were evaluated. Age, sex, race, subtype of glaucoma, IOP, number of eyedrops, visual acuity and complications were colected.

Success criterion was defined as an IOP measuring between 6 and 21 mmHg at the last visit and a decrease of more than 20%, relative to preoperative values, with or without medication.

Results

A total of 101 eyes of patients suffering from glaucoma were included. Varied types of glaucoma were included in the study design in a way to be as real-life practice as possible. The follow-up time lasted one year. The mean age was 64.19 years. Mean preoperative IOP was 26.19 mmHg and the mean number of topical eyedrops in preoperatory was 3.38. The majority of the patients had primary open angle glaucoma (65,35%), the others diagnosis were primary closure angle glaucoma (2,97%), normal pressure glaucoma (1,98%), primary congenital glaucoma (7,92%) and glaucoma secondary (20,79%). The group of secondary glaucoma envolved several causes as uveitis, post corneal graft, ICE syndrome, post trauma, post vitrectomy, neovascular glaucoma and aphakia.

The mean visual acuity in Logmar in preoperative was 0.53 ± 0.64 and in the end of study was 0.63 ± 0.72. There was a reduction in the number of eyedrops used to control glaucoma progression after MP-TSCPC during follow-up of 2.26 ± 1.54 and it was statistically significant (p=0.0001).

There were few severe complications after MP-TSCPC, only one case of macular oedema cystoid, three corneal decompensation and two eyes with loss of light perception. During follow-up, it was observed a statistically significant decrease in IOP at every observation time. The mean IOP reduction was 11,76±8,03 (p=0,0001) and it was sustained during the following years

Image



Conclusions

This study showed that MP-TSCPC has favorable efficacy with minimal postoperative complications when used as an surgical glaucoma intervention in different types of glaucoma patients with medically uncontrolled glaucoma or intolerance to medications. Our encouraging findings support extending the role of MP-TSCPC in glaucoma management and as a viable alternative to incisional glaucoma surgeries.

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P-294
FOCUSED ULTRASOUND CYCLOPLASTY, IN THE TREATMENT OF GLAUCOMA

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Purpose
To evaluate the efficacy and safety of cycloplasty, with focused ultrasound in the treatment of glaucoma.

Methods
37 eyes of 37 patients with primary or secondary glaucoma were included, without achieving intraocular pressure control. Focused ultrasound cycloplasty was performed. Visual acuity, intraocular pressure and number of hypotensive medications, were registered, before the procedure and during the postoperative check-ups on day 1, week 1, month 1, month 3 and month 6. As well as the presence of adverse effects. The comparative analysis, was carried with Graphpad 9.0.0 Software. A statistically significance result, was established at p<0.05%.

Results
The most common diagnosis, was neovascular glaucoma (n=15), followed by primary open-angle glaucoma (n=10). The rest, were glaucoma secondary to: retinal surgery (n=5), pseudoexfoliation (n=2), penetrating keratoplasty (n=2), steroids (n=1), thyroid orbitopathy (n=1), and uveitis (n=1). Mean intraocular pressure, before the procedure, was 27±13 mmHg. In the postoperative check-ups, the mean intraocular pressure was 20±7.5 mm Hg (day 1), 15±11 mm Hg (week 1), 17±12 mm Hg (Month 1), 17±13 mm Hg (Month 3), and 18±10 mm Hg (Month 6), obtaining a statistically significance (p=0.001). The average of hypotensive medications used, prior to the intervention, was 4. Decreasing to 3, in all postoperative check-ups (p>0.001). The average visual acuity, prior to the procedure, was 1.4 LogMar. Six months after the procedure, it was 1.43 LogMar, without statistically significance difference (p=0.97). The most common adverse effects, were conjunctival hyperemia (n=29) and cellularity 1+, in the anterior chamber (n=14). There were no adverse effects, that required surgical intervention for their resolution, and nor loss of light perception. Failure of the procedure, was observed in 7 eyes (18%). Which underwent Ahmed valved implant (n=3), trabeculectomy (n=2), transscleral micropulsed laser (n=1), and endocyclophotocoagulation (n=1).

Conclusions
Focused ultrasound cycloplasty, is useful to achieve target intraocular pressure in patients with uncontrolled glaucoma. The most common adverse effects, are mild and reversible. In case of procedure failure, it does not limit the performance of subsequent surgical interventions.

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P-295
GONIO-ENDOSCOPY: A NOVEL APPROACH TO MINIMALLY INVASIVE GLAUCOMA SURGERY IN A GLAUCOMATOUS EYE

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Purpose
The gonio-endoscope is a novel device for use during minimally invasive glaucoma surgery (MIGS) to treat glaucomatous eyes with cloudy cornea. The MIGS procedure requires a surgical gonioprism lens for direct visualization of the angle, intraoperative manipulation of the surgical microscope and the patient's head position, and the patient's eye without a cloudy cornea. In cases with cloudy corneas, MIGS cannot be safely performed. Gonio-endoscopy facilitates clear visualization of the trabecular meshwork (TM) to perform MIGS safely and easily even in patient with corneal opacities without the need for additional MIGS procedures. We report the first case in which we performed the newly developed gonio-endoscopy procedure.

Methods
The patient was a 58-year-old man with Down syndrome who had secondary glaucoma bilaterally after cataract surgery and long-time use of a steroid for atopic dermatitis and allergic conjunctivitis. His left eye had a cloudy cornea because of rejection after penetrating keratoplasty for acute corneal hydrops in keratoconus. When the intraocular pressure (IOP) in his left eye increased to 41 mmHg despite use of anti-glaucoma eyedrops, he was referred to our hospital. Anterior-segment optical coherence tomography showed an open angle. We developed a new gonio-endoscope (Machida Manufacturing Co., Chiba, Japan, and Nipro Co., Osaka, Japan), the probe of which is bent appropriately to aid visualization of and access to the TM. After obtaining clinical approval from the government and our institution, we performed a gonio-endoscopy-assisted microhook trabeculotomy.

Results
We successfully incised the trabecular meshwork by maintaining clear visualization. And we did not need to change the position of the microscope or the patient's face. The IOP decreased to 10 mmHg and the visual acuity has been preserved with no major complications for 1 year postoperatively.

Conclusions
This new technique of gonio-visualization using

a gonio-endoscope

might be useful for a safe and easy

microhook trabeculotomy

in patients with cloudy corneas. This device can be applied to other types of MIGS procedures and cases with pathological diagnoses of glaucoma that are difficult to treat.

P-296

LONG-TERM EFFECTS OF LATANOPROST WITH DIFFERENT EXCIPIENT COMPOSITIONS ON INTRAOCULAR PRESSURE, HYPEREMIA AND DISCOMFORT

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Purpose

To compare the long-term effects of two preservative-free 0.005% latanoprost ophthalmic solutions with different excipient compositions on intraocular pressure (IOP), conjunctival hyperemia, and subjective ocular discomfort.

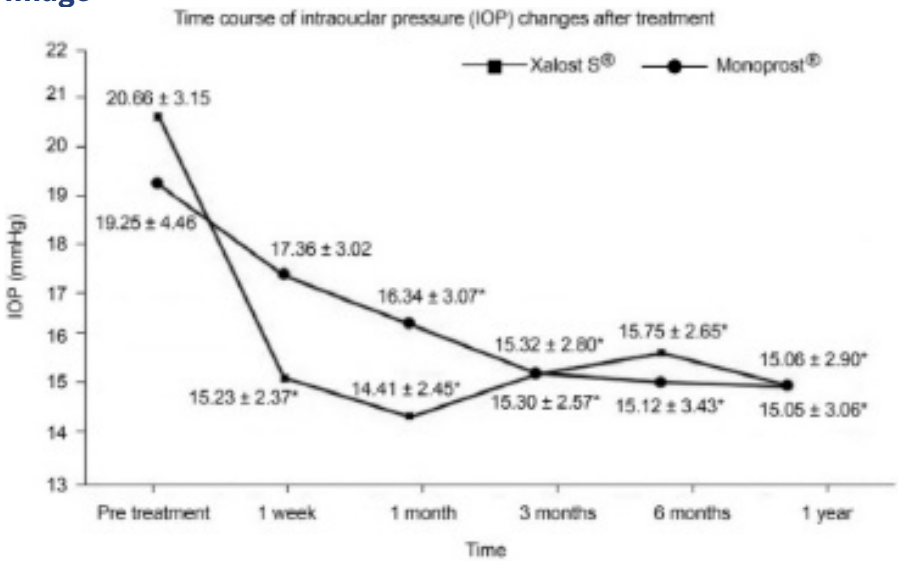
Methods

The medical records of patients newly diagnosed with normal tension glaucoma or primary open angle glaucoma who started treatment using Xalost S® (Taejoon Pharm. Co. Ltd., Seoul, Korea) or Monoprost®(Thea Pharmaceuticals Ltd., Staffordshire, UK) were reviewed. IOP was measured with Goldmann applanation tonometry. Conjunctival hyperemia was measured with a Keratograph® 5M and subjective ocular discomfort was surveyed using a visual analog scale. Routine examinations were scheduled 1 week and 1, 3, 6, and 12 months after treatment. A generalized estimating equation was used to evaluate the changes of these parameters with time.

Results

Xalost S® was used in 31 patients (60 eyes) and Monoprost® in 27 patients (50 eyes). The baseline characteristics were generally similar in the two groups with no significant differences. In the Xalost S® group, the IOP difference from baseline was significant at all time points ($p < 0.001$). However, in the Monoprost® group, after 1 month of treatment, the IOP difference decreased significantly ($p = 0.054$ at 1 week; $p = 0.005$ at 1 month; $p < 0.001$ after 1 month). Conjunctival hyperemia and subjective ocular discomfort did not differ significantly from baseline in either group.

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Conclusions

There was no significant difference in the frequency of side effects between the two drugs. The effect on the IOP drop was similar over time, but the initial IOP drop was greater in the Xalost S® group. This difference is presumed to be due to the different excipient compositions of the two drugs.

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P-297

EARLY POST-OPERATIVE EFFECT OF MICROPULSE CYCLOPHOTOCOAGULATION ON CORNEAL, RETINAL, AND CILIARY BODY STRUCTURES

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Purpose
To evaluate micropulse cyclophotocoagulation effect on corneal, retinal, and ciliary body structures in the early post-operative period.

Methods
A prospective study was performed where 19 patients (19 eyes) were recruited. All participants underwent micropulse (MP3) cyclophotocoagulation procedure (Iridex, G6) under a retrobulbar block with varying laser length and power based on visual acuity and pain tolerance. Patients underwent a full ophthalmic examination before the procedure, one and three months after the procedure. Statistical analysis was performed using RStudio.

Results
Overall, 63,2% women and 36,8% men were recruited, with a mean age of 71,0 years (66,0-76,5). BCVA increased by 1 line 3 months after the procedure from 0,7 (0,5-0,9) to 0,8 (0,6-0,9) (p=0,0056). IOP decreased 3 months after the procedure from 24,0 mmHg (19,0-26,0) to 17,0 mmHg (13,0-18,0) (p=0,0004). Moderate correlations were observed between IOP lowering and the increase of laser power one and three months after the procedure (-0,425 and -0,370, respectively) and between IOP lowering and the increase of laser length at first and third month (-0,472). No change in endothelial cell parameters was detected. An increase in central retinal thickness and RNFL was detected 3 months after the procedure from 259,0 mkm (246,0-269,5) and 64,0 mkm (58,5-74,0) to 265,0 mkm (251,0-275,5) and 72,0 mkm (60,5-77,0) (p=0,0065; p=0,0014, respectively). 3 months after the procedure trabecular iris angle (TIA) and ciliotrabecular angle increased significantly from 35,7° (24,5-55,3) and 87,0°(80,0-101,5) to 59,6° (52,8-79,3) and 103,2° (86,5-111,5) (p=0,0014; p=0,0462, respectively) which did not differ depending on lens status. Ciliary body area decreased from 2,30 mm^2 (2,06-2,37) to 2,09 mm^2 (1,90-2,21) (p=0,0048) 3 months after the procedure. A moderate correlation was detected between the increase of TIA and the length of laser usage 1 and 3 months after the procedure (0,315 and 0,315, respectively). A stronger correlation was detected between the increase of TCA and the length of laser usage 1 and 3 months after the procedure (0,586 and 0,663, respectively).

Conclusions
Early post-operative results indicate that micropulse cyclophotocoagulation is a safe and effective procedure to lower IOP. TIA and TCA could possibly be used as indicators of the effectiveness of the procedure in the long term. Additional evaluation of the effects on retinal structures in the long term is needed. Further research is to be conducted.

P-298

CAN ULTRASOUND CYCLO-PLASTY (UCP) PREVENT GLAUCOMA PROGRESSION IN BOSTON KERATOPROSTHESIS TYPE I PATIENTS?

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Purpose

To Study Ultrasound CycloPlasty (UCP) as a glaucoma treatment in eyes undergoing Boston kerato-prosthesis (BKpro) type I can stabilize intraocular pressure (IOP) and glaucoma progression.

Methods

Retrospective study, Boston Kerato-prosthesis type 1 implantation with UCP treatment at the same time from 2018 till 2021

Data include age, gender, corneal horizontal diameter, B-Scan, IOP and Antiglaucoma medication (AGM) preop and postop, visual acuity and Optic nerve head (ONH) evaluation, Visual field and anterior segment OCT in the postop

IOP measured using iCare IC100 (iCare) in 4 quadrants of peripherical cornea. Six (6) measures per quadrants + a reliable measure with Meditronic Solan pneumotonometer model 30 (Meditronic Technologies). The mean was used as IOP. Digitally verification was done (soft, normal, or hard globe).

Glaucoma progression was defined as change in ONH, NFL or Visual field in consecutive's visits in all or one tests. Risk of progression was defined as increase of IOP compared with previous visits or needs of increase of AGM. Hypotony was defined as very soft globe estimated by digital palpation or by tonometry, when IOP < 6 mmHg

Results

14 patients were included. Age 53 years (range 26 to 81).10 males, 4 females, 5 right and 9 left eyes. Average duration of follow-up was 21 months (range 4 to 40). 28,6% of the patients did not have previous diagnosis of glaucoma. Retention rate of the device was 100%. 65% BCVA > 20/200 with at least 12 months of follow up.

Mean IOP was reduced from 21.7 ± 6.6 mm Hg to 15.1 ± 3.9 mm Hg at last visit, a mean IOP reduction of 23%. Mean AGM used before surgery was 2.64 ± 1.15, and 2.2 ± 1.40 in the last visit. AGM reduction in 50% patients, unchanged in 36%, only 14.3% require an increase in AGM and one eye required another glaucoma surgery (Ahmed Glaucoma Valve).

Complications: 1 case of endophthalmitis, 3 cases developed choroidal, 1 case of macular edema, 1 case with previous tube surgery developed tube exposure, and 2 cases had a gap between the BKpro and the ocular walls

Image

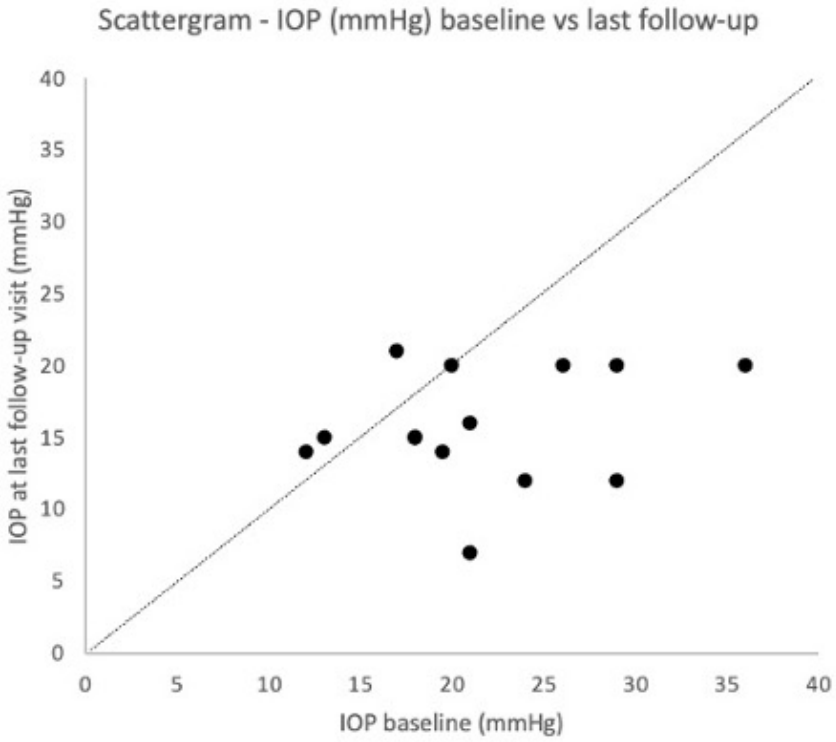


Figure 1. Scattergram showing the IOP before treatment (X axis) vs IOP at last follow-up visit (Y-axis). All points bellow the diagonal dashed line represent eyes with IOP reduction from baseline

Conclusions

For a mean follow up of almost 2 years, the glaucoma progression was only seeing in 1 case out of 14 patients (7,14%). The complications cannot be attributed to the UCP treatment

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P-299

MICROCYCLOPHOTOCOAGULATION IN GLAUCOMA TREATMENT: A SHORT-TERM FOLLOW-UP STUDY

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Purpose
The present study aimed to evaluate the efficacy and safety of transscleral microcyclophotocoagulation (µCPC) in patients with glaucoma for twelve consecutive months.

Methods
Fourty-five patients (47 eyes) with primary and secondary glaucoma were enrolled to undergo µCPC using diode laser FOX 810 (A.R.C. Laser, Nuremberg, Germany) The primary outcome measures were intraocular pressure (IOP) reduction, success rates, glaucoma medication use, and visual acuity after µCPC. An IOP reduction of 20% compared to the baseline value without re-intervention was considered a successful treatment. Complete success was defined as cessation of antiglaucoma medications. Secondary outcome measures included intraoperative and postoperative complications. Measurements were performed preoperatively and at the first week, and 1, 3, 6 and 12 months postoperatively.

Results
A total of twenty-seven patients (28 eyes) were evaluated 12-month after µCPC. The mean ± SD values of IOP preoperatively at 1 day, 1 week, 1; 3; 6 and 12 months postoperatively were 23.6 ± 7.8 mmHg, 16.8 ± 4.4 mmHg, 16.0 ± 5.6 mmHg, 19.8 ± 7.2 mmHg, 16.8 ± 5.2 mmHg, 17.5 ± 6.4 mmHg and 15.9 ± 3.3 mmHg, respectively. The mean IOP at the last follow-up was reduced by 32.8%. The qualified success rate was 42.6%. Only one patient at 12-month follow-up did not require the use of antiglaucoma medications – complete success rate was 2.1%. During the follow-up period, nineteen patietns (20 eyes – 42.6%) were re-treated because of nonachievement of the target IOP. Uveitis was observed in one patient (2.1%). No other major intraoperative or postoperative complications occurred.

Conclusions
µCPC seems to be moderately effective but well-tolerated method to reduce IOP in glaucoma patients. Further studies with a larger group and longer follow-up period are needed to confirm the efficacy of this procedure.

P-300

IMPROVEMENT OF CORNEAL EPITHELIAL DAMAGE AFTER SWITCHING FROM CONCOMITANT BRINZOLAMIDE AND BRIMONIDINE TO BRINZOLAMIDE/BRIMONIDINE FIXED COMBINATION

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Purpose
It was previously reported that switching from the concomitant use of two anti-glaucoma drugs to a fixed-dose combination anti-glaucoma drug regimen reduced corneal epithelial damage in an animal glaucoma model. However, there have been few reports on the effectiveness of that switch in glaucoma patients. The purpose of this study was to assess the effectiveness of switching from the concomitant use of brinzolamide 1% (BZM) and brimonidine 0.1% (BMD) to a BZM/BMD fixed-dose combination (BBFC) for the reduction of corneal epithelial damage in Japanese glaucoma patients.

Methods
This study involved 52 eyes (39 right eyes and 13 left eyes) of 52 glaucoma patients (26 females, 26 males; mean age: 67.0±14.0 years) seen at the Oike-Ikeda Eye Clinic, Kyoto, Japan from June 2020 to March 2022 who could be observed for more than 3 months after being switched from concomitant BZM and BMD to BBFC. Superficial punctate keratitis (SPK) was assessed by fluorescein staining according to the National Eye Institute classification, with the cornea divided into 5 areas: center, superior, nasal, temporal, and inferior. SPK density was graded as 0 (no SPK), 1 (separate SPK), 2 (moderately dense SPK), and 3 (high SPK with overlapping lesions). SPK scores and intraocular pressure (IOP) at pre switching to BBFC (pre-BBFC) and at 3-months post switching to BBFC (post-BBFC) were then compared using the Wilcoxon signed-rank test. In patients who were switched to bilateral BBFC therapy, only the right-eye SPK/IOP data was used.

Results
Of the 52 patients, 28 were normal tension glaucoma, 12 were primary open-angle glaucoma, and 12 were other glaucoma types. Pre switching to BBFC, the mean number of anti-glaucoma eye drops used was 2.5 ±1.3. Mean IOP at pre-BBFC and post-BBFC was 12.4±2.5 and 12.4±2.7 mmHg, respectively, thus illustrating no significant difference in IOP between pre and post switch (P=0.924). The mean SPK score for center, superior, nasal, temporal, and inferior at pre-BBFC and post-BBFC was 0.06 ±0.24, 0.04 ±0.19, 0.52 ±0.67, 0.15 ±0.36 and 0.92 ±0.74, and 0.04 ±0.19, 0.02 ±0.14, 0.37 ±0.56, 0.04 ±0.19 and 0.75 ±0.62, respectively. The SPK scores for the nasal, temporal, and inferior areas at pre-BBFC were significantly higher than those at post-BBFC (P<0.05).

Conclusions
Our findings revealed that compared with the concomitant use of BZM and BMD, BBFC is effective for reducing corneal epithelial damage.

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P-301

SODIUM HYALURONATE IMPROVES CORNEAL REINNERVATION AND EPITHELIAL HEALING IN AN *IN VIVO* BAK-INDUCED TOXICITY MODEL

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Purpose

To evaluate the protective effect of 0.4% sodium hyaluronate on benzalkonium chloride-induced toxicity using an *in vivo* model.

Methods

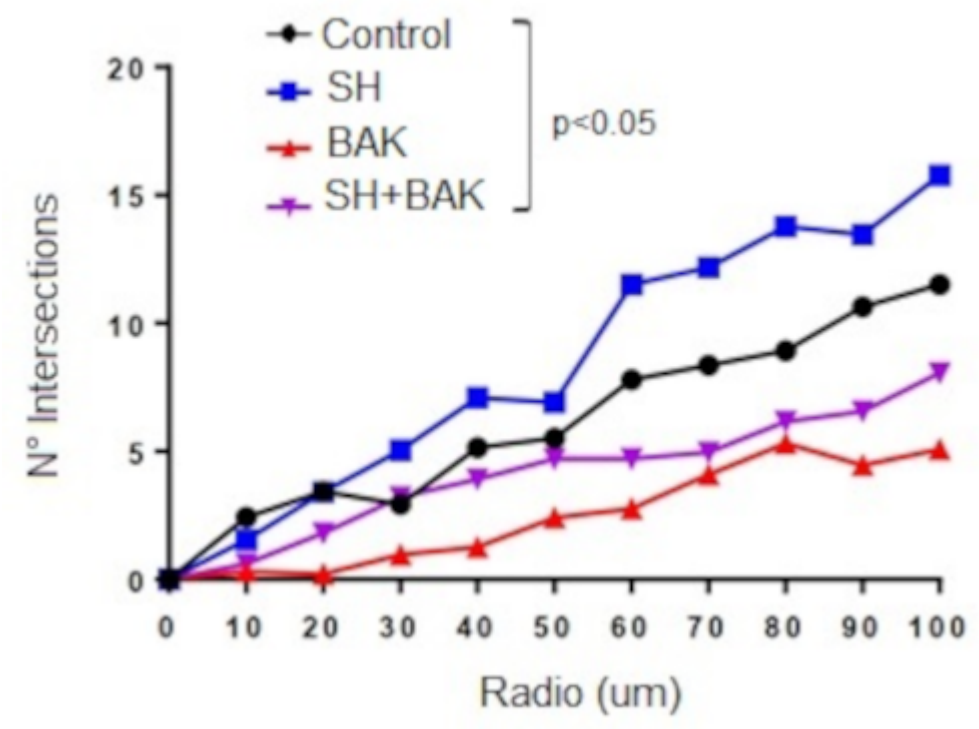
88 Balb/c mice were divided into 4 groups: 1) Control: saline solution; 2) SH: 0.4% sodium hyaluronate 3 times a day; 3) BAK: benzalkonium chloride 0.01% twice a day; 4) SH+BAK: SH 0.4% 3 times a day + BAK 0.01% twice a day. All groups received 3 daily instillations (8 AM, 2 PM, and 8 PM). For the SH+BAK group, SH was administered first and BAK was administered 10 minutes later. The dosing scheme began 48 hours before time 0 when a controlled, 1.5 mm-diameter corneal ulcer was made under a surgical microscope in the right eye of all mice. The dosing schedule continued for 10 days. After this period, all mice were sacrificed, the corneal nerve plexus was analyzed by confocal microscopy, with βIII tubulin immunostaining. Wound healing over time and corneal nerve regeneration using Sholl analysis were assessed. Data were analyzed by two-way ANOVA.

Results

Wound closure: There were statistically significant differences in ulcer closure between treatment groups over time ($p<0.0001$). Mice treated with BAK show slower healing than those treated with SH+BAK ($p=0.0124$). The AUC of corneal cicatrization for Control group was 19.7±2.5; for SH 20.1±2.7; for BAK 28.0±4.6, and for SH+BAK 24.4±5.0 ($p<0.001$). All ulcers closed within 72 hours of injury. The media of hour of wound closure was: 41.5±9.6 for control group; 39.3±7.6 for SH group; 51.3±9.9 for BAK group, and 45.8±8.8 for SH+BAK group. ($p<0.001$).

Corneal nerve regeneration: The neural network presented an increasing complexity in the groups: BAK < BAK+SH < CONTROL < SH. Considering the largest radius analyzed (100 µm), the number of intersections was: 11.5 ± 2.6 in Control group; 15.8 ±2.1 in SH; 5.1 ± 2.2 in BAK, and 8.05 ± 2.2 in SH+BAK ($p<0.05$).

Image



Conclusions

BAK has a toxic action both on epithelial regeneration and corneal nerve plexus.

The concomitant addition of SH protects against the toxic action of BAK, promoting epithelial healing and corneal nerve regeneration.

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P-302

EFFICACY OF NETARSUDIL IN PRIMARY ANGLE-CLOSURE DISEASE AFTER LASER PERIPHERAL IRIDOTOMY WITH PERSISTENT HIGH INTRAOCULAR PRESSURE: INTERIM RESULTS

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Purpose

To evaluate efficacy of Netarsudil 0.02% ophthalmic solution OD in comparison to Latanoprost 0.005% HS in Post-Peripheral laser iridotomy (PPLI) Primary angle-closure disease (PACD) patients with inadequately controlled Intraocular pressure (IOP).

Methods

In this prospective randomized comparative study, 21 eyes of 21 PACD patients with post-laser iridotomy open angles up to at least 180°, and having persistent high IOP were recruited. The patients received either topical Netarsudil 0.02% (Group A, n= 11) once daily or Latanoprost 0.005% (Group B, n= 10) at bed time. IOP, Visual Acuity (VA) and side effects were assessed at 2 weeks and 6 weeks.

Results

Both the groups were age and sex matched.There were 5 patients of Primary angle closure (PAC) and 6 patients of Primary angle closure glaucoma (PACG) in group 1, while 4 patients of PAC and 6 patients of PACG in group 2. The baseline IOP (24.72 ± 3.37 mmHg in group 1 Vs 23.30 ± 2.50 mmHg) was comparable in both the groups. The mean IOP at 2 weeks was 20.70±2.94 mmHg and 18.2±3.41mmHg in group 1 and 2 respectively. The mean IOP at 6 weeks in group1 was 18.9±2.30 mmHg and 18.1±3.54 mmHg in group 2. At 6 weeks the mean IOP reduction from baseline was 6±3.6mmHg (23.90%) in group 1 and 5.21±4.31 mmHg (22.31%) in group 2, and the difference between the group was not significant. There was no significant change in VA from baseline in either group at any point of time. The conjunctival hyperemia was seen in 40% of patients in group 1, and only 10% were symptomatic. There were no side effects seen in groups 2.

Conclusions

The short-term efficacy of Netarsudil was comparable to Latanoprost in PACD with patent PLI with a visible trabecular meshwork of 180 degrees or above.

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P-303
ELECTRICAL OPTIC NERVE STIMULATION IN NORMAL TENSION GLAUCOMA

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Purpose
Normal tension glaucoma (NTG) is characterized by optic nerve degeneration and loss of retinal ganglion cells causing visual field impairment without elevated intraocular pressure (IOP) (1, 2). The current standard approach in NTG therapy is further reduction of the IOP. Despite effective medications leading to IOP-lowering, glaucoma exacerbation and progressive vision loss among patients is common. Electrical stimulation of the optic nerve (ONS) facilitates axonal regeneration and survival of retinal ganglion cells (3). The case series provides real-world evidence for long-term clinical efficacy of ONS in NTG.

Methods
Seven NTG patients, between 46 and 80 years old, with progressive vision loss despite therapeutic IOP reduction underwent electrical ONS. Closed eyes were separately stimulated by bipolar rectangular pulses with intensities up to 1.2 mA sufficient to provoke phosphenes. Ten daily stimulation sessions within 2 weeks lasted about 80 min each. Right before ONS at baseline (PRE), visual field loss was documented by static threshold perimetry in the central 30° visual field and compared to the same assessment approximately one year afterwards (POST). Mean defect (MD) was defined as primary outcome parameter. Only perimetries with a reliability factor (RF) of max. 20% were considered.

Results
Perimetry follow-up of 13 eyes in 7 patients fulfilled the inclusion criteria. MD significantly decreased from PRE 11.8±7.5 dB (mean±SD) to POST 10.0±7.3 dB one year after ONS ($p<0.05$) corresponding to an average improvement of visual fields. Nine eyes in 5 patients showed a reduction of MD by 3.2±2.6 dB (range 0.2 to 8.5 dB). Thus, 69% of eyes in the present case series were responders.

Conclusions
Innovative treatments that preserve visual function through mechanisms other than lowering IOP are required for NTG with progressive vision loss. The present long-term data document progression halt or even improvement of visual fields in more than 69% of affected eyes after ONS and, thus, extend existing evidence from clinical trials.

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P-304

MYOPIC SHIFT INDUCED BY OMIDENEPAG ISOPROPYL 0.002% IS ASSOCIATED WITH FORWARD MOVEMENT OF LENS IN PATIENTS WITH PRIMARY OPEN-ANGLE GLAUCOMA

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Purpose

To evaluate incidence, pathophysiology, and risk factors of myopic shift in primary open-angle glaucoma (POAG) patients using omidenepag isopropyl 0.002% eyedrop

Methods

A prospective observational study was conducted for 48 subjects who visited Chungnam National University Sejong Hospital glaucoma clinic. All of the subjects were diagnosed with POAG and prescribed with omidenepag isopropyl 0.002% eyedrop. Comprehensive ophthalmic examinations were done including slit-lamp examination, intraocular pressure, visual acuity, and refractive error measurement, keratometry, corneal topography, and optical biometry before and 1 month after the instillation of the eyedrop.

Results

A total of 42 subjects completed 1 month follow-up visit and included in the final analyses. There were 0.19 ± 0.42 diopter (D) of statistically significant myopic shift (P = 0.006), and a total of 5 subjects (12%) showed myopic shift of 0.75 D or more (0.75 - 1.125 D). Corneal thickness measured at the center of the pupil was slightly thickened by 5.23 μm (P = 0.022). However, there were no significant difference in corneal curvature according to keratometry, corneal topography, and ophthalmic biometry. Anterior chamber depth (ACD) was significantly decreased by 0.05 mm (by optical biometry, P < 0.001) to 0.06 mm (measured with topography, P < 0.001), and lens thickness was thickened by 0.02 mm (P = 0.009). However, axial length (AL) showed no significant change (P = 0.354). In the correlation analysis, decrease of ACD was positively associated with the myopic shift (P = 0.043). In the risk factor analysis, there was no identifiable risk factor including previous history of refractive surgery.

Conclusions

The incidence of clinically significant myopic shift was 12% in POAG patients using omidenepag isopropyl 0.002%. Corneal curvature and AL did not change after installation of the eyedrop, and the decrease of ACD was associated with the myopic shift. Forward movement of crystalline lens might be the possible mechanism for the myopic shift.

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P-305

CAI-AUGMENTED MACULAR PIGMENT SUPPLEMENTATION IMPROVES VISUAL ACUITY AND CONTRAST SENSITIVITY IN EYES WITH PERICENTRAL GLAUCOMATOUS VISUAL FIELD LOSS

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Purpose
The retinal pigment epithelium (RPE) is a regulation barrier for nutrients and waste within the retina. The RPE contains carotenoids and xanthophylls that dissipate energy from reactive oxygen species. Lumega-Z (CT) is a commercial medical food containing several prefoveolar membrane carotenoids in a microliposomal emulsion. Dorzolamide is a topical carbonic anhydrase inhibitor (CAI) with the capacity to enhance perifoveolar perfusion, and may thereby enhance the delivery of macular pigment-containing oral supplements. This prospective randomized double-masked placebo-controlled study examines the effects of combined CT and topical CAI on visual acuity (VA) and 12cpd contrast sensitivity (CS), a spatial frequency strongly associated with glaucoma progression.

Methods
We used methods described in “Augmented Macular Pigment Supplement and Pericentral Visual Function: A Randomized Controlled Trial” (NCT04676126). Pearson correlation was used to analyze the significance of treatment and Fisher’s r to z transformation was used to compare differences between groups.

Results
Mean values from paired-eye data (n=23:10T/13P) were evaluated over 3 mo. Visual acuity in both groups improved significantly, the treatment group (TG) showed greater improvements than the placebo group (PG). A comparison of correlations showed a significant difference, p = 0.03, indicating that treatment was significantly associated with improved LogMar acuity (placebo: -0.01x + 0.14, R2 0.428; treatment: -0.02x + 0.19, R2 0.779). CS at 12cpd in both groups showed significant improvement in the ability to discern contrast patterns, the TG with a greater and more consistent (p<.0001) increase than the PG (placebo: 0.12x + 2.28, R2 0.391; treatment: 0.37x + 0.66, R2 0.945).

Conclusions
Co-administration of topical CAI and oral CT was associated with a significant positive impact on 12cpd CS and VA from pre-treatment baseline levels relative to placebo-treated eyes. Patients in this study were selected for progressive glaucomatous VF progression despite stable IOP control. The statistically inferior, yet significant, improvement in pericentral visual function observed among PG eyes was likely attributable to regression-to-the-mean or learning effect. The improvements in acuity and 12cpd CS in the TG were significantly greater than those observed among the PG. These findings illustrate the importance of placebo-control prospective studies in discerning therapeutic efficacy from predictable artifacts.

P-306

THE USE OF ANTI-GLAUCOMA MEDICATIONS FOLLOWING PEDIATRIC GLAUCOMA SURGERY: A REPORT ON EFFICACY AND TRENDS IN CAIRO UNIVERSITY

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Purpose
to identify the pattern(s) in using antiglaucoma medications following glaucoma surgery in children and compare between them in terms of efficacy

Methods
A Retrospective chart review of patients (12 years or younger) receiving pressure reducing surgery between January 2013 and December 2020, which faileld to attain an IOP of 18 mmHg or less except after the addition of antiglaucoma medications. They were divided into 3 groups: Group A received B-Blockers (Timolol maleate 0.5% or Betaxolol 0.5%). Group B received Prostaglandin analogues (Latanoprost 0.005%) and Group C received fixed B-Blocker+ Carbonic anhydrase inhibitor (CAI) perparation (Dorzolamide 2%-timolol 0.5% or Brinzolamide 1%-timolol 0.5%). Data included age, gender, consanguinity, family history, type of glaucoma, corneal clarity, horizontal corneal diameter , cup/disc ratio and IOP (before, after1 month and at last follow up) The type, number and sequence of surgeries were also noted. Treatment was considered successful if IOP was ≤ 18mmHg at the last follow up visit. Any local or systemic side effects during the course of treatment were recorded.

Results
200 eyes of 152 patients were included. Most patients presented within the first month of life (61%), 54% were males, 48% had bilateral disease and the majority (82.2%) had PCG. IOP was significantly higher in Group C (p=0.009), however there were no pre treatment statistical differences between the three treatment groups. The most common procedure performed was trabeculotomy (p=0.014).. After a mean follow up period of 20.12 months , all three groups showed significant reduction in the IOP (p≤0.001), with the highest percent reduction attained in Group C (43.7% vs 33.4% and 33.1% in β Blocker and PGA groups respectively) p=0.001. Final success rates were 41.2%, 83.3%, 82.2% for Groups A.B, C respectively. The most common local side effects observed was dry eye (32 eyes), conjunctival hyperemia (14 eyes) and hypertrichosis (14 eyes). Dry eye was cmhighest in the β Blockers group (21.6%)

Conclusions
the most frequently used antiglaucoma medications following partially successful glaucoma surgery are CAI+B Blocker combinations. they seem to have the most potent effect and are usually used as a first line the higher the initial IOP is.

P-307
DORZOLAMIDE INDUCED GIANT CELL THROMBOCYTOPENIA: A CASE REPORT OF AN HITHERTO UNREPORTED CONDITION

A Ganguly

Purpose
To report a case of topical Dorzolamide induced Giant Cell Thrombocytopenia: a hitherto unreported condition in litreture

Methods
Carbonic anhydrase inhibitors are frequently prescribed in topical and oral forms in various types of glaucoma. Dorzolamide eyedrops are frequently associated with ocular side effects but systemic side effects are rare with its use.We report a case of Dorzolamide induced Giant Cell Thrombocytopenia in a patient with post uveitic angle closure glaucoma.After discontinuation of Dorzolamide eyedrop, the thrombocytopenia reversed.

Results
To establish a casual relationship between the thrombocytopenia and Eyedrop Dorzolamide , the Naranjo Algorithm or ADR probability score was computed as follows and the total score in our case is 7 , which implies that there is Probable/ Very Likely causuality between topical Dorzolamide and Giant Cell Thrombocytopenia. [16]

• TOTAL ADR PROBABILITY SCORE- 7;

Probable. The reaction (1) followed a reasonable temporal sequence after a drug, (2) followed a recognized response to the suspected drug, (3) was confirmed by withdrawal but not by exposure to the drug, and (4) could not be reasonably explained by the known characteristics of the patient's clinical state.

Image



Conclusions

In conclusion, this case report highlights the potential side effects of Dorzolamide eyedrops due to systemic absorption. Dorzolamide induced Giant Cell Thrombocytopenia is rare but can occur in patients being treated with it. This thrombocytopenia can occur without any systemic manifestations as happened in our case. Patients should be made aware of this potential complication and should be screened by Haemograms at regular intervals on follow up. Also , regular punctal occlusion should be taught to the patients when they are started on dorzolamide topical formulations as with any other Glaucoma drops. We suggest a complete haemogram every 6 months of topical carbonic anhydrase inhibitor use.

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P-308

ROLE OF NETARSUDIL IN PATIENTS OF ADVANCED GLAUCOMA ON MAXIMUM TOLERATED MEDICAL THERAPY DURING COVID-19 PANDEMIC

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Purpose

To elucidate the use of Netarsudil in patients of advanced glaucoma on maximally tolerated medical therapy who could not be offered the option of surgery due to the global pandemic lockdown.

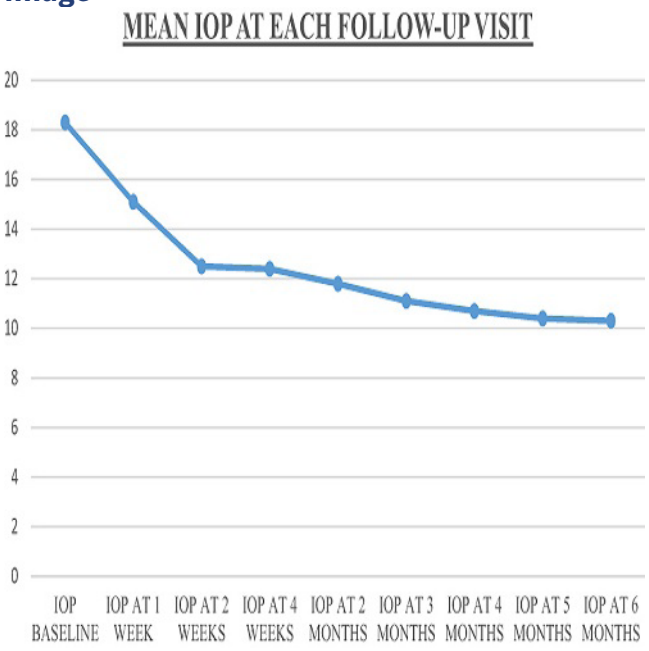
Methods

Only patients with primary open angle glaucoma (POAG), who had a cup-disc ratio (CDR) of 0.9 or a near total cupping on maximum tolerated medical therapy for at least 4 weeks and yet could not meet the target IOP were included. Target IOP was defined as ≤12 mm Hg. A total of 30 patients were enrolled. All patients in study cohort were started on E/D Netarsudil OD. Patients were followed up at 1 week, 2 weeks, 4 weeks and then monthly for 6 months for their best corrected visual acuity (BCVA), intraocular pressure (IOP), disc changes (slit lamp biomicroscopy), perimetry, and retinal nerve fibre layer analysis using optical coherence tomography (OCT-RNFL).

Results

Mean pre-treatment IOP on five drugs was 18.1 ± 1.1 mm Hg (range 14 to 22mmHg) on maximally tolerated medical therapy. At 1 week follow-up, mean post-treatment IOP was 15.4 ± 1.5 mm Hg (range 12 to 18mmHg) and at 2 week follow-up, mean post-treatment IOP was 12.3 ± 1.6 mmHg (range 10 to 16mmHg). Thus, target IOP ≤12mmHg was attained in 28 patients at 2 weeks. This target IOP was maintained throughout the 6 months of follow-up period. Of the 2 patients who could not meet target IOP, 1 patient needed rearrangement of their fixed-drug-combinations to achieve target IOP at 4 weeks. The second patient required unfixing of all fixed-drug-combinations to achieve target IOP at maximally tolerated medical therapy at 6 weeks

Image



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Conclusions

Netarsudil not only provides a better IOP control but also has a high safety profile even when started as an add-on drug to already-existing yet inadequate maximally tolerated medical therapy.

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P-309

CITICHOLINE IN EYE DROPS AS A NEUROPROTECTIVE AGENT IN GLAUCOMA TREATED PATIENTS

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Purpose
Citicholine, as a relatively new agent, has demonstrated neuroprotective effects in glaucoma treated patients. There is a small number of studies about the use of citicholine in eye drops. The aim of this study is to assess the effects of citicholne in eye drops as additional therapy in patients treated with intraocular pressure-lowering medications.

Methods
In this prospective observational study 57 eyes were included. All patients were divided in two groups. Group 1 (32 eyes) used citicholine eye drops as additional therapy, and group 2 (25 eyes) used citicholine with addition of vitamin B12 in eye drops. All patients underwent routine ophthalmologic examinations and visual field testing (Humphrey visual field analyzer 24-2) initially and four months later. The most of our patients were treated with prostaglandin analogs as monotherapy and fixed combination (beta blockers and carbonic anhydrase inhibitors).

Results
Visual field analyzer showed that mean MD value in all our patients was -10.99dB before treatment and -10.05dB after 4 months of study. In group 1 mean MD value was -9.63dB before and -9.14dB after treatment. In group 2 mean MD was -11.87dB before and -10.76dB at the end of treatment.

Conclusions
There was statistically significant difference in MD values in the evaluation groups before and at the end of observation period (p= 0.0396, t test). Also no patient had progression of glaucoma according to the visual field testing. So citicholine in eye drops might had a neuroprotective role as additional therapy in glaucoma treated patients. Additional research with larger number of subjects is needed in order to look further into the role of citicoline in eye drops as a neuroprotective agent

P-310

EFFICACY AND SAFETY OF A FIXED COMBINATION OF BIMATOPROST (0.03% W/V) AND TIMOLOL (0.5% W/V) FOR PATIENTS WITH OPEN-ANGLE GLAUCOMA

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Purpose

We investigated the efficacy and safety of a fixed combination of bimatoprost (0.03% w/v) and timolol (0.5% w/v) (Ganfort, Allergan Inc., Irvine, CA, USA) for open-angle glaucoma patients.

Methods

We included 25 right eyes with open-angle glaucoma treated with eye drops. The drops were changed to the fixed bimatoprost-timolol combination without a wash-out period. The therapeutic and adverse effects were evaluated by comparing the intraocular pressure (IOP) before the change to that at 1, 4, 7, and 10 months thereafter.

Results

The mean IOP before the instillation of eyedrop and the mean reduction of IOP at each time was 18.66 ± 8.22 mmHg (n = 21) and 2.47 ± 3.19 mmHg (13.24%) at 1 month, 19.05 ± 8.54 mmHg (n = 18) and 3.68 ± 5.55 mmHg (19.32%) at 4 months, 16.68 ± 2.52 mmHg (n = 16) and 2.13 ± 2.87 mmHg (12.77%) at 7 months, and 20.07 ± 9.91 mmHg (n = 14) and 2.79 ± 4.48 mmHg (13.90%) at 10 months. All reductions were statistically significant ($p < 0.05$). Side effects included soreness (two eyes, 7.7%), red eye and allergic symptoms (three patients, 11.5%), and discomfort (three patients, 11.5%); there were no severe adverse events such as permanent vision loss or systemic side effects.

Conclusions

A fixed combination of bimatoprost-timolol reduced the IOP of open-angle glaucoma patients without causing permanent vision loss or any other serious side effects.

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P-312

ABERRANT CORNEAL HOMEOSTASIS IN PATIENTS WITH LONG-TERM IOP-LOWERING MEDICATIONS

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Purpose
The trigeminal nerve maintains homeostasis of the ocular surface through neuroimmune interactions. The clinical side effects of long-term use of intraocular pressure (IOP)-lowering medications in terms of these neuroimmune interactions are unclear. In this study, we retrospectively analyzed the *in vivo* confocal microscopy (IVCM) findings of patients receiving IOP-lowering medications in a unilateral eye.

Methods
We analyzed the data of 16 eyes of 8 patients with glaucoma (mean age, 69.5 ± 11.4 years; 1 male, 7 female) who received IOP-lowering medications in only one eye for more than 1 year at Kansai Medical University Hospital from July 2020 to August 2021. The corneas of the eyes receiving IOP-lowering medications and the contralateral eyes were examined using IVCM (Heidelberg Retina Tomograph III with Rostock Cornea Module; Heidelberg Engineering GmbH, Heidelberg, Germany). Five 0.16-mm^2 images (Images with a size of 400 µm square) were prepared for each eye, and the trigeminal nerve density (µm/mm^2) and dendritic cell count (cells/mm^2) were calculated. For measurement of the basal cell size, the area of 15 basal cells located in the center of a 0.16-mm^2 image per eye was measured using Image J software (National Institutes of Health, Bethesda, MD, USA), and 6 images per eye (total of 90 cells for each eye) were used for analysis. These three items were compared between the eye receiving IOP-lowering medications and the opposite eye using analysis of variance.

Results
The mean period of treatment with IOP-lowering medications was 1615 ± 1141 days. The mean number of IOP-lowering medications was 1.875 ± 1.268. No patients had a history of eye surgery, and none of them were contact lens users. There was a significant difference in the trigeminal density between the affected and healthy eyes ($p = 0.0001$). A significant difference was also observed in the number of dendritic cells ($p = 0.0273$) and the basal cell size ($p = 0.0000$).

Conclusions
The long-term administration of IOP-lowering medications resulted in a decrease in corneal nerve density and an increase in the number of dendritic cells and the corneal basal cell size. The use of IOP-lowering medications for more than 1 year may disturb the homeostasis of the cornea through alteration of neuroimmune interactions.

P-314

MEDICAL TREATMENT FOR LIMBAL EPITHELIAL STEM CELL DEFICIENCY IN PATIENTS TREATED FOR GLAUCOMA

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Purpose

Limbal epithelial stem cell deficiency (LSCD) is an abnormal corneal epithelial lesion with several causes. Bullous keratopathy, multiple surgeries, and drug-related damage can cause LSCD in glaucoma patients. We evaluated the medical treatment course for LSCD in patients with glaucoma.

Methods

We retrospectively reviewed the electronic medical records of patients diagnosed with LSCD and investigated their background, course of treatment, and classification stages of LSCD before and after treatment. The global consensus classification system (stages IA–C, IIA–B, and III) proposed by Deng et al. (Cornea 2020) was used.

Results

Seven patients (two males) and eight eyes were studied. The median age of the patients was 82 years, and the mean duration of glaucoma treatment was 8 years. The patients had open-angle glaucoma (four eyes), exfoliation glaucoma (one eye), neovascular glaucoma (one eye), normal tension glaucoma (one eye), and secondary glaucoma (one eye). Stage classifications at diagnosis were stage IA in four eyes and stages IC, IIA, IIB, and III in one eye each. All treatments were carried out with dry eye drops, steroid eye drops, and antibiotics. The mean duration of treatment was 1.4 years. The classifications at the time of the final visit were normal corneal epithelium (three eyes), stage IA (two eyes), IIA (one eye), and III (two eyes). Three eyes (37%) improved by more than one stage and one eye deteriorated by more than one stage.

Conclusions

Medical treatment for LSCD due to long-term use of glaucoma medication is useful.

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P-315

ASSOCIATION BETWEEN EYE DROP INSTILLATION TECHNIQUE AND VISUAL FIELD PROGRESS IN GLAUCOMA PATIENTS

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Purpose
To assess the association between eye drop instillation technique and rate of progression of the visual field in glaucoma patients.

Methods
Transversal study. Patients receiving topical antiglaucoma treatment applied by the patient itself in both eyes for at least one year, with best corrected visual acuity ≥ 20/60 in at least one eye, who had at least five visual fields exams performed in their clinical record were included.

A self-report questionnaire about eye drop instillation difficulty was applied.

Patients were asked to apply fluorescein saline solution eye drops the same way they do at home, and were recorded doing so in each included eye. The installation was categorized as successful if it was possible to detect fluorescein from the cul-de-sac 30 seconds after the eye drops application. The number of drops required to achieve a successful application was also recorded.

The association between eye drop application technique and the rate of visual field progression was evaluated using a mixed regression model to account for the inclusion of both eyes of the same patients.

Results
150 eyes of 78 patients were included. An average of 6.5 visual fields (standard deviation (SD) 2.8) were performed in an average perimetric follow-up of 5.5 years. The annual progression rate was -0.31 decibels/year (dB/y) on average (SD 1.22).

All the subjects evaluated achieved a successful application, requiring for this an average of 2.2 drops. A successful application using just 1 drop was achieved in 61.5% of cases. On the other hand, 17.9% required 3 drops or more to achieve a successful application. Patients in this last group was classified as excessive drop spenders.

The average annual progression rate in the excessive spending group was -0.89 dB/y (95% confidence interval (CI95%) -0.14 to -1.65). When adjusted for other variables, excessive drop spender patients progressed -0.76 dB/year faster than non-excessive drop spending patients (p=0.005)

Conclusions
Excessive drop spending patients present a significantly higher visual field progression rates.

Efforts in educating patients on proper eye drop instillation technique might have an positive impact in glaucoma progression.

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P-316

TRIPLENEX (TRIPLE FIXED COMBINATION) USE EVALUATION IN PATIENTS WITH GLAUCOMA: RANDOMIZED CLINICAL TRIAL

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Purpose

This project purpose is to evaluate the effectiveness, ocular surface quality, medication adherence and quality of life in 17 glaucoma patients in use of three separate drugs (Bimatoprost 0.3%, Timolol Maleate 0.5% and Brimonidine Tartrate 0.2%) comparing with triple combination, Triplenex.

Methods

In this clinical trial approved by the Unifesp Etical and Research Comitte, volunteer glaucoma patients will be recruited from Unifesp Glaucoma Sector and VerMais Glaucoma Sector. They will be randomly divided em two groups,Group I is going to be treated with Triplenex (1 drop twice a day) and Grupo II with Brimonidine Tartarate (1 drop twice a day), Timolol Maleate (1 drop twice a day) and Bimatoprost (1 drop at night). At baseline visit a complete ophthalmolgical exam will be performed along with three questionnaires (“Ocular Surface Disease Index”, “Glaucoma Treatment Compliance Assessment Tool” and

“National Eye Institute Visual Function Questionnaire”),retinography, visual field, optic nerve OCT in all patients. This procedure will be repeated at baseline and within 4, 8, 12 weeks.

Results

Mean age, visual acuity, mean deviation and intraocular pressure (IOP) were similar between Group I and Group II (64.82±11.55 years,-10.59±9.09 dB, 16.23±4.94mmHg). Ocular Surface and QoL questionnaires showed no difference between groups.There was significant difference between washout IOP visit and third visit using the randomized eyedrops (25.8±7.9mmHg, 15.2±1.8mmHg, p=0.001).

Conclusions

Patients with glaucoma using separate drugs (Bimatoprost 0.3%, Timolol Maleate 0.5% and Brimonidine Tartrate 0.2%) comparing with triple combination, Triplenex had similar responses in IOP control,ocular surface index, QoL and in 4 months of evaluation. Both groups had significant IOP reduce comparing the washout visit and 2 months eyedrops use.

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P-317
TOPICAL GLAUCOMA THERAPY ANNUAL COST IN MEXICO

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Purpose
To estimate annual cost of the different topical ocular hypotensive drugs available in Mexico based on their cost, volume and number of drops dispensed by the bottle.

Methods
For some of the most commonly prescribed glaucoma drugs in Mexico, we counted the number of dispensed drops per bottle and measured the volume in each container. We averaged the measurements obtained for 10 bottles per medication. and calculated the number of drops per milliliter and the filling variation. The annual price was obtained using the average wholesale price and the conventional dosage regime. Descriptive data analysis of the qualitative variables, simple frequencies and percentages was used to compare the costs between the drugs.

Results
Twenty-six different medications were studied, which were divided into groups according to their mechanism of action. Most presented some degree of overfilling, however, those with the highest percentage of overfilling were also the ones with the highest cost. Triple fixed combinations were the most expensive group while dual fixed combination drugs, alpha agonists, and carbonic anhydrase inhibitors had similar annual costs. Prostaglandin analogs presented the best cost-effectiveness ratio. Beta-blockers were the group with the highest volume per bottle, the longest duration in days and the lowest cost.

Conclusions
Annual cost of glaucoma therapy depends not only on the price of the medications, but on the actual volume contained and the number of drops dispensed per bottle, dosing regime and wasted drops in incorrect instillations. These factors should be considered when choosing glaucoma treatment.

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P-318
GLAUCOMA IN PATIENTS WITH COVID-19

D Kazakova

Purpose
COVID-19 is an infectious disease caused by the virus of severe acute respiratory syndrome Coronavirus 2 (SARS-CoV-2). The data gathered over the past two years show that apart from being an infection of the respiratory system, COVID-19 affects a range of other systems and organs, including the eye. We studied several cases with previously existing glaucoma and also patients who visited the clinic and were diagnosed for the first time. Due to the pandemic and the difficulties that it brought, some patients weren't able to attend the normal visits to the ophthalmologist for observation or change in medical regimen. As a result, intraocularpressure (IOP) appeared significantly high in people who have been ininfected with COVID-19, even if they had full recovery.

Methods
Patients previously diagnosed with glaucoma

Patients after long time without observation came with increased IOP. They were treated for glaucoma with monotherapy and had good response.

Patients without prior diagnosis of glaucoma Patients who came to outpatient clinic with sudden increase of IOP (55mmHg) following COVID-19 infection.

Results
1.Glaucoma patients under monotherapy were added a second and third medicine to reduce their IOP.

2.Some of them further underwent SLT, MIGS, where the IOP had not been reduced to a sufficient level.

3.Patients who were first diagnosed with glaucoma after COVID-19 were put on a medication treatment with 2IOP-reducing drugs and are still monitored.

3.It is worth noting that despite the high IOP values prior to the glaucoma diagnosis, patients responded well to the drug treatment.

4.COVID-19 obstructed the regular monitoring of glaucoma patients and the post-COVID treatment poses many difficulties and challenges for these patients.

5.The diagnosis and monitoring of newly diagnosed glaucoma patients raise the question of possible toxic effects of the COVID-19 virus on the trabecular meshwork and possible vascular dysregulation, which could explain the high IOP levels.

6.Additional future studies will show the effect of COVID-19 on glaucoma patients.

Conclusions
As the pandemic continues to affect the world, it is crucial for physicians to understand the manifestations of COVID-19. Science has yet to determine whether the standard protocol treatment for COVID-19, which includes corticosteroids or other medicines, affects the trabecular meshwork of non-glaucomatous COVID-19 patients.

P-319

SENOLYTICS IN GLAUCOMA: A REVIEW OF THE LITERATURE, PERSPECTIVES AND PROSPECTS

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Purpose
To evaluate the latest data and the new prospects for the use of senolytic drugs in glaucoma.

Methods
Review of the literature

Results
Recent experimental and clinical studies have shown a possible correlation of glaucoma with the presence and buildup of senescent cells. On murine models' early removal of senescent cells had a beneficial effect on the remaining retinal ganglion cells (RGCs).Increased intraocular pressure had a higher effect on RGCs functional recovery in elder eyes and in another case increased formation or toxic deposition of astrocytes and complementary factors respectively in older subjects. Retrospective studies highlight the absence of ocular and systemic sideffects of senolytic drugs under oral administration. The most commonly used senolytic compounds in these studies are drugs as dasatinitb, quercetin and fisetin. A larger range of natural compounds has senolytic action (flavonoids,antioxidants etc) and many are already used as dietary supplementals. At the same time NIH under the joint action of the SecNet Consortium tries to map collectively the types on senescent cells in the human body and their role in disease. Concurrently a series of clinical trials under the auspices of Translational Geroscience Network are evaluating the efficacy of known senolytic drugs in a variety of geriatric diseases.

Conclusions
Senescent cells have a major role in the pathogenesis and evolution of the diseases in the geriatric spectrum. Recent studies pinpoint to a correlation of the aging ocular pathology and senescence with glaucoma having its share in it. Programs as the SecNet Consortium will help in a faster and coherent way in cataloguing and studying the senescent cellular types in the human body and their mechanisms. There's a series of known senolytic compounds used as drug and dietary supplements with an established and safe adverse reaction profile when used systematically. They could be effectively administered as eye drops formulations or as stable formulations with drugs already used in glaucoma treatment.

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P-322
ANURIC ACUTE KIDNEY INJURY AFTER TAKING ACETAZOLAMIDE FOR GLAUCOMA TREATMENT

M Lee

Purpose
Acetazolamide (ACZ) is a sulfonamide derivative that inhibits carbonic anhydrase and was approved by the Food and Drug Administration in 1953 for its use as a diuretic, anticonvulsant, and antiglaucoma agent. ACZ is rapidly absorbed, achieves a peak concentration at 2 to 4 hours, and is eliminated unchanged in the urine.

I report a case of an anuric acute kidney injury (AKI), an underrecognized complication of ACZ, in a healthy middle-aged man after taking ACZ for treatment of glaucoma.

Methods
A 41-year-old man with a history of glaucoma took two 2 doses of ACZ 250mg for the treatment of glaucoma(OD). The patient said that there were no abnormal findings in a health examination 2 months before. Five days after taking ACZ, he developed concentrated urine. Six days after taking the medicine, or on the day of visiting our hospital, the patient visited the local clinic with bilateral flank pain. In local clinic examination, microscopic hematuria was found in urinalysis, and abdominal ultrasonography showed bilateral hydronephrosis. The patient was transferred to the emergency department at 11 AM.

Results
His physical examination was unremarkable and vital signs were within normal limits. In the early morning, there was costovertebral angle tenderness (CVAT), but these disappeared on admission to the ER. After visiting the ER, the urine was shut down.

His initial evaluation included a noncontrast abdomen CT that showed bilateral hydronephrosis suggesting urinary obstruction, suspicious abrupt narrowing in left mid ureter and right distal ureter with high density intraluminal lesion, suggesting stone. Additional blood tests revealed mild leukocytosis, serum creatinine 2.50 mg/dl, serum bicarbonate of 15 mmol/L, serum anion gap of 14 mmol/L, serum potassium of 4.2 mmol/L, and CRP of 1.52 mg/dL. After 12 hours, his serum creatinine was upto 4.99 mg/dl and eGFR was 12.38 ml/min/1.73m2. For obstruction and rapidly decreased renal function, he underwent emergency surgery for bilateral uteteral stents. After that, he started urinating and his renal function was restored.

Conclusions
The cause of an anuric AKI after taking ACZ for the treatment of glaucoma was bilateral obstruction caused by debris-like urinary stones. We report renal complications that occurred within a short period after taking acetazolamide. In addition to the well-known complications such as metabolic acidosis when prescribing ACZ, it is necessary to explain the risk of complications such as urinary stones.

P-324

EFFICACY AND TOLERANCE OF NETARSUDIL LATANOPROST FIXED DOSE COMBINATION (NLFC) IN A SWITCH STUDY WITH OTHER GLAUCOMA MEDICATIONS

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Purpose

To study the Efficacy and Tolerance of Netarsudil-Latanoprost Fised Dose Combination(N-LFC) in a switch study in Glaucomatous Eyes with inadequate IOP control in 24 Patients (24 OD & 24 OS) on Glaucoma Medications.

Methods

24 of 34 Glaucoma Patients (POAG 20 PACG 1 (S/P LPIS) SOAG 3) 17 Black 6 White &; 1 Hispanic; 16M: 8F; Ages < 50 (1) 50-69 (12) 70-89(11) with 24 OS &; 24 OS (2 OD &; 2 OS Only) with inadequate IOP Control on Current Anti Glaucoma medications &; Switched to NLFC 23 Pts (20 OU, 2 OD &; 1 OS) complete 48 wks (44-52 Wks) mean 12 mths were studied. 6 pts who completed 3 - 9 mths were excleded 5/34 pts discontinued due to side effects - Corneal Edema (3) Intolerance - Redness-Irritation(1) &; Body aches (3) Pre switch Glaucoma Medications switched to NLFC included Netarsudil (4) PGAS (7) Netarsudil &; PGAs (8) Other Medications (4) IOPs in mm Hg were measured at Visit 0 (Initial) Vist 1 @ 2wks (1-3 wks) Visit 2 @ 4 wks (3 -5 Wks) Visit 3 @ 12 wks (10-14 wks) Visit 4 @ 24 wks (22- 26 wks) &; Vist 5 @ 48 wks (44 - 52 wks) after switch.

Results

IOPs in mm Hg Visit 0 : 24.6 (12-40) OD 21.9 (10-46) OS Visit 1: 20.9 (14-34) OD (P 0.004) 19,8 (12-45) OS (P:0.002) Visit 2 : 21 (12-31) OD (P: 001) 19.6(12-40) OS (P: 002) Visit 3 : 20.5 (11-31) OD (P :0.001) 19.1 (12-40) OS (P:0.003) Visti 4 : 20.5 (11-31) OD (P: 0.001) 20.1 (12-40) OS (P : 0.002) Visit 5 : 18.4 (11-26) OD (P : 0.001) 16.95 (10-24) OS (P : 0.02) Preswitch Hyperemia : 0 (11) +0.5-1 (9) +2 (3) +3 (1) Post Switch Hyperemia : 0 (12) +0.5-1 (6) + 2 (4) + 3 (2) Reduction in No. of Bottles : 3.2 Pre vs 2.7 Post Switch. No.Meds : 2.8 Pre vs 2.4 Post Switch

Conclusions

1 Netarsudil Latanoprost Combination (NLFC) is better than most Single & Combination Glaucoma Medications and equal to Netarsudil and Latanoprost used separately together. 2. The Safety profile is comparable to the other Glaucoma Medicatiosn except for Corneal Edema in few patients with few exceptions where Hyperemia increased.

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P-325
NTG UNRAVELLING THE CONUNDRUM FOR METABOLIC SYNDROME: A CASE REPORT

S Tripathi

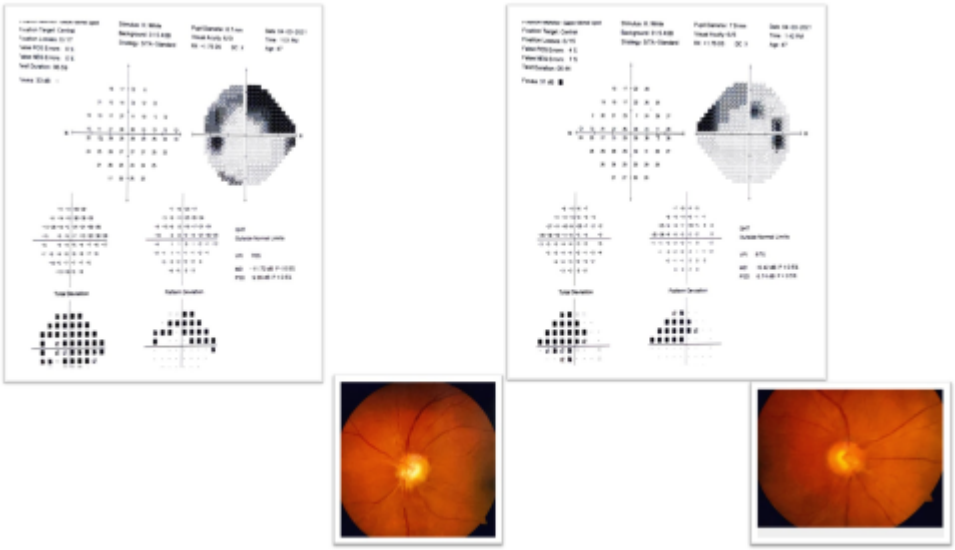
Purpose
We present a case where the underlying cause of NTG was diagnosed with detailed history taking and examination as OSAS due to Metabolic Syndrome. This led to prevention of life threatening comorbidities due to Metabolic syndrome and OSAS. In turn there was also improved control of the Progression of NTG

Methods
A 47 year old male presented with Chief Complaint of watering both eyes on and off for 2months. Patient was on antihypertensives treatment with irregular usage. BCVA: Both eye 6/6. Anterior Segment was within normal Limit. Gonioscopy :Both eyes had Open Angle. Baseline IOP inRight Eye was16mmHg &Left Eye 18 mmHg . Fundus Right eye:Cup Disc Ratio 0.6 with Inf Notch& Left Eye:CDR 0.65 Inf Notch. Pachymetry: Right Eye 490µ and Left Eye was 500 µ..Fields&OCT showed the corresponding disc damage changes.

Pattern of IOP showed rise despite on Treatment with AGM. There was addition of drugs to the treatment regimen. There was progressive weight gain and history of day time Sleepiness.

Results
Patient was diagnosed with metabolic syndrome leading to obstructive sleep apnea and normal tension glaucoma .appropriate measures were taken by the Otolaryngologist and Physician, in turn resulting in an appropriate treatment of Metabolic Syndrome&OSA .

This translated to control of IOP.

Image


Conclusions
Interprofessional approach with holistic care lead to the appropriate diagnosis preventing patient from the comorbidities of metabolic syndrome and treatment of OSA and prevention of Progression of normal tension glaucoma.

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P-326

SIGNIFICANT REDUCTION IN THE RATE OF GLAUCOMA PROGRESSION AFTER ADDING SYSTEMIC AND TOPICAL UBICHINON-10: A CASE REPORT

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Purpose

Idebenone being synthetically and Ubichinon-10 (Ubidecarenon, Coenzyme Q10) produced naturally in the body are in discussion to be helpful in treating glaucomatous eyes by protecting the optic nerve. Formulations of Ubichinon-10 for the treatment of glaucoma patients are meanwhile available. Here we report about a patient, who was under topical medical therapy for glaucoma and was additionally treated with Ubichinon-10.

Methods

At the first time of presentation in 2018, the female patient was 55 years old and had a diagnosis of ocular hypertension in the right eye and early open angle glaucoma in the left eye. Local therapy in both eyes was already Dorzolamide/Timolol fixed combination twice daily and a prostaglandine once daily and was continued without changing the medication. In March 2019 a disc hemorrhage was observed in the left eye, and a first selective laser trabeculoplasty (SLT) was performed twice. However, further structural und functional progression in the left eye was observed (the right eye was stable). As the patient was very opposed to a recommended surgical intervention to lower the intraocular pressure (IOP), an attempt with topical and oral administration of Ubichinon-10 was made, 2 x 100 mg orally and eyedrops in a concentration of 1 mg/ml twice daily.

Results

The patient showed up for follow-up examinations very regularly every 3 months for IOP measurements and structural assessment by optical coherence tomography (OCT; circumapapillary nerve fibre layer measurements (RNFL) and posterior pole analysis). The intraocular pressure was in a range between 13-15 mmHg in the right and 15-17 mmHg in the left eye in the visits. There were no defects in perimetry in the right eye but there were nasal defects in the left eye. The slope of progression in the temporal inferior sector of the retinal nerve fibre layer (RNFL) was -18 µm/year until the combined admistration of Ubichinon-10. Thereafter, slope reduced to a rate of -4 µm/year to the current date. Compliance and adherence of the patient can supposed to be excellent.

Conclusions

Although being a single patient report, the alteration in slope of progression of structural changes after persistent additive therapy (combined oral and topical) is impressive. Except for the addition of Ubichinon-10 there was no other change in treatment. Ubichinon-10 therapy should be worded towards the patient as “attempt to heal”, as Ubichinon-10 is a dietary supplement and not a classical pharmaceutical drug.

P-327

EVALUATION OF TRIPLE-FIXED-COMBINATION OF BIMATOPROST-TIMOLOL-BRIMONIDINE CONTROL OF INTRAOCULAR PRESSURE IN PATIENTS WITH GLAUCOMA

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Purpose

The purpose of this study was to evaluate the intraocular pressure (IOP)-lowering efficacy of a triple-fixed-combination of bimatoprost 0.01%/brimonidine 0.15%/timolol 0.5% (Tripligan ®) ophthalmic solution instilled once-daily or twice-daily and its safety in two different groups of patients with glaucoma.

Methods

Patients with diagnosis of glaucoma in whom IOP control was not achieved with fixed-combination of timolol/brimonidine/dorzolamide were included in this study. Patients were divided in two groups, one group with a history of intraocular surgery and the other group without intraocular surgery. After washout of previous treatment, eyes were randomly assigned to receive once-daily or twice-daily therapy of fixed combination of bimatoprost-timolol-brimonidine. IOP follow-ups were performed the day after starting treatment, at 8,15,30 and 90 days later. Safety, including adverse events, was assessed at each visit.

Results

77 eyes of 43 patients (mean age was 63.8 years) met the inclusion criteria and were included in this study. Group 1 (n=31) had a history of intraocular surgery and group 2 (n=46) had no history of intraocular surgery. The mean IOP reduction in group 1 was 8,9 ± 2,4 mmHg (41.2%); in eyes receiving 1 drop per day the mean IOP reduction was 9.2 ± 2.4 mmHg (42.3%) and in eyes receiving 2 drops per day the mean IOP reduction was 8.8 ± 2.5 mmHg (40.6%). In group 2, the mean IOP reduction was 8,8 ± 2,5 mmHg (40.6%); in eyes receiving 1 drop per day the mean reduction was 8,8 ± 2.5 mmHg (40.3%) and in eyes receiving 2 drops per day the mean reduction was 8.8 ± 2.5 mmHg (40.4%). There were no statistically significant differences identified in baseline IOP, final IOP, or IOP difference values between both groups and between once-daily vs twice-daily dosing groups ($p>0.05$). There was also no significant difference in IOP-lowering efficacy comparing patients with a diagnosis of open-angle, angle-closure or secondary glaucoma in both treatment groups ($p>0.05$). Treatment-related conjunctival hyperemia, ocular irritation, and dry eye were reported more frequent in eyes receiving 2 drops per day than 1 drop per day (60.2% vs 46.5%; $P < 0.05$). However, no discontinuations or unexpected adverse events were reported.

Conclusions

Triple-fixed-combination bimatoprost/brimonidine/timolol is equally as effective in patients with or without history of intraocular surgery. Also, it was demonstrated the same efficacy when used once-a-day or twice-a-day dosis, with fewer adverse effects.

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P-328

OCULAR SURFACE DISEASE WITHIN SPECIALIST GLAUCOMA CLINICS IN THE UNITED KINGDOM: A CONTEMPORARY PREVALENCE STUDY

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Purpose
Ocular Surface Disease (OSD) is a common condition that is often debilitating to patients impacting their quality of life, and with significant economic burden to healthcare systems. Patients with glaucoma are often affected by OSD due to exposure to preservatives in eye-drops and due to an increased incidence with age. However, the extent of this problem has yet to be studied in the United Kingdom. We aimed to estimate the prevalence of OSD within specialist glaucoma clinics in the United Kingdom through both patient-reported outcomes and objective clinical examination findings.

Methods
A cross-sectional study of 878 patients attending specialist glaucoma clinics at Moorfields Eye Hospital in February 2019. Participants were recruited after giving informed consent and completed 3 validated questionnaires whilst waiting for their routine outpatient consultation: The Ocular Surface Disease Index (OSDI), The Symptom Assessment iN Dry Eye (SANDE) 10-point Visual Analogue Scale and the Glaucoma Symptom Scale (GSS). Treating clinicians documented the presence of blepharitis, tear film instability and graded corneal and conjunctival staining using the 5-point Oxford Scheme against reference standards.

Results
The prevalence of OSD in this population using the patient-reported OSDI was 57.5%, of which 18.4% were classified as mild, 13.5% moderate and 25.5% severe. The mean GSS score was 13.9 (95% CI: 11.7-16.0), mean SANDE score for frequency of symptoms 3.5 (95% CI: 3.3-3.8) and mean SANDE score for severity of symptoms 3.0 (95% CI: 2.8-3.2). Using the objective Oxford Grading Scheme, 65.3% of patients had abnormal corneal/conjunctival staining, with 36.5% showing minimal staining, 18.3% mild and 10.3% severe. There was a significant positive correlation between OSDI and Oxford Grading Scores ($r=0.16$, $p<0.0001$). 49% of patients had tear film instability and 62% of patients showed signs of blepharitis.

Conclusions
There is a high prevalence of OSD in patients attending glaucoma clinics in the United Kingdom using both patient-reported outcomes and objective clinical examination findings. Treatment of this additional co-morbidity to improve patients' quality of life will increase the economic cost of caring for glaucoma patients. Future studies into the cost-effectiveness of preservative-free medications to reduce exposure to Benzalkonium Chloride may help minimise the burden of OSD to patients, and also reduce the associated economic burden to healthcare systems.

P-329

AN ANALYSIS OF 3,536 ADVERSE EVENTS FROM STENT-BASED MEDICAL DEVICES REPORTED BY THE FDA'S MANUFACTURER AND USER FACILITY DEVICE EXPERIENCE DATABASE

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Purpose

With the rapid growth of Microinvasive Glaucoma Surgery (MIGS), documenting and understanding adverse events is a topic of clinical importance for ensuring safe technology use and prioritizing complications. This study summarizes the medical device reports (MDRs) associated with adverse events for Stent-Based Medical Devices indicated for glaucoma reported by the FDA's Manufacturer and User Facility Device Experience (MAUDE) database.

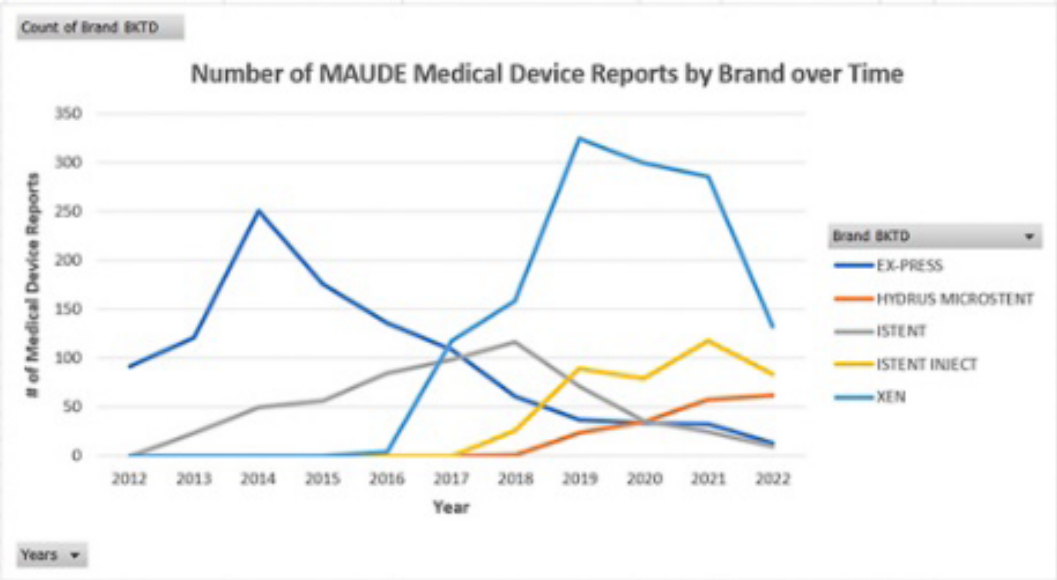
Methods

The FDA MAUDE database[1] was surveyed for MDRs for adverse events between 01/01/2022 - 10/30/2022 for Hydrus (Alcon), iStent & iStent Inject (Glaukos), XEN (Abbvie), and Ex-Press (Alcon) Stent-Based glaucoma medical devices. Event descriptions, device problems, and correlated patient problems were grouped and analyzed using R. All data is de-identified and HIPAA-compliant.

Results

3,536 MDRs met the inclusion criteria, 88% of which were associated with patient complications. The most common adverse event by device was Malpositioning of the device for Hydrus (30% of n=179), iStent (13% of n=573), and Ex-Press (15% of n=1063), Break (associated with the trocar) for iStent Inject (18% of n=396), and Physical Resistance/Sticking for XEN (7% of n=1325). Malpositioning of the device, the most frequent device malfunction across all MDRs (11% of n=3536), was associated with 27 unique patient problems, including intraocular pressure increases (13% of n=425) and eye injury (11% of n=425). The devices described within the Malpositioning reports comprise 41% Ex-Press, 13% Hydrus, 19% iStent, 18% iStent Inject, and 9% XEN. Between types of devices, Malpositioning was reported in 165 MDRs for Ex-Press (16% of n=1063), 53 MDRs for Hydrus (30% of n=179), 75 MDRs for iStent (13% of n=573), 70 MDRs for iStent Inject (18% of n=396), and 35 MDRs for XEN (3% of n=1325). The next two top-cited device malfunctions across all MDRs were Complete Blockage (7% of n=3536), comprising of Ex-Press (59% of n=229) and XEN devices (41% of n=229), followed by Obstruction of Flow (4% of n=3536), composing mainly of iStent devices (53% of n=130).

Image



Conclusions

While subject to a certain level of reporting and learning curve bias, the MAUDE database highlights insights not ubiquitously present in literature, lending critical perspective to the clinical setting. Ultimately, this retrospective study characterizes the most common and consequential side effects of Stent-Based glaucoma medical devices.

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P-330

ROCK INHIBITION-RELATED CONJUNCTIVAL HYPERAEMIA: EVENT CHARACTERISTICS FROM THE MERCURY-3 STUDY

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Purpose
Netarsudil (NET) is a Rho kinase inhibitor (ROCKi) for the treatment of glaucoma. NET is new to the market in Europe; however, it has been extensively studied (as monotherapy and in combination with latanoprost [NET/LAT]) in clinical programmes, real-world studies and practice. Conjunctival hyperaemia (CH) has been observed as a relatively common adverse event with NET/LAT treatment in previous MERCURY 1 and 2 investigations. This exploratory analysis examines the characteristics of CH in the MERCURY-3 population.

Methods
MERCURY-3 was a head-to-head six-month prospective, double-masked, randomized, parallel-group, non-inferiority study that compared (NET/LAT 0.02%/0.005%; Roclanda®) with bimatoprost 0.03%/timolol maleate 0.5% (BIM/TIM; Ganfort®) [submitted]. Biomicroscopic grading of CH was performed on a standardised, 4-point scale: 0 = none (normal); 1=mild; 2=moderate; 3=severe. This analysis was performed in the study safety population.

Results
The NET/LAT safety set included 218 patients. In those with a treatment-related CH (n=67; 30.7%), 34 (50.7%) had CH recorded at baseline and 33 (49.3%) had no CH at baseline. The mean time of onset of CH was 57.8 days (median, 42; range, 1–185). CH resolved in 27 of 67 (40.3%) patients in the NET/LAT arm during the study; mean time to event resolution was 42.1 days. Times to onset and resolution were similar in those with or without CH at baseline. In the BIM/TIM arm (n=212), 19 (9.0%) patients had a CH event (of which 9 [47.4%] had no CH reported at baseline) with a mean onset of 61.7 days. In 10 [52.6%] of them, the CH resolved after a mean of 21.8 days. At each study visit, in both treatment arms, the majority of patients had a CH grade of 0 or 1, and the mean overall grade through six months was <1.

Conclusions
CH has been reported with both ROCKi and prostaglandin treatment for glaucoma, and its incidence in a therapy combining both classes of agents is expected. The severity of CH was mild in both the treatment arm containing a ROCKi and latanoprost and the BIM/TIM arm; both arms had a similar onset of CH and, in those with a resolving event, a similar time to resolution. In the recent MERCURY-3 trial, CH was reported in 30.7% of patients, which is consistent with recent real-world insight and lower than in the previous MERCURY-1 and -2 trials. This analysis, in conjunction with expanding real-world experience and trial findings, helps contextualise the risk and severity of CH in patients treated with NET/LAT.

P-331

PHASE 3 TRIALS OF IDOSE TR (TRAVOPROST INTRAOCULAR IMPLANT) VERSUS TOPICAL TIMOLOL

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Purpose

Two Phase 3 registration trials (GC-010, GC-012) evaluated the safety and efficacy of a single administration of one of two models of travoprost intraocular implants (slow-eluting [iDose TR], fast-eluting) vs timolol maleate ophthalmic solution, 5 mg/mL twice daily in patients with open-angle glaucoma (OAG) or ocular hypertension (OHT).

Methods

The two multicenter, randomized, double-masked, active-controlled trials enrolled adult patients with OAG or OHT, on 0 to 2 IOP-lowering medications at screening. IOP entry criteria included a mean diurnal IOP of ≥ 21 mmHg and IOP ≤ 36 mmHg in the study eye at each timepoint (8AM, 10AM, and 4PM) after washout, if applicable. A total of 385 fast-eluting travoprost intraocular implant patients, 380 slow-eluting travoprost intraocular implant (iDose TR) patients and 385 timolol control patients were randomized into the trials. The primary efficacy endpoint was non-inferiority to twice-daily topical timolol 5 mg/mL based on change from baseline in IOP at 8AM and 10AM at Day 10, Week 6 and Month 3. Safety was evaluated through Month 12, including adverse events and ophthalmic assessments including visual acuity, slit lamp and fundus examinations, perimetry, pachymetry, and specular microscopy.

Results

Mean IOP reductions from baseline over the first 3 months of treatment with slow-eluting implant (iDose TR) were 6.6 to 8.5 mmHg and 6.7 to 8.4 mmHg in the GC-010 and GC-012 trials, with corresponding results for fast-eluting implant of 6.6 to 8.4 mmHg and 6.3 to 8.3 mmHg in the two trials. For the timolol groups, IOP reductions were 6.5 to 7.7 mmHg and 6.8 to 7.2 mmHg in in the two trials. At Month 12, a higher percentage of slow-eluting implant (iDose TR) patients (93%) versus timolol patients (67%) were well-controlled on the same or fewer IOP-lowering topical medications compared to screening. In addition, 81% of slow-eluting implant (iDose TR) patients did not require topical IOP-lowering medications. There were no reports of clinically significant endothelial cell loss, periorbital fat atrophy, or serious corneal adverse events. Conjunctival hyperemia occurred in 3% of travoprost implant patients.

Conclusions

The slow-eluting implant (iDose TR) was non-inferior to topical timolol in IOP-lowering efficacy, with a favorable safety profile and a high proportion of patients remaining well-controlled on the same or fewer IOP-lowering medications compared to screening.

P-332
GLAUCOMA DRUG DELIVERY SYSTEMS: A SINGLE-CENTER SURVEY

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Purpose
To report on glaucoma patients' beliefs and illness perceptions and to investigate their opinion on ocular drug delivery devices (ODD)

Methods
We performed a cross-sectional study in a tertiary referral outpatient glaucoma clinic at the university hospital in Bonn, Germany, which included 102 patients. Validated anonymized questionnaires were used (Beliefs about Medicines Questionnaire (BMQ), Brief Illness Perception Questionnaire (BIPQ), Modified 8 Item Medication Adherence Scale (MMAS-8)) which were slightly adjusted following a pilot survey. We investigated the awareness and acceptance regarding ODD (contact lenses, punctal plugs, subconjunctival implants, anterior chamber (AC) injections and stents) and looked at factors that could influence a patients' decision for having an ODD.

Results
63 patients (61.8%) confirmed that they would rather have an ODD than keeping their eye-drops (39, 38.2%). The most important factors influencing their decision were effectiveness (mean value: 9.38) and long-lasting effect (mean value: 9.05). A large share of patients reported accepting contact lenses (49, 48.0%), punctal plugs (54, 52.9%) or stents (45, 44.1%) whilst subconjunctival implants (37, 36.3%) and AC injections (29, 28.4%) were less favoured. When comparing patients who preferred ODD (group 1) over eye-drops (group 2), significantly more patients in group 1 were worried by their use of eye-drops ($p<0.001$), did not understand their eye-drops ($p=0.0024$), felt disrupted by their eye-drops ($p<0.001$) or were worried about becoming too dependent on eye-drops ($p<0.001$). Patients in group 1 also felt that their lives were significantly more severely affected by their glaucoma ($p=0.005$) and that they had significantly less control over their disease ($p=0.010$).

A significantly greater share of patients showed acceptance towards contact lenses (60.3% vs. 38.5%; $p=0.032$), AC injections (38.1% vs. 12.8%, $p=0.006$) or stents (54% vs. 28.2%, $p=0.023$) in group 1 whilst there were no significant differences regarding the acceptance of punctal plugs ($p=0.363$) or subconjunctival implants ($p=0.058$).

Conclusions
ODD for the treatment of glaucoma were broadly accepted by patients in this study. Effectiveness and long-lasting effect seem to be the most important factors for a decision towards having an ODD. The majority of patients who preferred ODD over eye-drops felt severely affected by their disease and was negatively influenced by the intake of their glaucoma medication.

P-333

THE EXIMORE LATANOPROST PUNCTAL PLUG: RESULTS OF A FIRST-IN-HUMAN STUDY IN EYES WITH OHTN OR EARLY OAG

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Purpose
To evaluate safety, tolerability, retention and preliminary IOP-lowering efficacy of the Eximore Latanoprost punctal plug, a non-absorbable nano-layered material molded with the drug

Methods
16 subjects were recruited. Following drops washout, the plug was inserted into the lower punctum in the study eye, while the other eye was treated only with commercially available Latanoprost drops (Xalatan). The investigator chose 1 of 2 plug designs - “wide” or “narrow”, each available in 3 sizes – small, medium or large. Subjects were followed after 2, 7, 14 days and after 1, 2, and 3 months.

Results
Mean age was 50.4 (range 25-73). 8 subjects (50%) had OHTN and 8 OAG; 8 had been previously diagnosed and treated, and 8 newly diagnosed. Post-washout IOP was 22.8±1.1 mmHg in the study eye and 23.0±1.2 in the fellow eye (p=0.61). 2 subjects withdrew early form the study, and 14 completed the 3-months follow-up. There was no serious adverse event. There were 61 ocular adverse events, 53 (86%) mild and 8 (14%) moderate, 35 in the study and 26 in the fellow eye. All of them resolved without intervention or only the use of lubrication. There were 4 possible device-related moderate adverse events, 2 cases of punctate keratitis and 2 foreign-body sensation; however in all these cases the same event and severity was recorded in the fellow eye, suggesting causality related to Latanoprost itself rather than the plug. Tearing was observed in only one case. Plug retention was 100% at 1 month; subsequently, in 8 of 14 subjects (57%) the original plug was retained throughout the 3-month study, whereas in the other 6 eyes an additional 1 (n=3) 2 (n=1) or 3 (n=2) plugs had been inserted. At the final visit, IOP was lower compared to baseline by 5.3 ±2.3 mmHg (23.1%) in the study eye and 5.5 ± 1.8 mmHg (24.0%) in the Xalatan-treated fellow eye (P=0.73).

Conclusions
These first in-human results suggest that the Eximore Latanoprost punctal plug is safe and tolerable. IOP-lowering was significant and similar to Xalatan, suggesting non-inferiority and a potential clinically meaningful effect. Further design refinement is planned to improve long-term retention of the plug.

P-334

A PHASE 3, RANDOMIZED STUDY COMPARING LATANOPROST PRESERVATIVE-FREE CATIONIC EMULSION TO PRESERVED-LATANOPROST IN GLAUCOMA AND OCULAR HYPERTENSION

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Purpose
To evaluate the intraocular pressure (IOP)-lowering efficacy, improvement in ocular surface disease (OSD) signs/symptoms and safety outcomes with the latanoprost preservative-free cationic emulsion (PF latanoprost CE) vs. Xalatan® (Pfizer) benzalkonium chloride (BAK)-preserved eyedrops (P-latanoprost) in open-angle glaucoma (OAG) and ocular hypertension (OHT).[1,2]

Methods
A Phase 3, prospective, parallel, multinational, investigator-masked, randomized, non-inferiority trial was conducted in OAG/OHT patients treated with topical monotherapy (IOP ≤18 mmHg). After washout, patients with IOP ≥22 mmHg (≤32 mmHg) in at least 1 eye were randomized to receive once daily PF latanoprost CE (50 µg/mL) or P-latanoprost (50 µg/mL) for 12 weeks. Primary endpoint was the change from baseline in mean peak (09:00) and trough (16:00) IOP at Week 12 (non-inferiority margin: 95% confidence interval [CI] for between-group treatment difference ≤1.5 mmHg). Secondary endpoints included the change from baseline in mean corneal fluorescein staining score (CFS; modified Oxford Grade Scale) and mean OSD symptom score at Weeks 4 and 12. Safety endpoints included adverse events (AEs) and suspected adverse drug reactions (SARs).

Results
Each treatment arm included 192 patients. Mean (standard deviation [SD]) age was 63.1 (11.16) years and 61.5% were female. Mean (SD) baseline diurnal IOP was 24.13 (1.81) mmHg. PF latanoprost CE demonstrated non-inferiority vs. P-latanoprost at Week 12 (Figure 1). Mean (standard error) IOP reduction from baseline with PF latanoprost CE was 8.8 (0.25; peak) mmHg and 8.6 (0.24; trough) mmHg vs. 8.2 (0.26; peak) mmHg and 8.1 (0.25; trough) mmHg with P-latanoprost. The least square mean between-group difference was -0.6 (95% CI -1.2, -0.1; peak) and -0.5 (95% CI -1.0, 0.1; trough). Non-inferiority was also shown at Week 4 (peak and trough). Compared with P-latanoprost, PF latanoprost CE provided significantly greater reductions in mean CFS score at Week 12 (p=0.0006) and OSD symptom score at Week 4 (p=0.0188). SARs occurred in 11 (5.7%) PF latanoprost CE users and 21 (10.9%) P-latanoprost users. No serious drug-related AEs occurred.

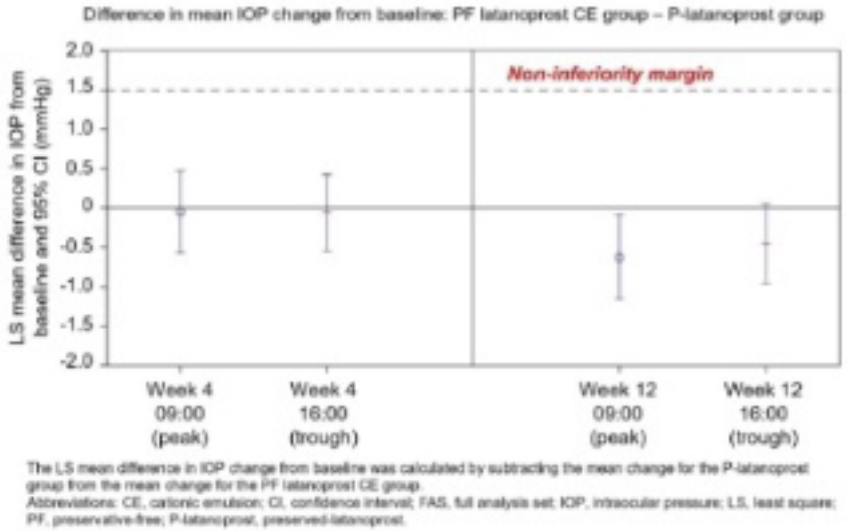
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Figure 1. Primary efficacy objective: non-inferiority of IOP-lowering efficacy at Week 12 peak and trough timepoints (FAS)



The LS mean difference in IOP change from baseline was calculated by subtracting the mean change for the P-latanoprost group from the mean change for the PF latanoprost CE group.
Abbreviations: CE, cationic emulsion; CI, confidence interval; FAS, full analysis set; IOP, intraocular pressure; LS, least square; PF, preservative-free; P-latanoprost, preserved-latanoprost.

Conclusions

PF latanoprost CE demonstrated non-inferiority vs. P-latanoprost concerning IOP-lowering efficacy at Weeks 4 and 12. PF latanoprost CE users achieved significantly greater reductions in mean CFS score (Week 12) and OSD symptom score (Week 4) vs. P-latanoprost users. Treatment was well tolerated in both groups.

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P-335

SAFETY AND EFFICACY OF A SINGLE ADMINISTRATION OF BIMATOPROST IMPLANT: 1-YEAR OUTCOMES

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Purpose

In a phase 3b study, intracameral administration of bimatoprost implant 10 µg (Durysta) lowered habitual intraocular pressure (IOP) throughout the day and night at Week 8 (primary endpoint).[1] This analysis of results from the same study evaluated 1-year IOP-lowering efficacy and safety outcomes after a single administration of the bimatoprost implant.

Methods

Multicenter, open-label, 12-month phase 3b study (NCT04285580) in patients with open-angle glaucoma or ocular hypertension. After washout and Baseline (BL) evaluations, patients received bimatoprost implant in the study eye on Day 1. A separate small cohort at a single site (reference arm, n=6) received bimatoprost 0.01% QD in the study eye. All fellow eyes received standard of care treatment. IOP was measured at 8 am with Goldmann applanation tonometry at BL, Day 2, Weeks 8 and 16, and Months 6, 9, and 12. Safety measures included treatment-emergent adverse events (TEAEs) and corneal endothelial cell density (CECD). Rescue IOP-lowering treatment could be initiated at the investigator's discretion. Change in IOP from BL in study eyes that had not been rescued was analyzed.

Results

All patients in the study arm (n=31) completed the 12-month study; 23 (74%) required no rescue IOP-lowering treatment. BL mean (SD) IOP was 24.2 (2.70) mmHg. Mean (SD) IOP reduction from BL in non-rescued eyes ranged from −8.6 (3.99) mmHg at Day 2 to −4.3 (3.35) mmHg at Month 12 (Figure). The most common TEAE was conjunctival hyperemia (incidence 35.5%, 11/31). No patient required implant removal, and no implant-treated eye had a ≥15% loss in CECD from baseline.

Image

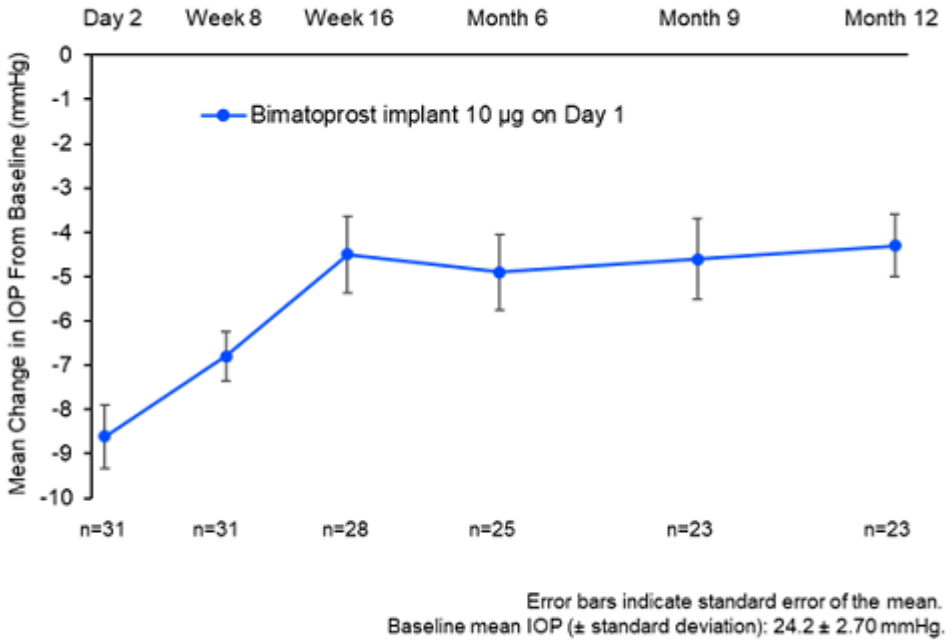


Figure. IOP change from baseline in non-rescued eyes.

Conclusions

In addition to lowering habitual IOP during the day and night, a single bimatoprost implant administration lowered IOP in the majority of patients for 1 year without additional therapy. The results are consistent with previous reports of a long duration of effect of the implant.2 The 1-year safety profile of the implant was acceptable. Study limitations include the small sample size.

A single administration of the bimatoprost implant was well tolerated and effectively lowered IOP, with the majority of patients requiring no additional treatment during the 12-month study. Patients treated with the bimatoprost implant have a high probability of needing no other IOP-lowering treatment for at least 1 year.

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P-336

THE 5-YEAR OUTCOME OF ASIAN PATIENTS WITH LOW-TO-MODERATE RISK OF OCULAR HYPERTENSION AFTER MEDICATION REDUCTION

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Purpose
To evaluate the 5-year outcome of patients with mild-to-moderate risk ocular hypertension (OHT) who underwent medication reduction and to investigate the baseline risk factors that predict primary open angle glaucoma (POAG) progression.

Methods
This is a prospective study. OHT patients on intraocular pressure (IOP) lowering medication underwent comprehensive assessment including IOP, central corneal thickness (CCT), visual field (VF), vertical cup disc ratio (VCDR), and retinal nerve fiber layer (RNFL) measurement by optical coherence tomography (OCT). Medication were stopped for eyes without glaucoma and were followed up at least 6 monthly for 5 years. Hazard Ratios (HRs) of baseline variables for predicting POAG progression, according to OHTS VF endpoint criteria and progressive RNFL thinning based on Guided Progression analysis (GPA) of serial registered RNFL thickness map, were calculated by Cox proportional hazard modeling.

Results
Four-hundred and six potential subjects were assessed in screening visits. 261 eyes of 138 OHT patients were included in the analysis. At 5 years, 51 eyes (19.5%) of 39 patients (28.3%) had POAG progression – 15 eyes (5.7%) developed new VF defect and 50 eyes (19.2) developed progressive RNFL thinning. Mean IOP (21.7±3.2 vs. 20.7±3.8mmHg), CCT (567.3±32.5 vs. 564.8±33.6µm), VF mean deviation (-1.30±1.68 vs. -1.70±1.99dB), VF pattern standard deviation (PSD) (1.81±0.70 vs. 1.95±1.03dB), VF index (98.5±1.8 vs. 97.7±3.71%), 5-year risk estimation (14.10±14.44 vs. 16.67±16.96%), and RNFL thickness (average: 89.8±9.4 vs. 88.5±10.5µm; superior: 109.3±17.0 vs. 106.3±17.0µm; nasal: 67.3±9.7 vs. 69.1±10.6 µm; inferior: 111.6±18.7 vs. 107.3±21.2µm; temporal: 72.0±13.7 vs. 71.0±15.5µm) changed at 5 year (all P≤0.035). After adjusting for age, IOP, CCT, PSD, and VCDR in multivariable models, baseline mean IOP [HR (95% CI); 1.19 (1.07-1.33) per 1 mmHg higher] and average RNFL [1.86 (1.20-2.87) per 10µm thinner] were predictive of glaucoma conversion. After adjusting for RNFL thickness in the models, a higher 5-year risk estimation was predictive of POAG progression.

Conclusions
In addition to the risk factors identified by the OHTS, a thinner RNFL thickness is also a risk factor for the development of glaucoma in patients with OHT.

P-337

EFFECTS OF NCX 470, A NITRIC OXIDE (NO)-DONATING BIMATOPROST, IN AN *IN VITRO* 3D-HUMAN TRABECULAR MESHWORK (TM)/ SCHLEMM'S CANAL (SC) TISSUE MODEL

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Purpose

NCX 470, a nitric oxide (NO)-donating bimatoprost[1], recently demonstrated non-inferiority to latanoprost at decreasing intraocular pressure[2] (IOP) in a pivotal phase 3 clinical trial in patients with ocular hypertension and glaucoma. Furthermore, this compound was effective at increasing uveoscleral and trabecular aqueous humor drainage in ocular normotensive non-human primates[3]. This study examines further the effect of NCX 470 on outflow facility and compares it to that of bimatoprost using a 3D-HTM/HSC™ co-culture tissue model[4].

Methods

Transforming Growth Factor Beta 2 (TGF-β2, 5 ng/mL for six days)-treated 3D-HTM/HSC™ constructs were used to mimic glaucoma-like conditions and explore the effects of treatment on outflow facility. Briefly, bioengineered 3D-HTM/HSC™ constructs were serum starved for 1 day and then treated for 6 consecutive days with vehicle (final 1%, DMSO), NCX 470 (10µM) or bimatoprost (10µM); on day 7 constructs from individual treatment groups were securely placed in the perfusion chamber and perfused at various rates for 5 hrs per flow rate (2, 4, 8, and 16 µL/min) for outflow facility (OF) determination.

Results

TGF-β2 treatment decreased outflow facility compared to naïve conditions [OF=0.71±0.04 and OF=0.47±0.02 µL/min/mm^2/mmHg, in naïve (n=4) and TGF-β2-treated (n=4) constructs, respectively]. NCX 470 (10µM) added to the culture media as well as during perfusion abolished the detrimental effects of TGF-β2 (OF=0.76±0.04 µL/min/mm^2/mmHg, $p<0.05$ vs TGF-β2). Bimatoprost, administered at equimolar concentration as NCX 470, diminished the effect of TGF-β2 by a numerically lower extent (OF=0.71±0.04 µL/min/mm^2/mmHg) compared to NCX 470.

Conclusions

Findings are consistent with NCX 470 improving outflow facility. This effect is likely dependent on the concomitant contribution exerted by both NO and bimatoprost on TM/SC conventional outflow. This effect, along with that exerted on uveoscleral outflow, explains the robust IOP-lowering effect of this drug observed in ocular hypertensive patients.

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P-338

IOP-LOWERING EFFICACY OF NETARSUDIL/LATANOPROST IN PATIENTS WITH GLAUCOMA STRATIFIED BY PRIOR MEDICATION USE: AN EXPLORATORY ANALYSIS FROM MERCURY-3

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Purpose
A recent real-world analysis showed that netarsudil (NET), a Rho kinase inhibitor (ROCKi), consistently maintained intraocular pressure (IOP) control when replacing previous IOP-lowering medication and provided additional IOP reduction in combination with other therapies in the treatment of glaucoma (Zaman et al., Curr Med Res Opin 2021; 37:1011–20). MERCURY-3 assessed the IOP-lowering efficacy of NET in fixed-dose combination with latanoprost (LAT) in people with ocular hypertension or open-angle glaucoma; this exploratory analysis examines the efficacy of NET/LAT in patients with or without prior prostaglandin (PGA) treatment, and who had received PGA either as monotherapy or in combination therapy, prior to washout in MERCURY-3.

Methods
MERCURY-3 was a head-to-head prospective, randomized, parallel-group, non-inferiority study that compared (NET/LAT 0.02%/0.005%; Roclanda®) with bimatoprost 0.03%/timolol maleate 0.5% (BIM/TIM; Ganfort®) [submitted]. This exploratory analysis was performed in the intention-to-treat (ITT) population.

Results
There were 218 patients in the ITT population of the NET/LAT arm; at treatment Day 1, 171 (78.4%) had received prior PGA treatment, 47 (21.6%) had not. In those without prior PGA therapy, at treatment Day 1, mean IOP (mmHg) was 24.8 and was 15.9 at Week 2, 15.5 at Week 6 and 15.7 at Month 3. Mean IOP at Day 1 was 25.1, then 15.3, 15.7 and 15.6, respectively in those with prior PGA treatment. In those who received PGA as a monotherapy (158/218 [72.5%] at Day1), mean IOP was 25.0 reducing to 15.4, 15.6 and 15.8, and in those who received PGA in combination with another IOP-lowering agent (60/218 [27.5%]), was 25.3, then 15.6, 15.7 and 15.3, respectively. In the BIM/TIM arm, 147/212 (69.3%) patients had prior PGA therapy at Day 1; mean IOP was 24.8, then 15.4, 15.1 and 15.0, and 24.8, then 15.9, 15.7 and 15.6 in those without prior PGA. In those who had received PGA as monotherapy (147/212 [69.3%]), mean IOP was 24.5, then 15.2, 14.9 and 14.8 and 25.6, then 16.3, 16.0 and 16.0 in those (65/212 [30.7%]) who received PGA in a combination.

Conclusions
In MERCURY-3, IOP reduction achieved with NET/LAT was not influenced by prior PGA treatment (either in monotherapy or combination). This suggests that NET/LAT is a viable treatment option for both PGA-treated and non-PGA treated glaucoma eyes.

P-339

NCX 470, A NITRIC OXIDE DONATING BIMATOPROST COMPARED WITH LATANOPROST - ADAPTIVE DESIGN PERIOD RESULTS FROM THE PHASE 3 MONT BLANC CLINICAL TRIAL

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Purpose
The Mont Blanc trial was designed to compare the safety and IOP-lowering efficacy of NCX 470 ophthalmic solution vs latanoprost ophthalmic solution in adult subjects with open-angle glaucoma or ocular hypertension. The protocol utilized an adaptive dose selection period to choose the NCX 470 concentration for the phase III trials.

Methods
Mont Blanc was a randomized, double-masked, multi-center, parallel group trial conducted in the United States. Subjects dosed NCX 470 or latanoprost once daily in the evening. The adaptive dose selection period specified at least 30 subjects randomized into each of the three treatment arms (NCX 470 0.065%, NCX 470 0.1%, and latanoprost 0.005%) must complete their Week 2 visit. IOP was measured at 8AM, 10AM and 4PM. Results from this adaptive period of the study were unmasked to a few non-trial related evaluators and the results determined the dose of NCX 470 used for the duration of the phase 3 trial.

Results
30 subjects were randomized to NCX 470 0.065%, 35 subjects to NCX 470 0.1% and 38 to latanoprost 0.005%. At the Week 2 timepoint, NCX 470 0.065% demonstrated 1.37 mmHg greater mean diurnal IOP reduction from baseline than latanoprost and NCX 0.1% demonstrated 1.73 mmHg greater mean diurnal IOP reduction from baseline than latanoprost. NCX 470 0.1% was selected for further study.

Conclusions
A dose ranging study (Dolomites) of NCX 470 at concentrations of 0.021%, 0.042%, and 0.065% suggested that the highest studied dose might still be below the top of the dose response curve. To explore this hypothesis a higher concentration of 0.1% was included in an adaptive dose selection period of the phase 3 Mont Blanc trial. Analysis of the results at Week 2 demonstrated that NCX 470 0.1% had greater mean diurnal IOP reduction than NCX 470 0.065% compared with latanoprost 0.005%.

An adaptive dose selection period of a phase 3 trial was used in place of additional dose ranging studies to select the concentration of NCX 470 for the duration of the 3 month Phase 3 Mont Blanc Clinical Trial. Results at 2 weeks demonstrated 1.73 mmHg greater mean diurnal IOP reduction with the NCX470 0.1% dose vs. latanoprost 0.005% and was thus chosen for development in the phase 3 trials.

PLB-017

BASELINE INTRAOCULAR PRESSURE DOES MATTER IN SEVERE STEROID-INDUCED OCULAR HYPERTENSION

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Purpose

To evaluate the baseline intraocular pressure (IOP)-related risk of severe steroid-induced ocular hypertension(OHT) (IOP >30 or 35 mmHg). We hypothesized that the incidence and severity of steroid-induced OHT may differ according to baseline IOP in patients who received intravitreal dexamethasone implants.

Methods

889 eyes treated with intravitreal dexamethasone implants and who had a baseline IOP of <23 mmHg was enrolled. Enrolled patients were divided into two groups: OHT and normal IOP. The OHT group was subdivided into post-injection IOP of ≥25, >30, or >35 mmHg or IOP elevation of ≥10 mmHg over the baseline value. The odds ratio of steroid-induced OHT was calculated using univariable logistic regression analysis, and significant variables were analyzed with a multivariable model. IOP was measured before (baseline IOP) and after dexamethasone implant injection at 1 week and 1, 2, 3, 6, and 12 months.

Results

Although baseline IOP was significantly associated with the development of steroid-induced OHT in logistic regression analysis, the results differed in subgroup analysis. In the group with IOP elevation of ≥10 mmHg over the baseline, OHT was not significantly associated with the baseline IOP, whereas in the severe OHT group (IOP >30 and >35 mmHg), it was significantly related with higher baseline IOP.

Conclusions

Higher baseline IOP is a risk factor for severe steroid-induced OHT. Clinicians should be aware of the risk of OHT while treating patients with high baseline IOP with steroids. (IOP >19)

PLB-018

TOLERABILITY OF OPEN-LABEL NICOTINAMIDE AND PYRUVATE SUPPLEMENTATION FOR PRIMARY OPEN ANGLE GLAUCOMA OVER 14 MONTHS

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Purpose
Nicotinamide and pyruvate supplementation has recently gained traction with evidence of short term neuro-enhancement in patients with treated, manifest glaucoma. Here we sought to evaluate the tolerability of nicotinamide and pyruvate oral supplements for primary open angle glaucoma (POAG).

Methods
Non-comparative case series. We performed a retrospective review of patients attending a tertiary referral glaucoma clinic who were offered oral nicotinamide and pyruvate alongside standard care. The acceptance rate, side effect profile and reason for discontinuation were assessed.

Results
A pilot sample of 14 POAG patients (12 male, 2 female; mean age 72±2.58 years) was identified. The mean MD at initiation was -19.3±4.15 dB OD (-1.01 to -33.7 dB; n=9 eyes) and -15.3±3.51 dB OS (1.42 dB to -23.41 dB; n=8 eyes). The mean OCT retinal nerve fibre layer thickness was 59.8±3.32 um OD (48-77 um; n=9 eyes) and 61.5±5.08 um OS (43-93 um; n= 10 eyes). The mean ganglion cell complex thickness was 59.4±5.02 um OD (83-43 um; n=7 eyes) and 58.4±3.98 um OS (44-82 um; n=8 eyes). IOP at initiation was 13.9±1.40 mmHg OD (6-24 mmHg; n=12 eyes) and 14.7±1.68 mmHg OS (8-29 mmHg; n=11 eyes). 14.3% of patients did not start due to systemic co-morbidities. 58.3% of those on nicotinamide also took pyruvate. The mean duration of supplementation was 14.5±2.9 months (1-31 months; n=12). 8.3% of patients reported side effect profile as a reason for discontinuation. Lack of perceived efficacy was also cited. 83% were continuing at the most recent follow up.

Conclusions
POAG patients show strong interest in non-invasive adjunctive strategies alongside IOP-lowering standard care. Nicotinamide and pyruvate are well tolerated in the medium-term with a low incidence of reported side effects and low rate of discontinuation.

Other

P-340
FUNDUSCOPIC OPTIC DISC CHANGES IN GROWTH PHASE

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Purpose
Individual variation of the optic disc shape affects the diagnostic accuracy of glaucoma. And the optic disc shape changes during growth phase. Therefore, the purpose of this study is to investigate the relationship between changes in the optic disc and axial elongation in children.

Methods
A prospective cohort study was performed in 75 right eyes of elementary school students for six years (8.5 to 14.5 years). Axial length was measured with OA-2000 (TOMEY, Japan). Color fundus photographs was obtained with OCT machine 3D OCT-1 Maestro (Topcon, Japan). The color fundus photographs taken at the first year and last year were superimposed to investigate changes of optic disc with and without oval change, central retinal vessel trunk shift, rim reddening, central pallor, and nasal whitening, and to compare whether there were differences in axial elongation.

Results
Thirty-seven boys and 38 girls were analyzed. Mean axial elongation for six years was 1.48 mm. The oval change was observed in 49 %, central retinal vessel trunk shift in 76%, rim reddening in 37%, central pallor in 6.7%, and nasal whitening in 44% of the eyes. The group with rim reddening ($p=0.02$) and central retinal vessel trunk shift ($p<0.001$) showed significantly greater axial elongation than the without groups.

Conclusions
The optic disc showed various changes during the growth phase.

P-341

INTRAOCULAR PRESSURE MEASUREMENT USING ICARE REBOUND TONOMETER IN DIFFERENT POSITIONS OF EYE AND DIFFERENT LOCATIONS ON CORNEA

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Purpose

To study the difference of intraocular pressure (IOP) measurement with iCare IC200 in different angles of eye and different locations on cornea

Methods

This is a cross-sectional study

All participants underwent IOP measurement by GAT twice. Then, IOP was measured with iCare by a single physician under the following condition. First step, IOP was measured in straight manner in an upright patient position. Second step, participants were asked to look at fixation targets which located in four different points. This manner made the eyes move 15 degrees from the primary position. IOP was measured in upgaze, downgaze, medial gaze, and lateral gaze. Third, IOP was measured at different spots on cornea which are 2 millimeters from limbus in superior, inferior, nasal, and temporal regions. All methods were measured two times, the mean was used for calculation. The physician who measured IOP by iCare was masked from GAT results.

Results

One hundred and sixty-eight eyes were recruited with a mean age of 62.15±12.34 years old. Mean IOP measured by GAT and iCare at central cornea were 15.53 ± 5.57 and 14.78 ± 6.14 mmHg, respectively. ICare demonstrated IOP values statistical significantly lower than GAT with mean difference IOP was 0.7 mmHg (P<0.01). The average IOP was 0.6, 0.47, 0.91, and 0.44 mmHg lower than primary position in upgaze, downgaze, medial gaze, and lateral gaze 15 degrees angulated positions respectively (p<0.01). IOPs at 2 mm from limbus in inferior, nasal, and temporal cornea were 0.5, 0.69, and 0.57 mmHg lower than IOP measured at central cornea (p=<0.01)

Image

Table 1. Average intraocular pressure by iCare IC200 in different positions of eye and different locations on cornea

	Mean ± SD	p-value
Icare ic200 at center	14.78 ± 6.14	
GAT	15.530 ± 5.57	<0.001*
iCare IC200 upgaze 15°	14.18 ± 6.43	<0.001*
iCare IC200 downgaze 15°	14.31± 6.28	<0.001*
iCare IC200 medial gaze 15°	13.87 ± 6.25	<0.001*
iCare IC200 lateral gaze 15°	14.34 ± 6.17	<0.001*
iCare IC200 2mm from limbus at superior	14.75 ± 6.30	0.825
iCare IC200 2mm from limbus at inferior	14.28 ± 6.06	<0.001*
iCare IC200 2mm from limbus at nasal	14.09 ± 6.30	<0.001*
iCare IC200 2mm from limbus at temporal	14.21 ± 6.48	<0.001*

Conclusions

IOP measurement with iCare in different angles of eye were statistical significantly lower than in primary position. Likewise, IOP at different locations on cornea were lower than at central cornea. The IOP values obtained with iCare and GAT are not clinically significant difference.

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P-342

24-MONTH EVALUATION OF ENDOTHELIAL CELL DENSITY AND LOSS FOLLOWING AB-INTERNO CANALOPLASTY

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Purpose
To evaluate endothelial cell density and IOP reduction over 24 months in glaucoma patients having undergone ab-interno canaloplasty using the iTrack (Nova Eye Medical Inc., Fremont, USA) combined with cataract surgery.

Methods
A prospective, multi-center registry study in the USA. Patients undergoing ab-interno canaloplasty combined with cataract surgery were recruited. Specular microscopy was performed preoperatively and at 6, 12 and 24 months postoperatively. Standard metrics for glaucoma surgery follow-up were also measured including visual acuity, intraocular pressure, visual fields, optic nerve OCT and glaucoma medication use. Endothelial cell density and loss were analyzed at each time point. Results from patients undergoing ab-interno canaloplasty combined with cataract surgery were compared with results from age matched controls who underwent cataract surgery only.

Results
Seventy-seven eyes of 46 patients (mean age: 74.7±6.8) were followed up for 24 months. Mean endothelial cell density was 2304±362mm^2 preoperatively and 2230±356 mm^2 12 months following ab-interno canaloplasty combined with cataract surgery (-3.2%±-9%) (p=0.2). 8% per cent of eyes showed an endothelial cell loss above 10%; 88% of eyes lost less than 10%; 4% of the eyes showed a gain. In Samuelson et al (2019) FDA controlled pivotal trial of iStent postoperative endothelial cell loss in patients undergoing cataract surgery alone was -12.3%±-12.7%. Mean IOP (mmHg) was 17.8±7.3.4 preoperatively and it reduced to 14.8±2.9 12 months postoperatively (p<0.001).

Conclusions
Ab-interno canaloplasty performed in conjunction with cataract surgery causes minimal and non-statistically significant change in endothelial cell density and significant decrease in IOP up to 24 months postoperatively.

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P-343

COMPARING FIELD PROGRESSION OF PHACOEMULSIFICATION COMBINED WITH MIGS PLUS: SCHLEMM CANAL MICROSTENT VERSUS AB INTERNO EXCISION

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Purpose

Understanding the relative effect on visual field progression of different microinvasive glaucoma procedures (MIGS) can be useful for clinical decision making. This study compares the Humphrey Visual Field tests (HVF) of patients who underwent phacoemulsification combined with Hydrus Microstent (Phaco/Hydrus) and phacoemulsification combined with Kahook Dual Blade (Phaco/KDB). The population of this study is derived from a recent paper accepted for publication in the French Journal of Ophthalmology (FJO) that compares the relative efficacy of these two procedures when it comes to intraocular pressure (IOP) and medication burden.

Methods

This retrospective study included 131 eyes of 131 patients following Phaco/Hydrus or Phaco/KDB from 2016 to 2021 at Massachusetts Eye and Ear. Primary outcomes included change in HVF overtime. Three main values were used to track HVF progression: mean deviation (MD), pattern standard deviation (PSD), and visual field index (VFI).

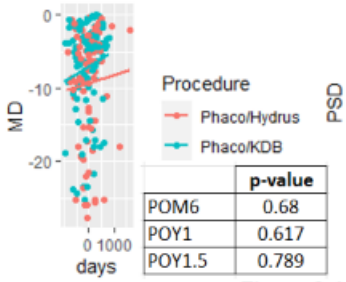
Baseline characteristics included demographic variables, corrected distance visual acuity, IOP, medication burden, glaucoma type, severity, and history of prior laser or surgery.

Results

All baseline characteristics were statistically similar between the surgical groups. There was no significant difference in visual field parameters of MD, PSD, or VFI between phaco/KDB vs. Phaco/Hydrus over time. The rate of change of MD over time was similar between both cohorts through POY 1.5 (R=0.25 for phaco/Hydrus vs. R=0.17 for phaco/KDB, p=0.61). The same was true for the rate of change of PSD over time through POY 1.5 (R=-0.11 for phaco/Hydrus vs. R=0.066 for phaco/KDB, p=0.62) as well as the rate of change of VFI over time through POY 1.5 (R=0.024 for phaco/Hydrus vs. R=0.066 for phaco/KDB, p=0.69).

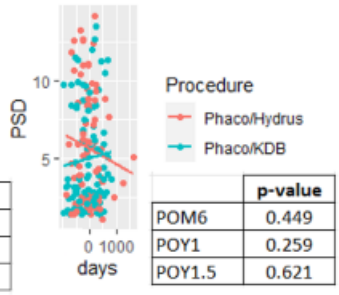
Image

Figure 1. MD over time



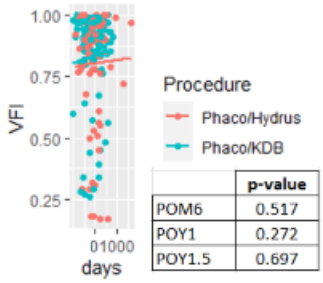
	p-value
POM6	0.68
POY1	0.617
POY1.5	0.789

Figure 2. PSD over time



	p-value
POM6	0.449
POY1	0.259
POY1.5	0.621

Figure 3. VFI over time



	p-value
POM6	0.517
POY1	0.272
POY1.5	0.697

Conclusions

Phaco/Hydrus and Phaco/KDB were comparable in terms of visual field parameters of progression.

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P-344

SURGICAL MANAGEMENT OF GLAUCOMA ASSOCIATED WITH STURGE-WEBER SYNDROME

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Purpose
Sturge-Weber Syndrome is a rare type of phakomatosis and usually arises from sporadic mutations, rather than being inherited.Glaucoma is the most common ocular manifestation of this disease and it's management can be challenging.Therefore, we would like to present our own experience regarding efficiency of surgical procedures concerning the treatment of glaucoma in children with SWS.

Methods
The study group included 52 eyes in 26 children (16 boys and 10 girls) with confirmed diagnosis of SWS and a mean diagnostic evaluation age of 26 months (±47) of which 14 were diagnosed with glaucoma (9 unilateral, 5 bilateral). Measurements in group of patients that underwent surgical procedure were taken before surgery, 6 (±3) days after surgery and 15(±9) weeks after surgery.The results were statistically analyzed at the assumed significance level α=0.05.

Results
The mean value of intraocular pressure at the time of the first examination of was 13 mmHg (±9.5) in non affected eyes, and 28,7(±11) in eyes with glaucoma. Six patients with glaucoma were not qualified for the surgery and were treated only with anti-glaucoma drugs including dorzolamide, timolol and brimonidine. In glaucomatous group six patients underwent trabeculectomy (3 with and 4 without mitomycin C), while 2 underwent cyclocryotherapy and transscleral cyclophotocoagulation (TSCPC). During the first control [6 (±3) days] after trabeculectomy mean intraocular pressure was 16.28 mmHg (±4.8), and 15(±9) weeks after was 18 mmHg (±2.8). All patients treated with trabeculectomy without mitomycin C in a period of not more than 6 months required subsequent additional treatment either cyclocryotherapy, TSCPC or local anti-glaucoma drugs administration. In patients who underwent TSCPC or cyclocryotherapy the mean intraocular pressure was 23mmHg (±3.5) and at the period of second control 24mmHg (±2.6). In this group the procedure had to be repeated several times and in 100% of patients after the procedure, it was not possible to discontinue anti-glaucoma medicine. Eyes with glaucoma in 93% had associated eyelid hemangioma.

Conclusions
The best results were observed in patients who underwent trabeculectomy with mitomycin C both in terms of lowering intraocular pressure and reducing the use of anti-glaucoma drugs. Procedures such as TSCPC or cyclophotocoagulation were less successful and required several repetitions, however, these procedures are less invasive than trabeculectomy.

P-345

REAL WORLD OUTCOMES OF ACUTE PRIMARY ANGLE CLOSURE ATTACK IN PATIENTS PRESENTING TO MOORFIELDS EYE HOSPITAL, UNITED KINGDOM

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Purpose
There is limited information available about long-term morbidity following an acute primary angle closure attack, especially in the European population. The aim of this study was to report on the long-term real-world outcomes following an acute primary angle closure attack in patients presenting to Moorfields Eye Hospital, United Kingdom.

Methods
A retrospective case review was performed of 116 consecutive patients (126 eyes) attending Moorfields Eye Hospital with acute primary angle closure between 2010 and 2014. Standard demographic data, features and management of angle closure and outcome data were obtained.

Results
The majority of patients were female (71.4%) and of Caucasian background (76.1%) and the mean age was 71 years (range, 43 to 97 years). The mean follow-up period was 58 months (range, 0 to 202 months). Most patients (72.2%) had visual acuities of 6/12 or better, meeting the UK driving standard, at final follow up. 78% had mild visual impairment. Only 11.7% had severe visual impairment in the affected eye. The mean cup:disc ratio in the affected and fellow eye was 0.53 and 0.41 respectively. 36% of patients had a cup:disc ratio of 0.7 or more. 74 patients had visual field data available with 51% showing mild damage of less than 6dB in the affected eye. Mean intraocular pressure at the final follow up was 14.7mmHg and 14.6mmHg in the affected and fellow eyes respectively. 65.8% patients were treated with laser peripheral iridotomy alone and did not require topical or oral hypotensive medications for long-term intraocular pressure control in the affected eye. 87.8% of patients did not require topical or oral hypotensive treatment for the fellow eye. 34% of the patients developed an increase in intraocular pressure requiring medication treatment in the affected eye. 10 patients eventually underwent glaucoma surgery and 89 patients (70.6%) underwent phacoemulsification surgery to achieve intraocular pressure control in the affected eye. 13 patients required topical hypotensive treatment in the fellow eye and none required glaucoma surgery.

Conclusions
Acute primary angle closure causes a low long-term visual morbidity in the population of the United Kingdom. The majority of patients maintain visual acuities of 6/12 or better, with normal intraocular pressures, cup to disc ratio and visual field at final follow up. Approximately a third of patients require topical hypotensive therapy and a very small number require glaucoma surgery for intraocular pressure control.

P-346

VIRTUAL GLAUCOMA CLINIC WITH INVESTIGATIONS PERFORMED IN A COMMUNITY SETTING IN SINGAPORE - DOES IT WORK?

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Purpose

The describe and report outcomes for a new model of care for glaucoma patients in Singapore - The 'Glaucoma Observation Clinic' (GLOC).

Methods

The GLOC model is as follows: a patient seen in the f2f glaucoma clinics is assessed by a clinician to judge if they are suitable for their next visit to be in GLOC. Suitability is a clinical decision (based on guidelines) but is essentially a patient with stable disease which is not sight-threatening or early post operative. These patients are given an appointment at the relevant time point. Appropriate investigations are ordered for the GLOC visit at this stage. When the patient attends GLOC (located off-site), they are attended to by nurses/technicians and undergo appropriate tests (*e.g.* VA/Icare IOP/HVF/OCT/fundus photo). He/she is also asked if there is any change to report since thier last visit. These data are recorded in the patient's EMR and the patient then goes home. A clinician reviews the data asynchronously via EMR and makes a management decision. This decision is then sent to the patient via SMS/phone call/video call.

Results

From 2018 to end 2022, there were 16,915 attendees to GLOC. This approximates to 10-15% of the average glaucoma patient workload. Analysing data from the last 3 years (n=3458), average age was 65 years (range 17-102) and 58% of patients were 'disc suspects'. Of these 3458 GLOC patients, 505 (14.6%) were referred back to f2f clinic by the GLOC reviewer. Reasons for referral included decrease in VA by ≥2 Snellen lines, target IOP not met or deterioration of visual field/OCT.

To assess safety of the model, two glaucoma specialists independently performed a record review of 100 consecutive GLOC patients seen in February 2022. The specialists concurred with the management decision made by the GLOC reviewer in 95 patients (95%).

For patients attending GLOC, average journey time was 59.3mins (range 20-208mins) compared to 132mins (range 50-240mins) in f2f glaucoma clinic.

In a survey of 214 GLOC patients, 100% of patients rated the quality of care received as good or excellent.

We calculated the cost to the healthcare institution for a patient attending GLOC to be 44% of the cost of a f2f consult.

Conclusions

The GLOC model is an efficient and safe and popular model for managing appropriate glaucoma patients that would otherwise have attended f2f clinics. It has increased the capacity of our conventional f2f glaucoma clinics to manage patients with more complex, sight-threatening conditions.

P-347

THE PHOTOREAL NEW-AGE INNOVATIVE COUNSELLING TOOL FOR GLAUCOMA WITH 3D AUGMENTED REALITY (EYE MG AR)

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Purpose

The unique selling proposition (USP) of this augmented reality (AR) program named, 'Eye MG AR' innovated by us, is to show different anatomical/pathological parts of the eye pertaining to glaucoma, from multiple customised angles of the patient's choice to simplify glaucoma counselling.

Methods

Also, complex structures such as the angles of the anterior chamber and optic nerve head, are constructed in advanced real-time three dimensional (3D) photoreal visuals for immersive patient counselling experiences.[1-6] This AR tool aims to reinvent approach to glaucoma counselling with 'Unreal Engine' software, and is constructed in a patient friendly approach. It is available free of cost from the Google Play Store for Android users, and from the App Store for iPhone users.

Results

Procedures ranging from, a simple YAG PI to a complex trabeculectomy/tube surgery can be counselled with this app.

Image



Conclusions

Incepting 3D counselling with AR in glaucoma, with deep visualisation has never been reported and can pave the way for a new age in glaucoma counselling.

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P-348

NOVEL HYPERPARALLEL OPTICAL COHERENCE TOMOGRAPHY FOR ANGLE CLOSURE ASSESSMENT: COMPARISON WITH SWEPT-SOURCE OCT AND GONIOSCOPY

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Purpose

To evaluate reproducibility and agreement of angle closure assessment by a novel hyperparallel OCT system (HP-OCT, Cylite Optics, Melbourne, Australia), in comparison with swept-source OCT (SS-OCT, CASIA SS-1000, Tomey Corporation, Nagoya, Japan) and gonioscopy.

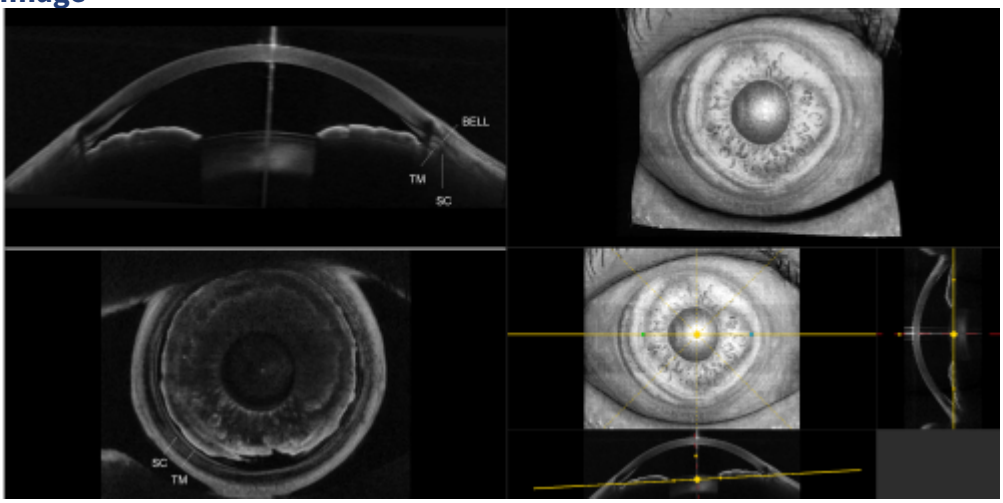
Methods

Cross-sectional study. Phakic subjects >40 years of age, with no relevant ophthalmic history were consecutively recruited from a glaucoma clinic (Singapore National Eye Hospital). Each subject underwent same-day evaluation with HP-OCT, SS-OCT, and gonioscopy in a dark room prior to pupillary dilation. The main outcome measures were the presence of angle closure (primary outcome), defined as iridotrabecular contact (ITC) in HP-OCT and SS-OCT images at 0°-180° meridional (horizontal scans) and as non-visibility of the posterior trabecular meshwork (TM) by gonioscopy. Visibility of the TM in AS-OCT imaging was also assessed (secondary outcome). Intra and inter-device agreement analysis (Gwet AC1) and logistic regression analysis were performed for primary and secondary outcomes, respectively.

Results

154 sectors from horizontal scans of 77 subjects were analysed. The localization of the scleral spur and detection of ITC was possible in 99.3% (145/146) of the angle images obtained with HP-OCT. The reproducibility of angle closure assessment by HP-OCT was excellent (AC1 of 0.95 for the temporal angle and 1.00 for the nasal). The agreement for angle closure detection was very good between HP-OCT and SS-OCT (AC1 of 0.88 for the temporal and 0.81 for the nasal angle) and good between HP-OCT and gonioscopy (AC1 of 0.71 for the temporal and 0.78 for the nasal angle). The TM was identifiable in 64.4% (94/146) of unprocessed HP-OCT images (both open and closed angles), while it was not visible in any of the SS-OCT unprocessed images. The TM was more frequently visible in the temporal sector of HP-OCT scans (p=0.02), and male sex was associated with greater TM visibility (adjusted OR 1.18, 95%CI 1.04 to 1.94, p=0.04).

Image



Conclusions

HP-OCT showed excellent reproducibility for angle closure assessment and good agreement with SS-OCT and gonioscopy. HP-OCT technology also provides the unique capability to visualize regions around the TM and Schlemm's canal, opening new avenues for clinical research of distal outflow pathways.

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P-349

3D PRINTING OPHTHALMOLOGY MODELS FOR ENHANCING GLAUCOMA ANATOMY LEARNING THROUGH THE CONCEPT OF PUZZLE ASSEMBLY - A SELF LEARNING TACTILE TOOL KIT

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Purpose

Practical sessions facilitate teaching and critical thinking, especially among medical students, glaucoma residents and allied ophthalmic personnels. Currently, virtual and augmented reality are employed for surgical training, using three-dimensional (3D) eye models. [1-4]

Methods

These 3D models when printed, can be used not only for surgical training, but also for concept learning among neophytes, through tactile 3D puzzle assembly.

Results

3D printing is perfectly suited for creation of complex, bespoke items in a cost-effective manner, making it ideal for rapid prototyping. Puzzle making, when combined with 3D printing can evolve into a different level of learning. Though various 3D eye models are currently available, complex structures such as trabecular meshwork has never been printed, and presented as 3D puzzles. Also, the 3D models created by us have real-time high resolution TrueColor confocal images with all the glaucomatous fundus signs, aiding as atlas.

Image



Trabecular Meshwork 3D Printing Models

Conclusions

This concept of pedagogy has never been reported in the literature. In this paper, we have discussed on how to create these unique 3D models, and the economics involved in 3D printing them into multiple puzzle pieces for effective tactile learning.

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P-350

CLINICAL CHARACTERISTICS OF PIGMENT DISPERSION SYNDROME AND PIGMENTARY GLAUCOMA IN SOUTHERN SPAIN

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Purpose
To assess the prevalence of classic clinical signs of Pigment Dispersion Syndrome (PDS) in PDS and Pigment Glaucoma (PG) patients.

Methods
Descriptive cross-sectional case series study evaluating the prevalence of characteristic clinical signs (classic triad) of PDS: Krukenberg spindle (KS), Trabecular meshwork pigmentation (TMP, ≥3 Scheie) and Iris transillumination defects (ITD). Differences between PDS and GP patients are evaluated (Chi squared test) and the risk of association with GP of clinical signs with statistically significant differences is also calculated (Odds Ratio OR, in multivariate logistic regression). Statistical significance was defined as $p< 0.05$.

Results
144 SDP/PG patients. Prevalence of KS, TMP and ITD is 91%, 88.9% and 24.3%, respectively. 96 patients (66.7%) were PDS and 48 (33.3%) were considered PG patients. Prevalence of KS is 92.7% in PDS and 87.5% in PG (p=0.3). Prevalence of TMP is 18.8% in PDS and 43.7% in PG (p=0.0015). Prevalence of TMP is 16.7% in PDS and 39.6% in PG (p=0.0026). OR of presenting GP is 17.9 for TMP (95% CI 2 to 154.3, p=0.0087) and 5.15 for ITD (95% CI 2 to 12.6, p=0.0004).

Conclusions
There are no big differences in prevalence of KS and TMP in our population from published data of caucasian population (91 vs 95% of KS and 88,9 vs 86%) but in ITD prevalence (24.4 vs 86%).

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P-351
CAUSES OF OCULAR HYPERTENSION/SECUNDARY GLAUCOMA IN UVEITIS

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Purpose
To study inflammation causes associated with ocular hypertension (OHT) or secondary glaucoma (SG) in uveitis referral patients.

Methods
An observational retrospective study of patients with uveitis seen between 2015 and 2021 in the Uveitis Department from Hospital Universitario de Jerez (SPAIN). OHT/SG patients are identified as those who required ocular hypotensive treatment. Prevalence of OHT/SG is related in a univariate model with different causes of uveitis (Chi-squared test, P< 0.05 is considered statistically significant).

Results
A cohort of 548 patients with uveitis has been studied and 138 patients requiring ocular hypotensive treatment have been found: global OHT/SG prevalence is 25.2% in our population. OHT/SG prevalence is significantly associated with the underlying cause of uveitis (P < 0,0001). The most significant related causes are uveitis from herpetic origin (49 of 138 patients, 35.5%) and iridocyclitis of other possible viral origins (35 of 138 patients, 25.4%).

Conclusions
Our research found a standard prevalence of OHT/SG associated with uveitis (25.2%) as observed in the scientific literature. Viral or suspected viral origin uveitis are the most frequent type of uveitis associated with OHT/SG (60.9%).

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P-352

GLOBAL LONGITUDINAL DATA REGISTRY ON THE ROLE OF CANALOPLASTY FOR TREATMENT OF GLAUCOMA - ONE YEAR RESULTS

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Purpose

The iTrack Global Data Registry (iTGDR) aims to collate efficacy and safety data for canaloplasty eg IOP, number of medications, pachymetry values, adverse events and complications, in addition to canaloplasty-specific treatment parameters.

Methods

Prospective multicenter cloud-based database, real-world study including patients with primary and secondary open angle glaucoma undergoing canaloplasty. The iTGDR is a surgeon-led initiative conducted in collaboration with the International Glaucoma Surgery Registry (IGSR). It collects longitudinal data of efficacy (IOP and number of medications), and safety (pachymetry values, adverse events and complications). The iTGDR started in January 2022 in the USA, Canada, Europe, Asia and Australia. The outcomes will be followed for at least 12 months. A minimum of 300 patients will be enrolled.

Results

248 eyes have been enrolled up to September 2022. 72.2% were primary open angle glaucoma (OAG) and 96.4% were phakic. Glaucoma stage was early (66.1%), moderate (17.9%), severe (9.5%) and advanced (6.5%). Ab-interno canaloplasty was performed in 100% of the eyes. Mean baseline IOP and medications were 18.3±5.6 and 2±1.2. Mean 12-month IOP and medications (n=33) were reduced to 13.5±4.7 and 1.0±1.3. Combined phaco-canaloplasty was done in 85.5%. 360° catheterization was achieved in 84% of the eyes. The most common ophthalmic viscosurgical device used was Healon Pro (40.7%). Hyphema occurred in 31 eyes (12%) with 25 eyes with less than 10% of the anterior chamber and 6 eyes more than 10%. No eye needed further glaucoma surgery.

Conclusions

The iTGDR will make a major contribution to understanding the clinical effectiveness of canaloplasty to guide evidence-based decision making for surgeons to achieve improved outcomes in the treatment of their glaucoma patients.

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P-353

ASSOCIATION BETWEEN OPTIC NERVE HEAD PERFUSION MEASURES AND RETINAL GANGLION CELL COUNT ESTIMATES IN GLAUCOMA

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Purpose

Glaucoma is characterised by loss of retinal ganglion cells (RGCs) as well as a disrupted blood flow to the optic nerve head (ONH). This pilot study aims to investigate whether ONH perfusion measures, characterised using optical coherence tomography angiography (OCTA), are associated with RGC counts.

Methods

A total of 36 patients (mean age 62 ± 9 years; 18 males), 16 with confirmed primary open angle glaucoma (POAG) and 20 glaucoma suspects were included. All participants had an optical coherence tomography (OCT) and a 4.5x4.5mm OCTA scan centered on the optic disc. Retinal nerve fibre thickness (RNFL) thickness as well as perfusion density (total area of perfused microvasculature) and flux index (total weighted area of perfused microvasculature) were obtained from OCTA scans. Perimetry results were also obtained using the Humphrey Field Analyzer (HFA) on a 24-2 SITA-Standard protocol. RGC count estimates were calculated using HFA and RNFL measures in formulas derived by Medeiros and colleagues[1,2], based on the work of Harwerth and colleagues[3].

Results

Reduced perfusion density and flux index were correlated with lower RGC count estimates ($r=0.62$, $p<0.001$ for perfusion density, and $r=0.44$ $p<0.003$ for flux index). Significantly lower RGC count estimates were observed in POAG compared to glaucoma suspects (705276 ± 144415 vs 846406 ± 158919; $p=0.009$). Similarly, mean ONH perfusion density was significantly lower in patients with POAG compared to glaucoma suspects (41.93% ± 1.70 vs 43.71% ± 1.41; $p=0.002$). Mean flux index was not significantly different between the two groups (0.39 ± 0.03 vs 0.40 ± 0.04; $p=0.40$). Perfusion density was found to have the largest effect (defined as d) in differentiating between POAG and glaucoma suspects ($d=1.2$, CI 95%) followed by RGC ($d=0.9$, CI 95%) and flux index ($d=0.3$, CI 95%).

Conclusions

Our results demonstrate a significant correlation between ONH blood flow measures and RGC count estimates in glaucoma, with reduced perfusion density and flux index associated with lower RGC count estimates. Further longitudinal studies are required to determine if disruption to ONH blood flow measures is a primary or secondary effect to RGC loss in glaucoma. A larger sample size is required to confirm the performance of ONH perfusion measures and RGC count in discriminating between confirmed glaucoma and glaucoma suspects.

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P-354

OCULAR HYPERTENSION AND GLAUCOMA ASSOCIATED WITH ACANTHAMOEBA KERATITIS: CLINICAL FEATURES AND OUTCOMES AT MOORFIELDS EYE HOSPITAL, UNITED KINGDOM

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Purpose

Acanthamoeba keratitis (AK) is a sight-threatening infection of the cornea caused by Acanthamoeba species. Extracorneal complications include ocular hypertension (OHT) and glaucoma. There is little reported on OHT and glaucoma secondary to AK. We investigated the clinical phenotype, possible mechanisms, management and outcomes of OHT and glaucoma secondary to AK.

Methods

A retrospective case series was performed of 39 consecutive patients (40 eyes) with OHT or glaucoma secondary to AK attending Moorfields Eye Hospital. We extracted standard demographic data, features of AK and characteristics and management OHT/glaucoma. Outcome features including visual acuity, intraocular pressure (IOP), number of intraocular pressure-lowering medications and glaucoma surgery complications at last follow up were also recorded.

Results

We analysed 40 eyes of 39 patients. The mean age was 44.8 years and 70% of cases involved CL wear. The diagnosis of raised IOP occurred at a mean of 2 years following onset of AK symptoms, with 39% developing it within the first year. In the 55% where gonioscopy was possible, 33% had angle closure. 40% of eyes were treated with medical hypotensive therapy only. 60% of eyes required glaucoma surgery, with 38% of them requiring revision or further surgery, 4% developing phthisis and 4% undergoing evisceration. Median final best-corrected visual acuity (BCVA) was hand motions in both groups. Of all eyes, 75% had BCVA worse than counting fingers. Glaucoma severity at the final visit, determined by C/D ratio, was 0.7 in the medical therapy only group and 0.9 in the surgical group, although in a large proportion of eyes glaucoma assessment was precluded by corneal disease.

Conclusions

Our series shows that the development of OHT and glaucoma in AK patients is a poor prognostic indicator with a high incidence of poor visual outcomes in this group. Therefore, early recognition and treatment is required. We recommend that the management protocol of all AK patients should include baseline intraocular pressure, gonioscopy, disc examination and imaging and visual field testing should the state of the cornea permit this. In terms of management, the majority of patients required glaucoma surgery and commonly adjunctive intraocular pressure-lowering medications and additional glaucoma procedures including revision surgery was necessary.

P-356

COMPARE THE RISKS OF OPEN ANGLE GLAUCOMA WITH RANIBIZUMAB AND AFLIBERCEPT INTRAVITREOUS INJECTION

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Purpose

To compare intravitreal aflibercept injection with intravitreal ranibizumab injection for the risk of primary open angle glaucoma(POAG)

Methods

This retrospective, nationwide cohort study investigated 16 888 and 4862 patients aged >50 years with at least one pharmacy claim for intravitreal ranibizumab injection and aflibercept injection between 2011 and 2018, respectively. The inverse probability of treatment weighting method was performed to adjust the baseline difference between the two groups and the hazard risk of POAG was estimated using the Cox proportional regression model.POAG was defined as at least three times of diagnosis based on ICD-9-CM or ICD-10-CM diagnostic codes with antiglaucoma agents (ATC code S01E) administration.3 recorded visits should be with the same diagnosis code, and the 3 visits should be at least 28 days part. These cases of glaucoma were all diagnosed by certified ophthalmologists Patients with any recoded visits for a diagnosis of glaucoma or those have been prescribed antiglaucoma agents before receiving the first intravitreal injection were excluded.

Results

During the 6-month follow up, the risk of POAG development after intravitreal injection did not significantly differ between the two groups (adjusted hazard ratio: 0.73, 95% confidence interval : 0.47-1.05; P =.192).

Conclusions

No significant differences in the risk of POAG were found between the patients receiving ranibizumab injection and those receiving aflibercept injection.

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P-358

HIGH MYOPIA INCREASED THE RISK OF PRIMARY OPEN-ANGLE GLAUCOMA: A SYSTEMATIC REVIEW AND META-ANALYSIS

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Purpose

To determine high myopia as a risk factor for primary open angle glaucoma (POAG). There are still divided opinions regarding the definitive relationship between myopia and POAG in recent studies.

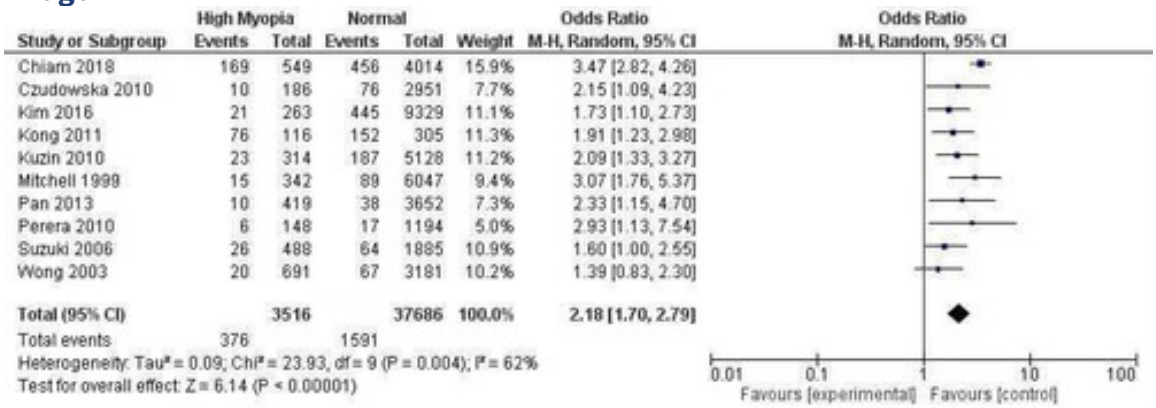
Methods

Authors conducted a meta-analysis using PRISMA systematic guidelines. The studies selected from medical search engine such as Pubmed and Cochrane Library which published from 2003 to 2018. The main data extraction was high myopia with meta-analysis performed using the random-effects model to produce an odds ratio (OR) with 95% confidence interval (CI). The outcome was POAG. Data analysis using the Review Manager 5.4 software.

Results

Ten studies were analyzed comprising 41202 people, the highest correlation between myopia and POAG based on the risk estimates is 3.47 (95% CI, 2.82-4.26). The pooled OR of the association between high myopia and POAG based on the risk estimates of the studies was 2.18 (95% CI, 1.70-2.79).

Image



Conclusions

This study suggest that people with high myopia had higher risk of developing POAG. Early diagnosis is sometimes tricky due to individual with myopic eyes masking of clinical presentations of POAG complicating its early diagnosis. As the years keep progressing there is a prediction of increased population with myopia therefore expeditious detection and prevention of high myopia may reduce the incidence of POAG.

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P-359

HOLOGRAPHIC ELYSIUM OF A 3D GLAUCOMA ANATOMICAL & PATHOLOGICAL METAVERSE WITH EXTENDED REALITY/MIXED REALITY

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Purpose

Extended reality (XR) is one of the leading cutting-edge technologies, which has not yet fully set foot into the field of glaucoma.[1,2] The use of extended reality technology especially in glaucoma education and counselling will revolutionize the face of teaching and counselling on a whole new level.

Methods

With reference from standard anatomic and ophthalmic textbook images, we have constructed the three-dimensional (3D) eye models in Computer-Aided Design softwares such as Autodesk Maya, Blender and Cinema 4D. These 3D models were then imported into HoloLens 2 (Microsoft, USA) for creating a successful XR experience.

Results

We have used this novel technology and have created a holographic museum of 3D eye ball models with trabecular meshwork and optic disc in fine detail.

Image



The HoloLens 2 User Is Experiencing The Visual Auras Of Various Pathological 4D Models Of The Eyeball In Space

Conclusions

These 3D ophthalmic holograms created by us, are constructed with TrueColor confocal images in a cost-effective manner to serve as a new-age immersive 3D pedagogical and counselling tool for gameful learning and counselling, respectively. According to our knowledge, this concept has not been reported in the literature before.

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P-360

AN INNOVATIVE, SELF-BUILT, 3D, COST EFFECTIVE, SMART PHONE APP FOR SIMULATIVE GLAUCOMA LEARNING

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Purpose

To make glaucoma concept learning & patient counselling better, we have innovated and self-built a totally 3D app (Eye_MG_Max), depicting the ocular anatomy and pathophysiology, for simulative learning for surgical procedures such as trabeculectomy and minimally invasive glaucoma surgery (MIGS).

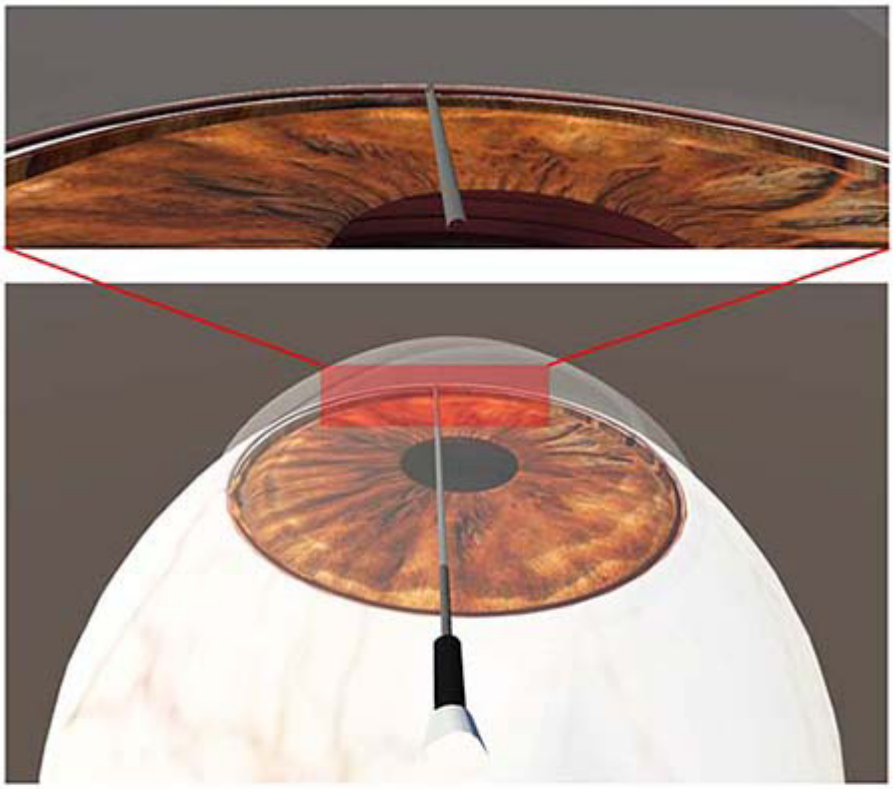
Methods

Currently, there are no simulation apps on the smart phone for glaucoma clinics and surgery. In this app, we have used real-time, high resolution, TrueColor, confocal images for constructing the eye models and have built it on 3D augmented reality. Only a powerful cognitive tool like a 3D atlas with real unanimated images, where users can choose their optimal frame, cross-section, and amount of zoom, to visualise various parts of the eye, can fill in these mental gaps.[1-5]

Results

Also, this app aids in simulative learning and honing the hand eye coordination for glaucoma surgery. Currently, this app is available free of cost for iPhone users from App Store.

Image



Conclusions

It simplifies glaucoma surgery coinceptual learning and also aids in e-counselling, allowing users to not have any dark side of oculus uterque pertaining to glaucoma.

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P-361
EFFECT OF GLAUCOMA SURGERY ON OCULAR BIOMETRY IN EARLY CHILDHOOD GLAUCOMA

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Purpose
To study and analyse the distribution of axial length at presentation in children < 3 years with glaucoma compared to the eyes of normal children and also to study the effect of surgical intervention on the axial length.

Methods
Design: Ambispective, comparative observational study

Method: 304 eyes of 155 children were studied and compared to 30 age-matched controls. Glaucomatous eyes had IOP, Axial length (AXL) measurements at baseline, 3, 6 and 9 months after surgery. Control groups were measured at baseline and nine months. Slopes of scatter plots were compared in both groups.

Outcome measures: Axial length and corneal diameter measurements at baseline compared in children with glaucoma and age-matched normal controls, changes in axial length following surgery, the change in corneal curvature and corneal diameter compared to that in the non- glaucomatous children.

Results
Buphthalmic eyes were 2.5 mm longer than controls. Axial length slope of treated cases were significantly lower than in controls ($p<0.001$), indicating that the axial length had reduced in the glaucomatous eyes and not just halted. Infants, where the IOP was measured to be “normal” (<12 mm Hg), had longer axial lengths compared to normals.

Conclusions
IOP in infants with glaucoma may be recorded as “normal” since the effect of the raised IOP may manifest as buphthalmos. Surgery for primary congenital glaucoma can normalize axial length with a reduction in IOP if conducted before 12 months.

P-362

SYSTEMATIC REVIEW OF CLINICAL PRACTICE GUIDELINES FOR THE DIAGNOSIS AND MANAGEMENT OF OPEN-ANGLE GLAUCOMA

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Purpose

To do an assessment of the Clinical Practice Guidelines (CPG) for the diagnosis and management of Open Angle Glaucoma (OAG).

Methods

A systematic review of CPGs for the diagnosis and management of OAG, published between January-2017 and November-2022, was carried out. A search in databases (Pubmed/Medline, Scopus, Web-of-Science, Embase), metasearch engines (Tripdatabase, Epistemonikos), CPG developer organizations, ophthalmology associations and CPG repositories/databases was performed. Only CGPs in English or Spanish were selected. Five authors assessed them independently, using the Appraisal of Guidelines for Research and Evaluation (AGREE-II) instrument. Individual assessment by domains, overall evaluation, and the recommendation for use with or without modifications were carried out for each CPG. Additionally, the authors made a meta-synthesis of the recommendations for the most relevant outcomes of each CPG.

Results

6 CPGs were appraised (National Institute for Health and Care Excellence-NICE 2022, European Glaucoma Society-EGS 2021, Preferred Practice Patterns-PPP 2020, Sistema Nacional de Salud Español-SNS 2017, Ministry of Health Malaysia-MaHTAS 2017 and EsSalud Peru 2021). Most CPG scored high in domain 4 (clarity of presentation). NICE, SNS and IETSI, scored high in domain 3 (rigour of development). The EGS guide and the MaHTAS scored low in domain 3 due to absence of available information, nevertheless these CGPs scored high in domain 4. All the CPGs used GRADE system for making recommendations. In the meta-synthesis, variability was found about risk factors such as diabetes, ethnicity, hypotensives drugs (Latanoprostene in the PPP, not available in Spain or Peru), IOP correction algorithms use(EGS), Selective Laser Trabeculoplasty (SLT) indication for initial treatment (EGS, NICE, MaHTAS), and minimally invasive glaucoma surgery indications (MIGS).

Conclusions

NICE, SNS and IETSI CPGs for the diagnosis and management of OAG have a high methodological quality, appraised with AGREE-II.

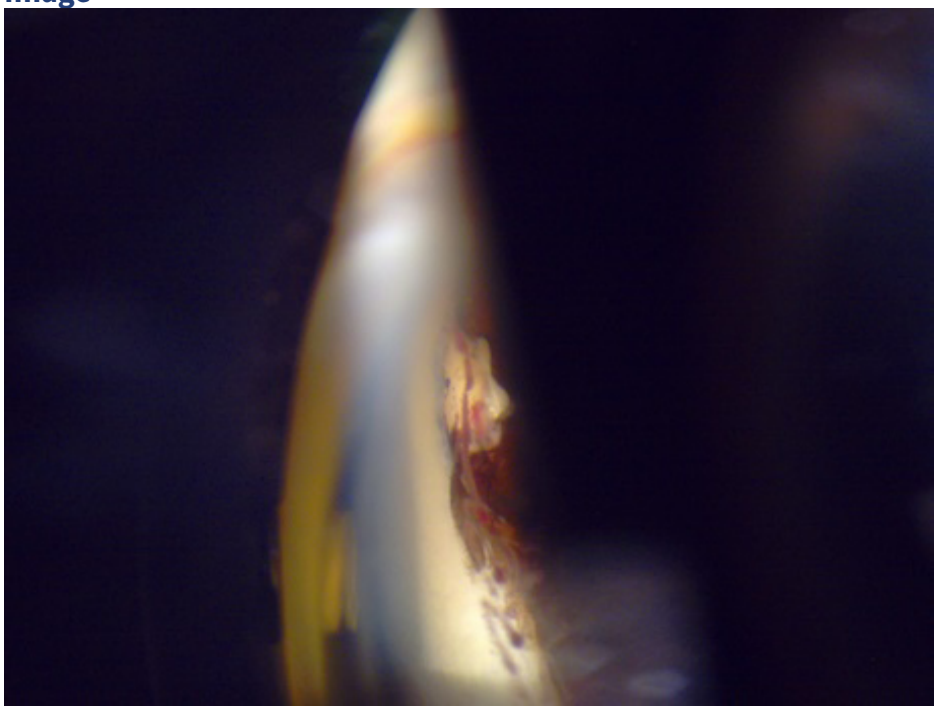
P-363
SWAN SYNDROME: A POSSIBLE CAUSE OF LATE HYPHEMA AFTER TRABECULECTOMY

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Purpose
To report an unusual complication of hyphema recognised as Swan syndrome after years of trabeculectomy.

Methods
Retrospective out-patient medical history review for a case report.

Results
A 66-year-old Thai female patient diagnosed as juvenile open-angle glaucoma in both of her eyes. The uneventful trabeculectomy with mitomycin C (MMC) had been done twice in her right eye and once in her right eye 10 years before this visit at the other hospital and another trabeculectomy with MMC had been done in her right eye 1 year before this visit at Naresuan University Hospital. For a week, she had experienced symptoms of transient blurry vision and throbbing pain in her right eye which worsened during the day. Hyphema in right anterior chamber with active bleeding points at superonasal sclerostomy vessels could be observed by gonioscopy. Argon LASER was shot along the causative vessels to stop bleeding. After LASER, there was no recurrent hyphema and the vessels seemed to be regressed.

Image


Conclusions
Swan syndrome is a possible unusual cause of late hyphema after trabeculectomy. Proper diagnosis can be made by gonioscopy and treatment with argon LASER at the target vessels is effective and safe enough to solve the problem at its source.

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P-364

QUANTITATIVE EVALUATION OF EYELID HYPERPIGMENTATION AND ERYTHEMA CAUSED BY PROSTAGLANDIN F RECEPTOR AGONISTS ANALOGUES USING MEXAMETER MX18

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Purpose

Prostaglandin (PG) F receptor agonists analogues are commonly used to treat glaucoma, but they can also cause characteristic side effects such as eyelid hyperpigmentation. However, there is currently no objective method for evaluating these side effects. The purpose of this study is to quantitatively evaluate eyelid pigmentation and erythema by measuring absorbance.

Methods

Sixty glaucoma patients (38 males, 22 females, mean age 63.8) consented and were included in the study. Of the patients, 31 were using PG F receptor agonists analogues (PG group) and 29 were not using PG F receptor agonists analogues (control group). Melanin pigment and erythema in the upper eyelids and buccal area were examined using Mexameter MX18. The Mexameter MX18 noninvasively quantifies the amount of melanin and hemoglobin (erythema) in the epidermis using different wavelengths of light (green, red, and near-infrared, respectively).

Results

The upper eyelid melanin levels in the PG group were 234±57 and in the control group were 196±62, and the erythema levels in the PG group were 426±77 and in the control group were 373±67. Melanin levels were significantly higher in the PG group than in the control group ($P<0.05$; Mann-Whitney's U test).

Conclusions

The Mexameter MX18 is useful for quantitative evaluation of eyelid hyperpigmentation and erythema, and is expected to be used for objective assessment of adverse reactions characteristic of PG F receptor agonists analogues.

P-365

RELIABILITY OF AHMED GLAUCOMA VALVE SURGICAL VIDEOS ON THE INTERNET FOR EDUCATIONAL PURPOSES

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Purpose

The use of video based social media platforms is increasing amongst practicing as well as trainee ophthalmologists. The present study aims to evaluate the educational quality of Ahmed glaucoma valve (AGV) implantation videos on open access, video based, social media platforms.

Methods

In this prospective, cross-sectional study 23 websites containing medical surgery training videos were queried using the search keyword “ahmed glaucoma valve implantation”. Descriptive statistics of video parameters were noted, and the videos were evaluated using Sandvik, HON code, mDISCERN, and GQS score. VQS was determined based on the 14 steps as per a rubric of AGV implantation. The host websites were further evaluated for Accuracy, Navigability and Readability using previously validated scoring systems.

Results

One hundred and nineteen videos were evaluated and 35 were excluded. The total quality of all 84 videos according to their Sandvik, HON Code, GQS, DISCERN, and VQS scores was 11.79± 1.70 (excellent quality), 6.86 ± 0.75 (excellent quality), 3.97 ± 0.93 (good quality), 3.26 ± 0.66 (fair quality) and 11.45 ± 2.67(good quality) respectively. Videos with descriptive subtitles and background audio had significantly better quality($p<0.05$). No significant correlation was found between any of the descriptive parameters and video quality score.

Conclusions

The educational quality of internet videos can vary greatly. Our study found that quality of the videos ranged between excellent to good. AGV implantation videos were sparse on exclusive ophthalmology surgical video portals. Therefore, more peer-reviewed videos following standardized rubric are needed on dedicated surgical video portals.

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P-367
INFLUENCE OF COGNITION ASSESSMENT ON VISUAL FIELD VARIABILITY

G Wada, A Bando , C Gracitelli

Purpose
To evaluate whether there is a relationship between cognition and the visual field variability observed in glaucoma patients.

Methods
Each patient had a campimetry visual field SITA Standard 24-2, and after the exam, the patient answered the following questionnaires: Mini-Mental State Examination (MMSE) and Montreal Cognitive Assessment (MoCA), both being questionnaires for cognition assessment questionnaires. Once the questionnaires were answered, a computerized analysis (STATA 13.0 software) of the results was then performed.

Results
The mean age of the patients was 61.47 ± 16.77 years. The mean of the MoCA values was 17.80 ± 5.61 points (reference value > 22 points). The mean of the MMSE values was 25.01 ± 3.86 points (reference value > 24 points). The worsening of cognitive level was significantly associated with patients who had peripheral visual field defects (p = 0.041). Also worse cognitive level assessed with both questionnaires were directly associated with worsening of the MD of visual field.

Conclusions
The results showed that there is a correlation between the cognitive impairment of the patient and the pattern of visual field loss with statistical significance. Also indicated that cognitive worsening was linearly proportional to the worsening of the visual field defect.

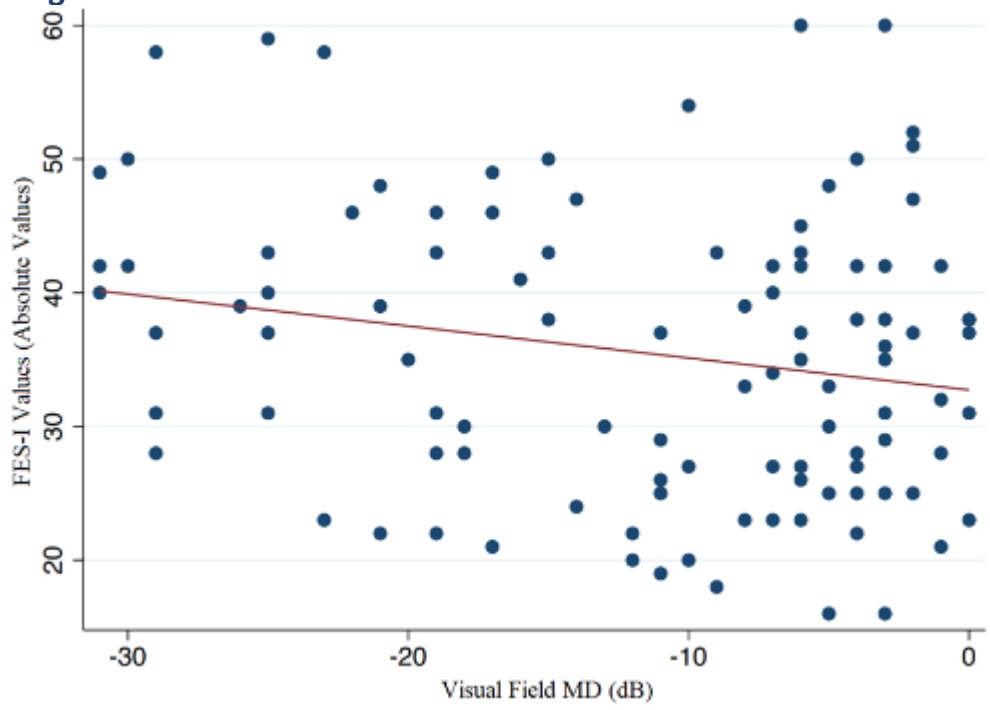
P-368
CORRELATION BETWEEN RISK OF FALL AND GLAUCOMATOUS VISUAL FIELD DEFECTS

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Purpose
To determine the correlation between risk of fall and glaucomatous visual field defects, both in severity and topography.

Methods
One hundred and eight patients, all diagnosed with Glaucoma and over 18 years old were enrolled. All recruited from the Glaucoma outpatient clinic of Universidade Federal de São Paulo (UNIFESP/EPM). They had no other ophthalmologic comorbidities, besides previous phacoemulsification for more than 6 months. All patients had a thorough ophthalmologic examination and were already familiar with visual field. They performed at the same day: standard automatic perimetric 24-2 and answered the Fall Efficacy Scale International (FES-I) questionnaire, properly translated and validated to Brazilian Portuguese. The FES-I is a well-known and validated questionnaire that assesses the risk of fall in several other studies[1,2]. After that, we proceeded to statistical analysis with STATA 13.0 software.

Results
The mean age of the patients was 61.47 ± 16.77 years. The mean score was 35.09 ± 10.56 points (normal value > 23). The worsening of risk of fall showed a correlation with perimetric defects (p=0.040), specially with central defects. Moreover, the risk of fall was significantly associated with worsening of MD in visual fields (p=0.032).

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Conclusions

There is a correlation between the risk of fall assessed with FES-I and worse glaucomatous peripheric visual field defects. Furthermore, our results showed that the worse the risk of fall, the worse the MD of visual fields gets.

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P-369

ENDOTHELIAL CELL DENSITY AND LOSS FOLLOWING AB-INTERNO CANALOPLASTY IN PATIENTS WITH MILD-MODERATE GLAUCOMA AS COMPARED TO SEVERE GLAUCOMA

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Purpose
To evaluate endothelial cell density and IOP reduction of ab-interno canaloplasty using the iTrack (Nova Eye Inc., Fremont, USA) combined with cataract surgery over 12 months in patients with mild-moderate glaucoma as compared to severe glaucoma.

Methods
A prospective, multi-center registry study in the USA. Patients undergoing ab-interno canaloplasty combined with cataract surgery were recruited. Specular microscopy was performed preoperatively and at 6, 12 and 24 months postoperatively. Standard metrics for glaucoma surgery follow-up were also measured including visual acuity, intraocular pressure, visual fields, optic nerve optical coherence tomography (OCT) and glaucoma medication use. Endothelial cell density and loss (ECD and ECL) were analyzed at each time point and eyes were categorized between baseline mild-moderate versus severe glaucoma and baseline controlled IOP with medications (≤18mmHg) versus uncontrolled (>18mmHg).

Results
77 eyes of 46 patients (mean age: 74.7±6.8) were recruited. There was no difference in ECD between the mild-moderate and severe groups at baseline (2292±395 and 2329±285 respectively; p=0.7), 12 months (2236±382 and 2215±293; p=0.8), or in terms of ECL (76±161 and 91±151; p=0.7). Likewise, there was no difference in ECD between the IOP controlled and uncontrolled groups at baseline (2305±372 vs 2302±354, respectively; p=0.97) and 12 months (2241±371 vs 2212±334; p=0.74). Baseline IOP (mmHg) in the mild-moderate group and in the severe group was 17.9±3.3 and 17.5±3.6 respectively and was reduced to 15.0±2.9 and 14.4±2.9 at 12 months. Eyes with preoperative uncontrolled IOP (21±1.8) were under control at 12-month postoperatively (16±2.7).

Conclusions
Ab-interno canaloplasty performed in conjunction with cataract surgery causes no significant change in endothelial cell density across all grades of glaucoma severity or baseline IOP up to 12 months postoperatively.

P-370

ANTERIOR SEGMENT OPTICAL COHERENCE TOMOGRAPHY ANGIOGRAPHY FOLLOWING MINIMALLY INVASIVE GLAUCOMA SURGERY USING A TRABECULAR BYPASS IMPLANT

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Purpose

To examine the potential role of anterior segment optical coherence tomography angiography (AS-OCTA) imaging of episcleral vessels before and after trabecular bypass minimally invasive glaucoma surgery (MIGS).

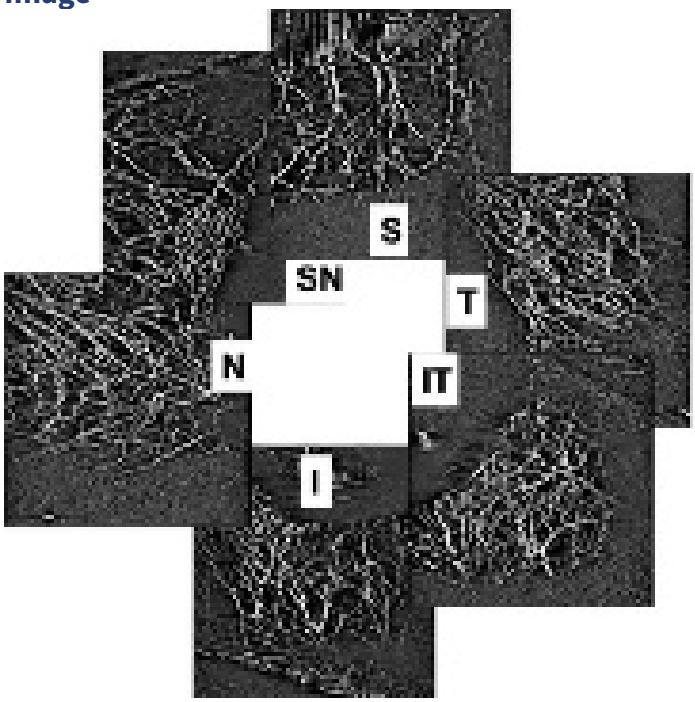
Methods

We conducted a prospective, observational study in patients with glaucoma or ocular hypertension undergoing Hydrus Microstent (Ivantis Inc. Irvine, CA, USA) implantation, who require at least one intra-ocular pressure lowering medication. AS-OCTA (Nidek RS-3000 Advance 2, Gamagori, Japan) pre- and up to 6 months post-MIGS implantation was performed using a standard protocol in all cornealimbal quadrants, to derive episcleral vessel densities (VD) using a previously described technique. Main outcome measure was episcleral VD pre- and post-surgery, in sectors with and without the implant.

Results

Serial AS-OCTA images were performed in 25 eyes undergoing MIGS implantation (mean age 70.3 ± 1.5, 61% female) with glaucoma or ocular hypertension. Mean preoperative intraocular pressure (IOP) of 15.5 mmHg ± 4.0 on at least one IOP lowering medication. We observed reductions in postoperative episcleral VD compared to preoperative VD at month 1 (mean difference -3.2, p=0.001), month 3 (mean difference -2.94, p=0.004) and month 6 (mean difference -2.19, p=0.039) in sectors with implants (p=0.011). On the other hand, we did not observe any significant changes in episcleral VD in sectors without implants (p=0.910).

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Conclusions

Our pilot study suggests that AS-OCTA was able to detect changes in the episcleral VD following trabecular bypass MIGS, which may become a useful modality if this is validated in future studies.

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P-372
EFFECT OF CITICOLINE IN SLOWING GLAUCOMA DISEASE PROGRESSION

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Purpose
Glaucoma is chronic progressive disease characterized by visual field loss and optic nerve damage. Lowering intraocular pressure(IOP) is effective in slowing disease progression. Besides controlled IOP, reduced glaucoma progresion, some patients show significant visual field deterioration. These cases besides hypothensive therapy use neuroprotection as adjunctive treatment. Potential neuroprotective is Cytidine-5diphosphocholine(citicoline), essential in cell membranes structural phospholipids synthesis, intermediate in phosphatidylcholine from choline. It was noticed in glaucoma(experimental model), that citicholine improves visual pathways functions thus reducing the rate of progression.

Methods
A total of 35 patients(64 eyes) with controlled Primary/Secondary Open Angle Glaucoma, IOP<21mmHg, with deterioration of visual field and MD progression between last two testings of -1,0dB were included in retrospective study. Patients older than 18 years were divided in 3 treatment groups: first with combined Citicoline (peroral/topical) therapy(group1,13eyes), second with only topical citicoline(group2,10eyes), last with only peroral use of neuroprotection(group3,41eye) that lasts four months. Standard automated perimetry(SAP, 24-2 central full threshold program;Octopus) were performed, and MD/PSD evaluated.

Results
Group1 patients were the oldest 69.23±4.09years, comparing to group2 (60.90±7.48) and 3(64.07±5.85). Mean IOP was 15.08±3.16mmHg/ 14.50±1.90/ 15.27±1.92mmHg. In group1 MD improved from -16.87±5.23dB before, to -13.1±5.90dB after 4 months of combined therapy (PSD from 7.17 to 6.75). In group2 MD improved from -15.98 ±5.65dB before to -14.01±6.33dB after 4 months of topical therapy (PSD from 7.55 to 6.43). In group3 MD improved from -16.11 ±6.74dB before to -13.32±7.16dB after 4 months of peroral therapy (PSD from 7.0 to 6.71).

Conclusions
The primary objective was evaluation of perimetric progression in 3 groups that received different therapeutic options (topical/peroral citicoline). All participants used topical hypotensive and neuroprotective agent that showed reduction in MD defect for 22.3%(group1), 12.34%(group2) and 17,32%(group3). Citicoline showed therapeutic efficacy slowing down progression of visual field damage, but most effective if combined two agents, then less effective as peroral use and weak effective if used as topical agent. All 3 groups improved visual acuity for one to two lines.

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P-373

KAP TOWARDS GLAUCOMA AMONG NEW GLAUCOMA PATIENTS AND THEIR FIRST-DEGREE RELATIVES: A CROSS SECTIONAL STUDY IN A TERTIARY EYE CARE CENTER, SAUDI ARABIA

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Purpose
Glaucoma, a disease marked by optic nerve damage with associated visual field defect, is a main cause of irreversible loss of vision globally as well as locally. Appropriate management of glaucoma lies in early diagnosis besides early and continuous control of the disease to preserve the optic nerve from further damage. This study aims to assess the knowledge, attitude, and practice among patients attending their first visit to glaucoma clinic and their first-degree relatives at King Khaled Eye Specialist Hospital in Riyadh.

Methods
A cross sectional study was conducted using a self-administered questionnaire. An informed consent was obtained prior to questionnaire distribution. The questionnaire involves 4 sections: sociodemographic data, awareness, knowledge, and attitude and practice.

Results
One hundred twenty subjects were included in our study; 70 (58.3%) of them were in the glaucoma patients group, and 50 (41.7%) were first degree relatives. Forty four (62.9%) from patients group and 39 (78%) from relatives group were men. Thirty four (48.6%) of the patients of the patients aged 41 to 65 years old, while 41 (82%) of the relatives group were 18 to 40 years old. Thirty six of patients (52.2%) and 35 of relatives (70%) have ever heard the term “glaucoma”. The correct definition of glaucoma was elected by only 12 subjects (17.1%) of patients group and by 4 subjects (8.2%) of relatives group. Living outside the central region and having negative systemic medical history are associated with poorer knowledge of glaucoma definition (p-value < 0.05). Although 84.8% of patients believe that compliance to anti-glaucoma medications helps in controlling the disease, only 22.7% reported actual good compliance in reality. Correct way of instilling the eye drops was stated by 43.9% of patients, and good hospital visit habits was reported by 53.03% of them. Eighty point three per cent strongly recommends their first-degree relatives to get screened for glaucoma.

Conclusions
Knowledge about glaucoma is still limited, and awareness programs needs to be further activated to spread correct knowledge about the nature of glaucoma disease, importance of compliance to treatment, way of instilling the eye drops, and significance of screening at risk people. Patients’ families should also be involved in the education programs.

P-375
COMPARISON OF CORNEAL ABERRATION PROFILE BETWEEN GLAUCOMA PATIENTS ON MONOTHERAPY AND POLYTHERAPY

R Pandit

Purpose
Ocular surface disease (OSD) in glaucoma patients can be a pre-existing condition that is exacerbated by topical therapy or a novel disease that manifests after initiation of topical therapy. The severity of OSD is directly proportional to the number of anti-glaucoma medications used. The chronic insult to the ocular surface in glaucoma patients on topical therapy does alter the corneal aberration profile which eventually causes impairment of the optical quality. The aim of this study is to compare the corneal higher order aberrations between primary open angle glaucoma patients on monotherapy and polytherapy.

Methods
Primary open angle glaucoma patients being medically treated with topical IOP lowering medications were divided into two groups viz. monotherapy and polytherapy. Patients in both the groups underwent wavefront aberrometry. Coma-like, spherical-like, and total ocular higher-order aberrations were measured as root mean square values.

Results
A total of 40 eyes of 40 patients were examined (20 eyes in each group). A statistically significant increase in the coma-like, spherical-like and total ocular higher-order aberrations was observed for the polytherapy group as compared to the monotherapy group. ($p < 0.05$)

Conclusions
Ocular higher order aberrations increase with the increase in number of IOP lowering medications thus impairing the quality of vision in the background of pre-existing visual impairment resulting from the disease itself.

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P-376

INTRAOCULAR HYPERTENSION CAUSED BY ELEVATED EPISCLERAL VENOUS PRESSURE FOLLOWING ARTERIOVENOUS FISTULA EMBOLIZATION

G Khalatyan, S Pourjavan, L Otjacques, C Marinescu

Purpose

To describe an interesting case of a patient who underwent a two-staged transarterial embolization procedure of a left sided ethmoidal arteriovenous fistula (AVF) and developed a few days after the intervention a proptosis, conjunctival injection, chemosis and intraocular hypertension secondary to elevated episcleral venous pressure caused by the obstruction of the left superior ophthalmic vein.

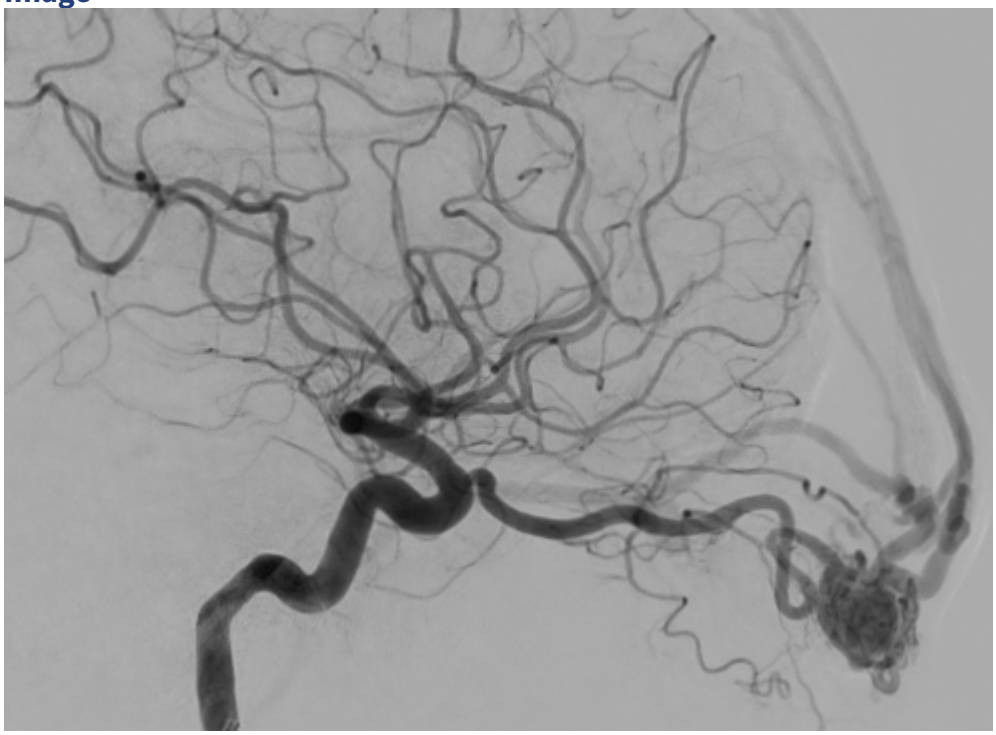
Methods

The patient presented with headache, facial edema and frontal venous congestion. There was a history of rhinoplasty at the age of 25 and 35 years old but no notion of trauma. The angiography revealed an ethmoidal AVF fed primarily by the left ophthalmic artery and left sphenopalatine artery. The venous drainage ran through the left superior ophthalmic vein and the temporal veins. Considering the complexity of the lesion, a two staged transarterial embolization procedure was performed. The first embolization procedure was done through the left ophthalmic artery, disconnecting the branches feeding the lesion. The second intervention took place two months later, embolizing feeding vessels emanating from the right ophthalmic artery and right facial artery. In the days following the procedure, the patient developed a progressive proptosis, conjunctival injection and chemosis of the left eye. The angiography demonstrated a severe circulatory slowdown of the left superior ophthalmic vein. The ophthalmic examination revealed an intraocular pressure (IOP) of 25 mmHg in the left eye (vs 15 mmHg in the right eye), blood reflux in Schlemm's canal and veinous stasis in the fundus of the left eye. The optic nerve head and the visual field were unremarkable. The patient was treated with lubricating drops and beta-blockers.

Results

We suspect a migration of the embolic material to the left superior ophthalmic vein responsible for the blood flow alteration and the elevation of the episcleral venous pressure (EVP). The EVP comes into play when aqueous drains into the episcleral veins after collecting into the collector's channels and the anterior ciliary venous circulation. According to the Goldman equation, there is a direct relationship between the EVP and the IOP.

Image



Conclusions

Our patient will necessitate regular ophthalmic evaluation as he is at increased risk of open-angle glaucoma, acute angle-closure glaucoma, central retinal vein and artery occlusion. Hopefully a collateral circulation will develop facilitating the decongestion of the orbit and the drainage of aqueous out of the eye.

P-377

INCREASED PLASMA CORTISOL LEVELS IN PRIMARY ANGLE CLOSURE GLAUCOMA

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Purpose
To compare the plasma cortisol levels in patients of Primary angle closure glaucoma with age matched controls.

Methods
This prospective non interventional case control study, was carried out in a tertiary eye care university hospital. In Group 1, 30 patients of moderate to advanced PACG patients (Mean age – 56.14 ± 4.57 years), with no systemic comorbidity, on medical management, were recruited. Patients who had undergone any surgical intervention in the past one year were excluded from the study. In Group 2, 30 age matched controls (Mean age – 55.82 ± 3.63 years), with no systemic comorbidity, were recruited. Serum cortisol samples (8 a.m. – 9 a.m.) were collected for each patient in both the groups. Serum cortisol levels, retinal nerve fibre layer (RNFL) thickness and visual fields were compared between the two groups.

Results
The mean serum cortisol levels in Group 1 and Group 2 measured using selective liquid chromatography-tandem mass spectrometry (LC-MS/MS) were 115.693 ± 74.326 µg/ml and 56.362194 ± 39.723788 ng/ml respectively ($p<0.001$). The mean RNFL thickness in Group 1 and Group 2 were 53 ± 13.3 µm and 102 ± 6.4 µm respectively ($p<0.001$). The mean deviation on Humphrey visual field 24-2C with P<0.5% in Group 1 and Group 2 were -17.97 ± 13.5 dB and -2.13 ± 1.43 dB respectively ($p<0.001$).

Conclusions
Primary angle closure glaucoma patients have raised endogenous corticosteroid levels.

P-378
NEOVASCULAR GLAUCOMA - 16 YEARS OF EXPERIENCE

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Purpose
Multiple protocols for Neovascular Glaucoma (NVG) management exist mainly with the goal of visual loss and pain prevention, but the main questions regard the timing and the order of the procedures. Nowadays there is no "best practice" approach to that condition, that is why we present our algorithm for NVG management by using a multicomponent approach and modification of the established treatments.

Methods
A prospective study was performed on over 50 eyes with NVG, treated in "St. Sofia" Hospital, (Sofia, Bulgaria) from 2006 to 2022 yr. All patients underwent routine eye exams, gonioscopy, and fluorescein angiography, OCT, B-scan when needed and possible. Varied combinations of treatment in different order were used (topical and systemic medications, intravitreal anti-VEGF, laser and surgical treatment) in order to achieve IOP control and long-lasting results. All patients were examined by an endocrinologist and cardiologist periodically.

Results
We achieved neovascular reduction, normal IOP, and visual acuity improvement in all the patients during the first year of treatment. The preferred management was an aggressive combination of topical drugs, intravitreal anti-VEGF, panretinal laser photocoagulation (PRP) and PPV, when needed. During the second year, the period without injections is extended by a month until achievement of maintenance dose of 1 to 2 times a year or discontinuing treatment until FA data for neovascularization occurred. Topical antihypertensive drops were applied to all the patients, but none of them underwent anti-glaucoma surgery.

Conclusions
Neovascular glaucoma is a therapeutic challenge, which requires combined therapy with topical drugs, systemic medications, laser therapy, surgical treatment, and multidisciplinary approach to decrease the ischemic drive. Our algorithm for NVG treatment shows good results and lack of complications. Its main disadvantage is time consumption because the patients need frequent consultations among surgical/medical retina, glaucoma specialists, and endocrinologists, cardiologists. The key points for maximum efficiency are persistence of the ophthalmologist, motivation of the patient, and interdisciplinary connections between doctors.

P-379

RETINAL VESSEL DIAMETERS AND RETINAL NERVE FIBRE LAYER THICKNESS MEASUREMENTS BY SCANNING LASER POLARIMETRY IN MIDDLE-AGED CAUCASIANS

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Purpose
To study the relationship between retinal nerve fibre layer (RNFL) using scanning laser polarimetry (GDx) and retinal vessel diameter in a cohort of middle-aged Caucasians.

Methods
We collected data from 3070 individuals in the Northern Finland Birth Cohort Eye Study. Retinal vessel diameter was measured using a semiautomated computer-assisted program (IVAN). The retinal nerve fibre layer was measured using GDx.

Results
Data from 2057 subjects were analyzed. Central retinal vein equivalent (CRVE) was significantly correlated to the change in GDx parameters. For each SD decrease in GDx nerve fibre indicator (NFI) and increase in temporal-superior-nasal-inferior-temporal (TSNIT) average parameters, there was a statistically significant increase in CRVE for both glaucomatous and non-glaucomatous subjects. There was a significant association between CRVE and all GDx variables in glaucoma subjects. There was no association between central retinal artery equivalent and GDx variables in the subjects with or without glaucoma.

Conclusions
Increased CRVE was associated with larger average TSNIT and smaller NFI especially in glaucoma subjects. This study clarifies the vascular changes in glaucoma and gives clue on the possible presence of vascular aetiology of glaucomatous optic neuropathy.

P-380

PREVALENCE OF OCULAR HYPERTENSION AND GLAUCOMA ASSOCIATED WITH DESCEMET'S STRIPPING AUTOMATED ENDOTHELIAL KERATOPLASTY

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Purpose

To describe the prevalence of ocular hypertension in patients who underwent Descemet's stripping automated endothelial keratoplasty.

Methods

A 9-year retrospective study was conducted (2010-2019). Analyzing electronic clinical records of patients undergoing Descemet's stripping automated endothelial keratoplasty (DSAEK) at the Conde de Valenciana Ophthalmology Institute, Mexico City. The variables analyzed were age, visual acuity before and at 3 months of DSAEK, indications for surgery, presence of complications such as ocular hypertension and glaucoma. For the descriptive analysis it was expressed in means, standard deviation and percentages. All analyses were performed with GraphPad Prism 9 (La Jolla, CA).

Results

A total of 53 patients were included. The mean age was 70.58 (10.10), the female sex being more prevalent (64.15%). The main indications for DSAEK was Fuchs' endothelial dystrophy (22.64%), pseudophakic bullous keratopathy (60.37%) and endothelial failure from angle clousure (11.32%). Visual acuity before DSAEK was 1.55 0.68, and at 3 months 1.039 0.76. Among postoperative complications, secondary glaucoma was present in only 7.54% (n=4), while ocular hypertension was found in 26.41% (n=12). However, the mean intraocular pressure after DSAEK was 17.19 mmHg 6.8. 58.33% of patients with ocular hypertension had DSAEK failure, while those with secondary glaucoma 75% had failure.

Conclusions

The results of subsequent lamellar transplants performed by trainees are similar to those reported in the literature. Visual acuity (VA) improved during 3 months, indicating that DSAEK is a favorable technique for the treatment of any type of endothelial dysfunction. However, the presence of ocular hypertension and glaucoma has a high percentage associated with failure.

P-381
GLAUCOMA SPECIALIST EMAIL ADVICE SERVICE (GSEAS) STUDY

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Purpose
Ophthalmology is a high-volume outpatient specialty. Despite this, communication between secondary and primary care can be suboptimal. At York and Scarborough Teaching Hospital NHS Foundation Trust, a Glaucoma Specialist Email Advice Service (GSEAS) was created alongside an existing virtual glaucoma clinic to strengthen relationships between service users and the hospital eye service team. Since inception in August 2019, the GSEAS has been quantitatively analysed through correspondences and subjectively through the service users' lens by online questionnaire.

Methods
GSEAS was publicised by word-of-mouth. Email correspondences from Jan-Dec 2020 were collated, including number of emails, service user type, source of the instigation, nature of enquiry, outcome and action taken. Each correspondence was coded using the following outcomes: 1. If the enquiry needed a response, 2. If the enquiry was replied to within two working days, 3. If the enquiry with a definitive outcome solved the query, 4. If the enquiry where actions were taken other than giving advice improved patient care. Measures of the GSEAS success included: 1. Percentage of enquires answered within two working days, 2. Outpatient patient appointment avoided by the enquiries, 3. Streamlining of patient care – actions taken other than giving advice to improve patient care. Service users who accessed GSEAS were subsequently invited to complete a satisfaction questionnaire. Questions were designed in a scaled 1-10 format with free-text comments and were asked to quantitatively rate their experiences by the following quantifiers: 1. Speed of response, 2. Satisfaction with the received response, 3. Did it solve their problem? 4. Did they find this service useful? and finally 5. Would you recommend it to others.

Results
Results suggested that a hospital appointment was avoided in 75% (95 of 126) of enquiries resolved. Analysis of service user feedback also indicated high satisfaction, with 100% (25 of 25) of service users reporting the GSEAS had resolved their query and all would recommend it to others. There is promising evidence to suggest GSEAS helps streamline patient management and avoidance of outpatient appointments.

Conclusions
The GSEAS encourages a small select population of service users to take greater ownership of eye health. By avoidance of outpatient appointments, a GSEAS has been a novel and cost-neutral method of meeting demand alongside traditional methods of service delivery.

P-382
DEVELOPING AN ONLINE EDUCATIONAL COURSE FOR GLAUCOMA PATIENTS

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Purpose
Teleophthalmology plays a vital role in the delivery of glaucoma care. In asynchronous review clinics, there is no direct doctor-patient contact. Various studies report that this is one of the main areas in which patient satisfaction and acceptance of these clinics are negatively impacted. Innovative educational concepts that facilitate accessible digital remote patient education can be a powerful adjunct to asynchronous review clinics, as well as provide a standardised and complete tool for clinicians to refer to in their clinic reports. Patient education is essential in empowering patients in becoming autonomous concerning their health and treatment.

Methods
We describe the development of a free and comprehensive online glaucoma patient education course for adults with glaucoma, their family and friends, with the aim of providing a readable resource to aid remote learning and understanding of the condition, encouraging patients and their families to be empowered and become partners in their care.

Results
The working group for the development of the course comprised of consultants, medical practitioners and education specialists and expert patients. Given the specialized nature of ophthalmology and glaucoma, certain aspects can be difficult to conceptualize, and, therefore, clear and adequate explanations of concepts are provided in the course using diagrams, flow charts, medical illustrations, images, videos, written text and analogies.

The course is available in a short and long version to suit different learning needs which take approximately 2 hours and 10 hours to complete respectively. The contents list allows course takers to find sections relevant to them and it can be taken anywhere, with easy access to the information at any time as long as there is Internet access.

The course can be accessed easily via Google, by typing in the words “Glaucoma Patient Course – Moorfields Education” in the search engine.

Conclusions
Patients want to know more about glaucoma, in particular what effect it has on them, how they can help themselves and how best to administer their eyedrops. This becomes more relevant as we move towards asynchronous review clinics. We have created an online glaucoma course. We invite you to utilise this resource for the benefit of your patients and their families.

P-384

BERNARD BECKER (1920-2013) THE MAN, THE SCIENTIST, THE PHYSICIAN: HIS LIFE AND HIS CONTRIBUTION TO THE DIAGNOSIS AND TREATMENT OF GLAUCOMA

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Purpose

Bernard Becker (1920-2013) was a giant of Ophthalmology, a tireless and meticulous scientist dedicated to the research, diagnosis, and treatment of glaucoma. In this presentation, we unfold his scientific route in every field of Ophthalmology. With his work and insight, he established himself as the most severe specialist in glaucoma during the 20th century. He loved the ophthalmologic heritage and rare books, and he founded and became famous for the library that brings his name: Bernard Becker Medical Library Collections

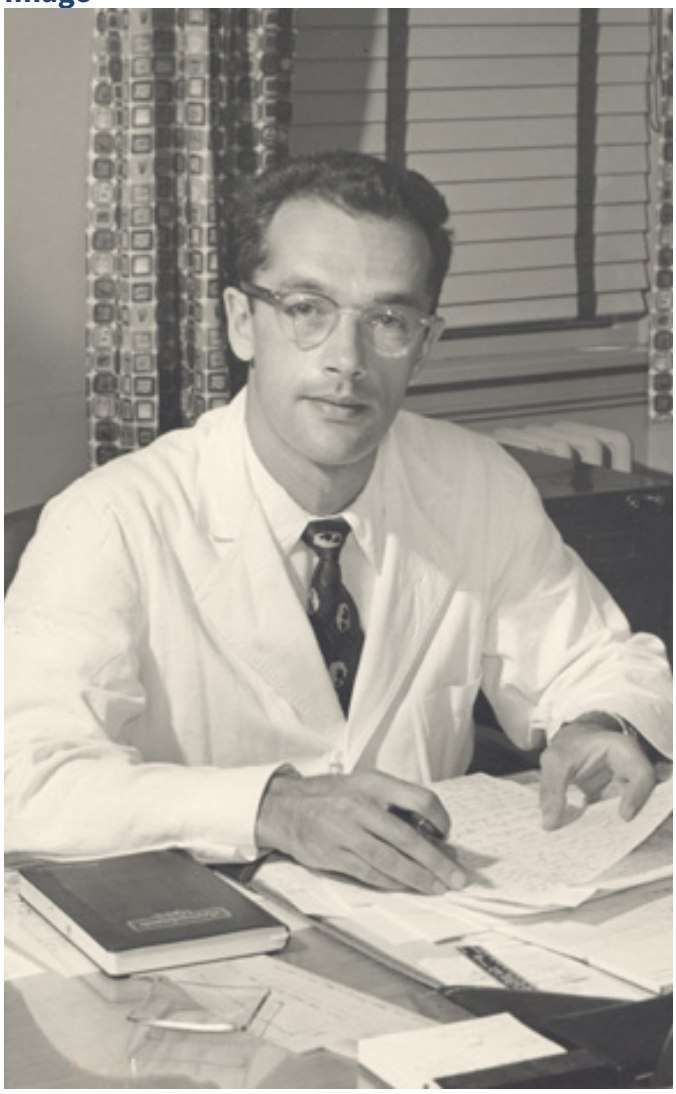
Methods

Bernard Becker had a rich scientific life. We studied biographical data, his monumental treatise 'Becker-Shaffer's Diagnosis and Therapy of Glaucomas,' and other scientific works. He discovered the drug acetazolamide and the mechanisms of glaucoma. At 17, he entered Princeton University on a full tuition scholarship and tutored fellow students to earn the necessary money. Albert Einstein asked him to tutor his nephew.

Results

Bernard Becker was a multifaceted personality. He started with chemistry and mathematics, received a scholarship to attend Harvard Medical School, and maintained his interest in chemistry. During World War II, he served in the US Army Medical Corps. Becker was interested in applying histochemistry techniques to medical research. Jonas Friedenwald invited him to join his laboratory at Johns Hopkins University, where he did his training in ophthalmology. After his residency, he went to the Washington University School of Medicine in St. Louis. He kept the Chair of Ophthalmology for 35 years and transformed the small department into a true academic center with an international reputation.

Image



Conclusions

Dr. Becker was one of the world leaders in studying the pathogenesis and treatment of glaucoma. He and Dr. Robert Schaffer published a textbook on glaucoma, one of the classics of ophthalmic literature: Becker-Shaffer's Diagnosis and Therapy of the Glaucomas. Dr. Becker studied many diseases, including diabetes and thyroid disease. He studied the physiology and biochemistry of the eye and published more than 400 articles in those fields. Dr. Becker had a deep knowledge of ophthalmology and medicine. He collected rare medical books and manuscripts and donated his collection to the Washington University Medical School Library (The Bernard Becker Medical Library). He received many awards during his career, including the Friedenwald Award, the Proctor Medal, the Helen Keller Award, and the Laureate Award of the American Academy of Ophthalmology

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P-385
SUCCESSFUL GLAUCOMA MANAGEMENT IN PANDEMIC: A REVIEW

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Purpose
Since centuries, pandemics have been a burden of human life, despite different causative organisms and different ways of life centuries ago and now.

Glaucoma on the other hand is sight-threatening disease which needs a strict management protocol and a good collaboration between doctor and patients.

The question arises how different safety and hygiene regimens can be implemented in daily office work.

Methods
A review was done looking at different ways of handling patients during unusual times and comparing old and new experiences.

Results
Glaucoma management is a challenge for every ophthalmologist even in non-pandemic times because of different influences on the cooperation of doctor and patient. In times of pandemic, we are challenged even more because of the constant threat of transmission of disease between different individuals.

The review showed interesting differences in handling glaucoma patients in pandemic times depending on the different backgrounds of ophthalmologists and patients.

Conclusions
Pandemics have been around human life for centuries and we have seen in the ongoing Covid 19 - pandemic that there is a constant struggle between the care for our patients and our own safety. This review shows ways how to handle the challenges we face every day in the management of our glaucoma patients. We will discuss how to ameliorate our approach to potentially upcoming pandemics in regard of the global differences in health systems.

P-386

INTRAOCULAR PRESSURE CHANGES IN PATIENTS WITH CHRONIC RENAL FAILURE UNDERGOING HEMODIALYSIS

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Purpose

- The aim of the study is to evaluate changes in intraocular pressure (IOP) before, during and after HD session and to evaluate the correlation of IOP changes with anterior chamber angle anatomy.

- To analyze the mechanisms intraocular pressure changes in all 3 study groups according anterior chamber angle anatomy.

- To Evaluate RNFL thickness changes in patients undergoing hemodialysis.

- To determine the risk factors affecting intraocular pressure changes during hemodialysis

Methods

In patients with chronic kidney failure who are on hemodialysis, intraocular pressure was evaluated before hemodialysis, 30 minutes after starting of hemodialysis and 30 minutes after the end of hemodialysis.According anterior chamber (irido-corneal angle) patients were divided into 3 groups.

Retinal nerve fiber layer (RNFL) and optic disc imaging with OCT was done for every patient, at the beginning of the study ,six months later, 12 month, 24 month and 36 month later

Results

Group A- The mean increase in IOP after hemodialysis (0.35 mmHg) was not statistically significant; after ultrafiltration, however, the mean IOP showed a significant decrease of 1.48mmHg.

In Group B – consisting of 18 eyes (22.5 %), with Moderate narrow angle in 1O patients IOP revealed no statistically significant differences.

In the other 8 patients, there was moderate increased IOP. 16.05 ±7.04 mmHg before HD , during HD 17.05 ±7.07mmHg, and 17.09 ±7.07 mmHg after HD.

In this group, 2 patients developed acute angle - closure glaucoma attack during the session of Hd.

In Group C- Extremely narrow -angle 7 eyes - 8.75% -In this eyes was markedly increased of IOP after HD. Before HD IOP = 18mmHg +_ 7 mmHg , during HD IOP=21mmHg +_ 9mmHg , After HD IOP = 21 mmHg +_8 mmHg. 3 patients developed acute angle closure glaucoma attack.

Conclusions

Acute primary angle closure (APAC) is a medical emergency and remains a therapeutic challenge, particularly in ESRD patients.

To avoid severe Intraocular pressure changes during hemodialysis in patients with moderate and extremely narrow anterior chamber angle prophylactic laser periphery iridotomy (LPI) may be done to prevent the development of Acute Angle - closure glaucoma.

Regular ophthalmic examinations may be useful in patients undergoing HD with a diagnosis of Glaucoma or narrow anterior chamber angle to avoid vision loss.

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P-387
COMPLICATIONS AND INTERCURRENCES DURING CATARACT SURGERY IN PATIENTS WITH GLAUCOMA

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Purpose
In cataract surgery, posterior capsular rupture (PCR) is the most common complication, and zonular dehiscence (ZD) and capsulorrhexis enlargement with leakage (CE) may also occur [requiring anterior vitrectomy (AV) or pars plana vitrectomy (PPV)]. In this study, the aim was to identify the most prevalent types of glaucoma and evaluate the incidence of complications and surgical intercurrences during cataract surgery in eyes with Glaucoma.

Methods
Retrospective study at CHUPorto, between June 2019 and May 2021. Patients aged ≤18 years and cataract surgery combined with other procedures, namely PPV and glaucoma surgery, were excluded. The following groups were identified: eyes with Primary Open Angle Glaucoma (POAG), Pseudoexfoliative Glaucoma (PXF), Glaucoma Secondary to Familial Amyloid Polyneuropathy (FAP), Primary Angle Closure (PAC) or suspect (PACS), as well as the coexistence of a phacomorphic component (lower anterior chamber - LAC).

Results
A total of 5813 eyes (overall sample) submitted to cataract surgery were analyzed: 58.9% female with a mean age of 71.43 ± 9.4 years. Of these, 13.4% (n=779) had pathology associated with Glaucoma: POAG in 48.8% (n=380); PXF in 25.2% (n=196); PAC/PACS at 22.0% (n=171); FAP at 2.3% (n=18); PXF+LAC at 1.5% (n=12); FAP+ LAC at 0.2% (n=2).

In global sample: PCR rate 1.8% (n=104); ZD 0.7% (n=42); EC 1.2% (n=69); AV 0.8% (n=45); PPV 0.5% (n=27). In POAG group: PCR rate 2.6% (n=10, p=0.141); EC 1.1% (n=4, p=0.526); AV 1.8% (n=7, p=0.025); PPV 1.1% (n=4, p=0.086). In PXF group: PCR rate 2.6% (n=5, p=0.273); ZD 2.6% (n=5, p=0.013); EC 1.0% (n=2, p=0.587); AV 2.0% (n=4, p=0.064); PPV 0.5% (n=1, p=0.591). In PAC/PACS group: PCR rate 1.8% (n=3, p=0.634); EC 1.2% (n=2, p=0.669); in FAP group: PCR rate 11.1% (n=2, p=0.040 – all eyes had previous PPV history); in PXF+LAC group: the ZD rate 25% (n=3, p<0.001).

Conclusions
The overall rate of CPR observed in CHUPorto was 1.8%: this rate is higher in the POAG group (according to the literature) and in PXF group (literature shows divergent data). The zonular dehiscence rate is higher in the PXF group, being statistically higher in the PXF+LAC group. In conclusion, patients with these comorbidities have a high rate of surgical complications, so they require a more careful preoperative assessment and adequate planning of the surgical procedure, taking into account the greater probability of intraoperative difficulties and complications.

P-391

THE BEHAVIOURAL SUITABILITY OF INDIE PUPPIES TO TRAIN AS GUIDE DOGS FOR THE BLIND

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Purpose

Guide dogs are useful aids for people with blindness, of which glaucoma is a leading cause. Breeding and training guide dogs is a rigid and costly process. They are bred and reared for key behaviours such as minimal distraction, docility, trainability, low aggression, and lack of fear. The dogs are assessed and if they pass, they are competent to assist a visually impaired person in navigation; improving quality of life and keeping the handler safe. Indie dogs, which are strays, are plentiful in India, scavenging scraps and posing a public health risk and animal welfare concern. Although not a typical guide dog breed, the Indie dog could be more suited than previously thought. They are highly intelligent, having learnt survival skills in difficult environments. They have strong immune systems and lack the predisposition to certain genetic conditions found in some European breeds.

Methods

A pilot study on two Indie puppies has been carried out under the aegis of National Association for Blind Goa and Welfare for Animals Goa. Muskie and Aramis were street dogs, rescued by a co-author at three weeks old and fully vaccinated and neutered/spayed, while fostered in his home. Their intelligence was assessed by teaching them skills with a reward feedback mechanism. They were tested for intelligent disobedience, a crucial guide dog skill, where a dog independently disobeys a handler's command in a potentially dangerous situation. A literature review has been written to investigate dog behaviour, breed and the importance of early life experiences in conditioning a puppy.

Results

The pilot study concluded that the puppies were highly intelligent but further studies are needed with larger samples and a scientific assessment of suitability. The review found that breeding guide dogs for performance increases the chances of desirable behavioural traits, but behaviour still depends on the individual dog. A complex interplay of genetic and environmental factors shape a dog's personality and there is no evidence that all Indie puppies should be ruled out as guides. However, a selection tool is required to choose puppies with the highest chance of success. This would help solve the stray dog crisis and avoid expensive breeding of guide dogs.

Conclusions

Another study is being planned in Kochi, which will test 15 Indie puppies using games and social interaction with Blind volunteers to determine behavioural suitability. If successful, recommendations will be made to begin training these puppies as guides.

P-392

AN INNOVATIVE GLAUCOMA TITLED-BASED CRICKET MATCH FOR SCREENING AND PROMOTING AWARENESS ON GLAUCOMA

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Purpose

A novel green cricket match was conducted to create glaucoma awareness among public at Trichy, India during World Glaucoma Week 2021, with players involving ophthalmologists. Goal of the match was to simultaneously educate and screen the public attending, with non-contact tonometry, confocal fundus scanner and portable virtual reality perimetry, and refer suspicious patients to base hospital.[1]

Methods

Protocol of the match was designed with glaucomatous nomenclatures, such as 'Ocular Hypertensive Man of the Match, Compliant Economic Bowler, Visual Fielder, Trabeculectomy Wicket Taker, Pseudo-exfoliative Catch of the Match & Applanative Tonometric Batsman' to educate the public. A 12-point questionnaire-based survey was also conducted, to assess impact of the campaign in creating awareness.

Results

1,021 people visited the match and 253 people above the age of 40 were screened, out of which 24 (9.4%) were found to be suspicious and were referred to hospital. 17 out of 24 (70.8%) glaucoma suspects presented to the hospital, out of which 10 (41.6%) were confirmed to have glaucoma. A total of 327 people took up the 12-point questionnaire, out of which 201 (61.4%) people answered ten or more questions correctly.

Image



Various Glaucoma Named Awards For Extraordinary Players

Conclusions

Innovative approaches through cricket in India, where people have high affinity for Indian Premier League (IPL), will increase the awareness about glaucoma.

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P-393
UNILATERAL CONGENITAL ECTROPION UVEAE WITH GLAUCOMA: A TWO-CASE SERIES

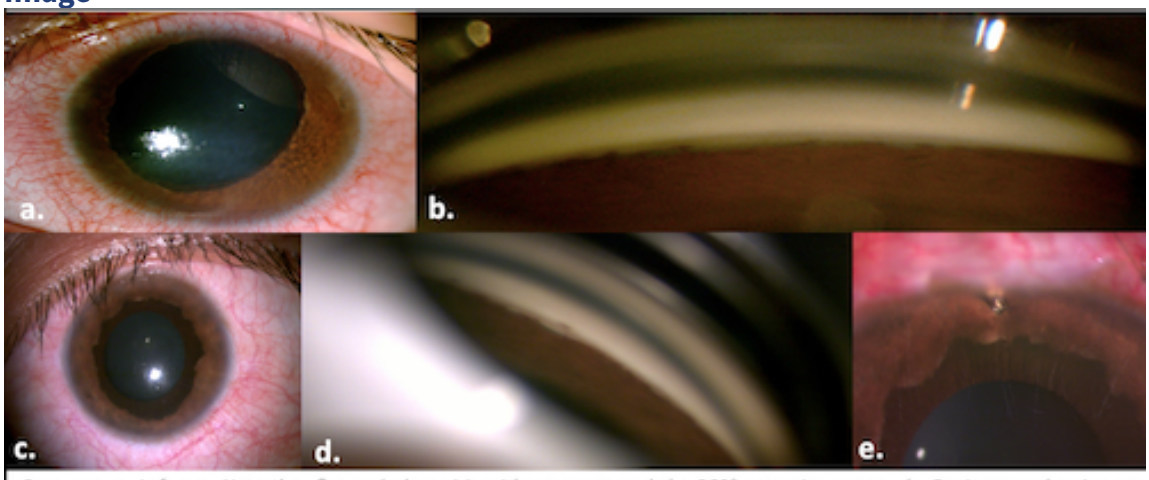
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Purpose
Congenital ectropion uveae is a rare, typically unilateral entity characterized by iris pigment epithelium on the anterior surface of the iris around the pupil margin. Generally, these patients develop glaucoma due to iridotrabecular dysgenesis caused by the iris pigment epithelium migration and it usually requires multiple surgeries.

Methods
We performed a research in the clinical file, searching patients with unilateral congenital ectropion uveae with glaucoma

Results
Case one, a 9-year-old male with progressive visual loss in his left eye, unresponsive to medical glaucoma treatment, showed IOP of 30mmHg, underwent uneventful goniotomy surgery. First day postoperative, left eye showed BCVA of HM and IOP 12mmHg but progressively showing a significant increase of IOP thus, requiring medical management and a second goniotomy was successfully performed achieving a better VA and lower IOP. In time, IOP increased, due to the refractory nature of this glaucoma, we performed a micropulse transscleral cyclophotocoagulation. Last follow-up visit revealed an IOP of 18 mmHg under only one medication.

Case two, a 30-year-old woman with history of ocular hypertension in medical glaucoma treatment and a 6-month course of blurry vision on her left eye. Initial intraocular pressure was 18 mmHg OS which showed fluctuations up to 22 mmHg. Due to the severe glaucomatous damage and lack of IOP control in a patient with an anterior segment disgenesys with ectropion uveae, surgical treatment was decided. Considering the patient's age and the maximum benefit in terms of long-term IOP control, an Ex-PRESS Microshunt Implant was performed without complications on her left eye reaching an optimal IOP control with no topical medications.

Image


Case one: a. Left eye: Note the flat and glossy iris without crypts and the 360° ectropion uveae., b. Gonioscopy showing an anterior iris Insertion. Case two: c. Left eye showing a 360° ectropion uveae and a cryptless surface., d. Gonioscopy of the left eye. Notice the narrower areas inbetween the open sectors. And e. ExPRESS Microshunt Implant in the first follow-up visit (1-day postoperative visit).

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Conclusions

We found that glaucoma presents during youth and early adulthood and is the main cause of visual loss. Refractory glaucoma presented in these patients requires a prompt and aggressive treatment. Although medical management may be the first-step intervention, early surgery is adviced to improve visual outcome of these patients. Moreover, angle surgery is less effective and good results depend on early treatment. We report two cases of congenital ectropion uveae which underwent two different procedures with good outcomes: MP-TSCPC proved to achieve an immediate IOP reduction with little to no side effects in a patient with low vision and a high risk of severe complications. Ex-Press Microshunt Implant achieved an optimal target IOP and showed to preserve a vision.

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P-394

GONIOSCOPY AND OPHTHALMOLOGISTS IN TRAINING: THIS “NARROW” TO “ “CLOSABLE” RELATIONSHIP (PRELIMINARY RESULTS OF AN ONGOING STUDY)

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Purpose

Gonisoscopy is considered as a crucial step in the diagnosis of glaucoma. It is usually a simple and informative exam. Though, it’s still time and effort consuming for young ophthalmologists.The purpose is to evaluate the perception of ophthalmologists in training of their gonioscopy learning experience under the program of specialized training in ophthalmology.

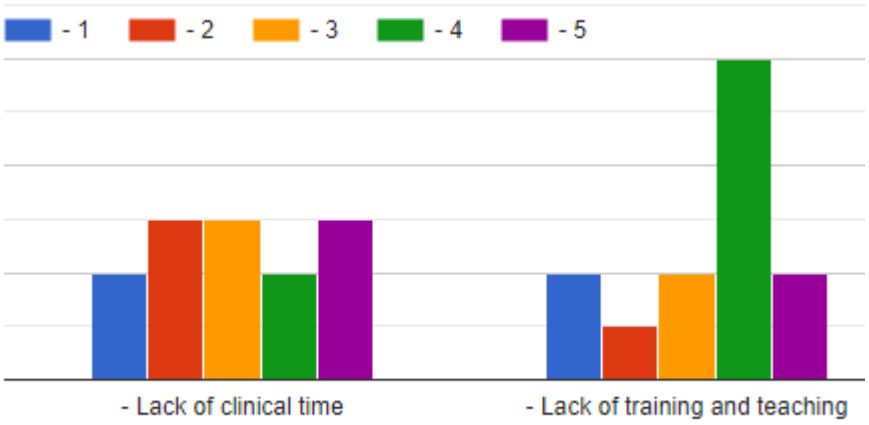
Methods

A cross-sectional electronic survey for was conducted with ophthalmologists in training. The survey in ten questions a collect parameters, in particular the level of training, the previous level training in gonioscopy, confidence in performing the procedure, level of satisfaction with training formats received, barriers potential and improvements to the training program. Respondents have were also invited to provide additional comments. Their complete responses were analyzed.

Results

in our study, 23,1% of residents were in their first , 23,1% in seond year and 15,4% in third year. Concerning confidence of practicing gonisociopy, 30,8% felt a lack of confidence. When asked about the satisfaction of learning amount of training they received to practice gonioscopy , on a scale from 1 (unsatisfied) -5(extremely satisfied) : the responses by “1” and “2” percentage was 69,3%. This percentage was around 53,9% when asked abou the quality of gonioscopy practice. The same percentage was found while responding to the amount of learning received in goniocopy interpretation. In this paramaeter, none of the participants responded by being very or extremly satisfied. The main means used to learn gonioscopy by our participants were : Self-directed learning via onlinematerials (E.g. E lectures, videos) (76,9%) and Books (61,5%). This two means obtained the higher rates of satisfaction in learning , unlike the consultant learning in clinics. When asked about the factors impacting learning : lack of time and diffculty obtained close responses , meanwhile the mean barrier was lack of training and teaching.

Image



Conclusions

Teaching formats, tell us what consultant teaching, self-directed learning and online tutorials small groups were all well catered for. Lack of training was seen as the main obstacle in the trustworthy group. This study highlights the dissatisfaction with the current training program en gonioscopy and a lack of confidence in performing the procedure. To conclude : Appropriate modifications to the specialized training program inophthalmology could improve the learning experience of gonioscopy.

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P-395

COMPARISON OF GOLDMANN APLANATION TONOMETRY, BIOMECHANICALLY CORRECTED INTRAOCULAR PRESSURE AND PENTACAM CORRECTION FORMULAS IN EYES WITH GLAUCOMA

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Purpose
To compare Goldmann aplanation tonometry (gIOP), biomechanically corrected intraocular pressure (bIOP) and intraocular pressure corrected with the Pentacam® Formulas.

Methods
Prospective study that included 220 eyes (of 113 patients) with primary open-angle glaucoma. Each eye underwent IOP measurements in different devices in the same visit. The parameters analyzed were the gIOP, the noncontact intraocular pressure (ncIOP) and bIOP, obtained with Corvis ST®, and the intraocular pressure corrected with 4 Pentacam® correction formulas, namely, the Ehlers (eIOP), Shah (sIOP), Dresden (dIOP) and Spoerl (spIOP). To correct for multiple comparisons, a p value inferior to 0.010 was considered statistically significant.

Results
Mean gIOP was 13.2±5.9mmHg, ncIOP was 14.6±4.7mmHg, bIOP was 13.1±3.4 mmHg, eIOP was 14.3±4.2mmHg, sIOP was 14.8±4.0mmHg, dIOP was 14.9±3.9mmHg and spIOP was 13.9±3.9mmHg. There were significant differences between gIOP and ncIOP (p=0.007), sIOP (p=0.004), and dIOP (p=0.002). No significant differences were found between gIOP and bIOP (p=0.055), eIOP (p=0.147) or spIOP (p=0.724).

Conclusions
gIOP measurments were comparable to those obtained with bIOP, elOP and spIOP. In patients where gIOP cannot be performed, these could be acceptable alternatives. The ncIOP, sIOP, and dIOP tend do give superior values, compared to gIOP.

P-396

COMPARATIVE STUDY OF PERIPAPILLARY RETINAL NERVE FIBRE LAYER THICKNESS AND MACULAR THICKNESS IN NORMAL AND GLAUCOMATOUS EYES BY SPECTRAL DOMAIN OCT

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Purpose
To categorize Glaucomatous eyes into Mild, Moderate and Severe by the Hodapp's Anderson Grading system using the MD Index of visual fields on Humphrey's Field Analyzer and to corelate them with the corresponding Peripapillary RNFL and Macular Thickness on SDOCT

Methods
An 18 month prospective, non-randomized cross sectional analytical study between December 2019 to September 2021 was undertaken at a rural tertiary care hopital in Central India. The Institutional Ethics committee approval was obtained at the beginning of the study.All patients of Primary Open Angle Glaucoma between 18-80 years on Medical Therapy were included in the study.

Results
- The difference in mean MD was found to be statistically significant between the normal, Mild , Moderate and Severe Glaucoma subgroups which confirms that MD Index is a reliable parameter for for categorizing glaucoma by HPA as compared to PSD and VFI.

- On comparison among the glaucoma subgroups and normal eyes, Average Macular Thickness , GCL+ and GCL++ Thickness were statistically different among the 4 sub groups.

- The Maximum AROC was obtained for Avg RNFL Thickness indicating its best diagnostic capability to differentiate Normal eye from Mild Glaucomatous eyes.The GCL++ and GCL+ also had statistically significant AROC values and may also be used to diagnose early glaucoma according to our results.

- The maximim AROC was obtained for Avg Macular Thickness, indicating it as best parameter to distinguish Mild from Moderate Glaucoma, GLC+ and Avg RNFL Thickness also had significant AROC values and may also be used to differentiate progression from mild to moderate glaucoma.

- The maximum AROC was obtained for Average RNFL Thickness, whicc is the best parameter to differentiate moderate to severe glaucoma.The other parameters were found to be statistically insignificant in our study.

Conclusions
- Categorization of Glaucomatous eyes into Mild, Moderate and Severe Glaucoma using the Hodapp Anderson Grading System and to correlate them with corresponding OCT Findings provides a definitive staging system of OCT Parameters.

- SD OCT parameters may be able to detect early changes in Preperimetric Glaucoma.

P-397

STATUS OF SECONDARY GLAUCOMA IN A TERTIARY HOSPITAL DURING THE COVID-19 PANDEMIC. A STUDY FROM EASTERN INDIA

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Purpose

To see the clinical profile, prevalence, and management outcomes in various types of secondary glaucoma during the COVID-19 pandemic.

Methods

This prospective longitudinal study was done at AIIMS, Bhubaneswar, from September 2020 to June 2022 during the period of Covid-19 pandemic.

Results

Out of 62 patients, 46 (74.2%) were males. The maximum number of patients was in the> 60 years age group (40.3%). The leading causes of secondary glaucoma were found to be PXF (27%), neovascular glaucoma (17%), trauma (13%), steroid-induced glaucoma (12%), miscellaneous causes (11%), lens-induced glaucoma (9%), developmental (6%) and uveitic glaucoma (5%). Secondary glaucoma was found to be an important cause of visual morbidity with 41.4% of eyes presenting with best corrected visual acuity (BCVA) < 3/60, IOP > 30 mm Hg in 57.4 % of eyes, and 42.7% of eyes with severe glaucoma. Out of the total of 82 eyes, 59 were given medical treatment and 23 were treated surgically. Almost 62.7% of cases treated medically achieved target IOP at the end of 6 months and 73.3% of cases treated surgically achieved target IOP at the end of 6 months. Also, the mean IOP in follow-up visits was lower in the surgical group than in the medical group. The mean values of the C:D ratio and mean value of mean standard deviation (MSD) on HVF showed no statistically significant changes at the subsequent follow-ups showing good treatment outcomes, while the RNFL thickness showed statistically significant improvement at the subsequent follow-ups.

Conclusions

Pseudoexfoliation glaucoma is the most common cause of glaucoma in our study, with more prevalence in the elderly age group. Also, our study shows that the maximum number of eyes affected with secondary glaucoma falls in the elderly age group and are males. While steroid-induced glaucoma forms the most common cause in the young age group, PXF is in the elderly age group. Secondary glaucoma is more commonly unilateral and presents with intraocular pressure >30 mmHg with low BCVA. Most cases present with severe optic disc/visual field changes. Most patients can be treated efficiently with medical management but surgery might be required in cases with advanced glaucoma at presentation with very high IOP, specific types of secondary glaucoma which need only surgical intervention like lens-induced glaucoma and most neovascular glaucoma. The achievement of target IOP was more by surgery and also mean IOP was low after surgery.

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P-398

ANTERIOR CHAMBER ANGLE STATUS AT THE TIME OF NEOVASCULAR GLAUCOMA DIAGNOSIS

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Purpose

Many medical and surgical therapies are available to patients presenting with neovascular glaucoma (NVG), but their efficacies largely depend on the status of the anterior chamber angle, with open angles more responsive to medical or angle-based therapies as compared to synechially closed angles. However, little data on this topic exists, so this case series was created to describe the angle status of NVG eyes on presentation.

Methods

A retrospective chart review was performed for all NVG patients, identified via a SlicerDicer search of the electronic medical record from 2010-2022, with a gonioscopy at the time of presentation. Complete angle closure was defined as having >75% peripheral anterior synechiae (PAS), partial angle closure as having 1-75% PAS, and open angles as having 0% PAS.

Results

Of 206 patients with a diagnosis of NVG, 134 patients (68 men, 66 women, mean 65.6 years) had a gonioscopy performed at the time of presentation and were included in the analysis. Underlying etiologies included PDR (N=70), RVO (N=40), chronic RD (N=10), RAO (N=9), OIS (N=3), radiation retinopathy (N=1), and idiopathic (N=1). Presenting IOP was 33mmHg in 32 eyes (23.9%), 44mmHg in 43 eyes (32.1%), and 49mmHg in 59 eyes (44%) with open, partially closed, and completely closed angles, respectively. In the three aforementioned groups, presenting best corrected visual acuity (BCVA) was between 20/20 to 20/40 in 47%, 16%, and 0% of eyes, and was between CF to NLP in 16%, 47%, and 91% of eyes, respectively. The proportion of eyes that were phakic and that presented to the emergency room setting (instead of outpatient clinic setting) were 47% and 6%, 47% and 19%, and 64% and 24% in open, partially closed, and completely closed angles, respectively.

Image

Table 1. Angle, status, demographics, and clinical characteristics of neovascular glaucoma patients at the time of presentation.

	OPEN ANGLE (N=32)	PARTIALLY CLOSED (N=43)	COMPLETELY CLOSED (N=59)
MEAN AGE (yrs)	67.4 (SD 11.6)	67.6 (SD 15.1)	63.3 (SD 15.0)
GENDER			
Male	17 (53.1%)	19 (44.2%)	32 (54.2%)
Female	15 (46.9%)	24 (55.8%)	27 (45.8%)
RACE			
AA	17 (53.1%)	31 (72.1%)	40 (67.8%)
White	14 (43.8%)	11 (25.6%)	17 (28.8%)
Other	1 (3.1%)	1 (2.3%)	2 (3.4%)
ETIOLOGY			
PDR	11 (34.4%)	32 (74.4%)	27 (45.8%)
RVO	16 (50.0%)	5 (11.6%)	19 (32.2%)
RD	1 (3.1%)	3 (7.0%)	6 (10.2%)
RAO	1 (3.1%)	1 (2.3%)	7 (11.9%)
OIS	1 (3.1%)	2 (4.7%)	0 (0%)
Radiation Retinopathy	1 (3.1%)	0 (0%)	0 (0%)
Idiopathic	1 (3.1%)	0 (0%)	0 (0%)
BCVA			
20/20-20/40	15 (46.9%)	7 (16.3%)	0 (0%)
20/50-20/200	9 (28.1%)	12 (27.9%)	3 (5.1%)
20/250-20/1250	3 (9.4%)	4 (9.3%)	2 (3.4%)
CF-HM	4 (12.5%)	12 (27.9%)	25 (42.4%)
LP	1 (3.1%)	6 (14.0%)	16 (27.1%)
NLP	0 (0%)	2 (4.7%)	13 (22.0%)
MEAN IOP (mmHg)	32.6 (SD 9.5)	44.1 (SD 10.9)	49.1 (SD 11.6)
MEAN # OF IOP-LOWERING MEDS	0.9 (SD 1.4)	1.0 (SD 1.6)	1.1 (SD 1.6)
LENS STATUS			
Phakic	15 (46.9%)	20 (46.5%)	38 (64.4%)
Pseudophakic	16 (50.0%)	23 (53.5%)	19 (32.2)
Aphakic	1 (3.1%)	0 (0%)	2 (3.4%)
SETTING			
ED	2 (6.3%)	8 (18.6%)	14 (23.7%)
Clinic	30 (93.8%)	35 (81.4%)	45 (76.3%)
NEW PT			
Yes	12 (37.5%)	20 (46.5%)	31 (52.5%)
No	20 (62.5%)	23 (53.5%)	28 (47.5%)

IOP = intraocular pressure; BCVA = best corrected visual acuity; PDR = proliferative diabetic retinopathy; RD = retinal detachment; RVO = retinal vein occlusion; RAO = retinal artery occlusion; OIS = ocular ischemic syndrome; ED = emergency department

Conclusions

This case series describes the angle status amongst patients presenting with NVG, with nearly half with effectively total synechial angle closure, one-third with partially closed angles, and a quarter with completely open angles. While there is a trend towards higher IOPs and worse BCVAs in eyes with increasing degrees of synechially closure, all groups exhibited a wide range of IOPs and BCVAs. Eyes with synechial angle closure also trended towards being phakic, presenting to the ED, and being new patients. Future prospective studies are needed to determine the optimal multidisciplinary treatment plan in NVG eyes, which may differ according to the angle anatomy, rendering a gonioscopic exam essential.

P-400

THE IMPACT OF COVID-19 IN THE FOLLOW-UP OF GLAUCOMA PATIENTS: A 2-YEAR PANDEMIC ANALYSIS

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Purpose

To evaluate the impact of 2-year Covid-19 pandemic in glaucoma patients visits, surgeries and medication released compared to the corresponding year before the pandemic outbreak.

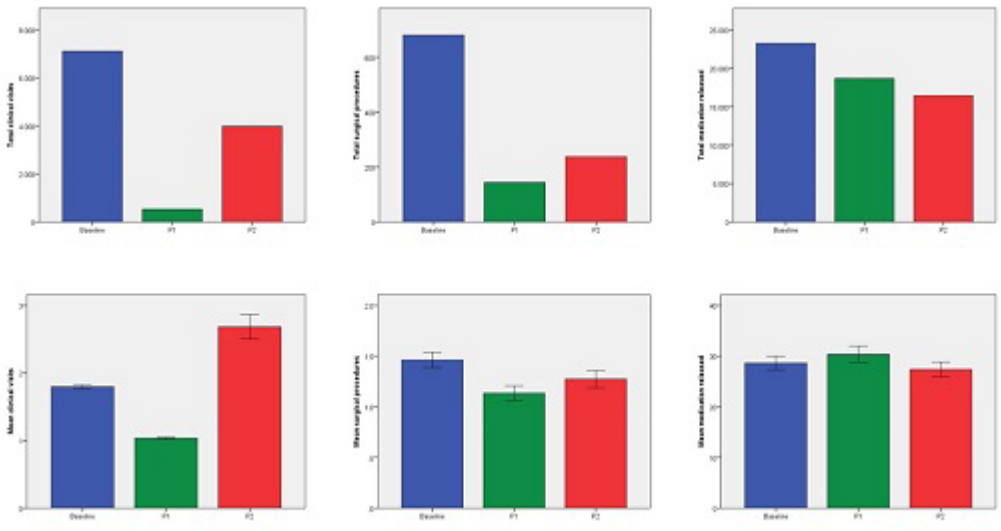
Methods

Data from glaucoma patients was obtained from electronic records of our institution. The analysis enrolled the total number of clinical visits, surgeries and medication released. Baseline period was considered from March 2019-February 2020. First-year pandemic (P1) and second-year pandemic (P2) were considered from March 2020-February 2021 and March 2021-February 2022, respectively. The mean number of clinical visits, surgical procedures and medication release per patient during the 3 periods was also compared in a non-paired analysis. Normality of the data was assessed by Shapiro-Wilk test. Kruskall-Wallis test was used to compare the groups. A p-value<0.05 was considered significant.

Results

Total number of visits, surgical procedures and medication released decreased 92.52% and 44.03% (7,117 vs 532 vs 3,983), 78.85% and 65.05% (681 vs 144 vs 238), and 19.65% and 29.35% (23,259 vs 18,692 vs 16,432), respectively, when compared the baseline period to P1 and P2. The mean number of clinical visits per patient decreased when compared baseline period to P1 (1.8±0.79 vs 1.04±0.18), but increased in P2 (2.68±3.5) (p<0.001). The mean number of surgeries per patient decreased from baseline period to P1, but slightly recovery during P2 (1.46±0.82 vs 1.13±0.4 vs 1.27±0.58, p<0.001). Also, the mean number of medication released increased from the first to the second period (28.61±19.11 vs 30.34±20.15), but decreased in the third period (27.39±17.88). There was no statistical difference between the means of the groups (p=0.08).

Image



Conclusions

The pandemic severely impacted the assistance of glaucoma patients. The total number of visits and surgeries decreased during the first year, with a partial recovery in the second year. Medication released was less affected compared to the other two parameters, which may indirectly indicate that patients continued their treatment during this period.

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P-401

OUTCOME OF AHMED VALVE IMPLANTATION IN REFRACTORY GLAUCOMA AT ALZARGA SPECIALIZED EYE CENTER IN KHARTOUM STATE-SUDAN

S Hussein Awad Abu Elgasim, E Mohamed Osman Elshiekh

Purpose

To evaluate the outcome of Ahmed valve implantation at Alzarga Specialized Eye Center(Khartoum-Sudan).

Methods

This is a descriptive retrospective hospital based study conducted at Alzarga Specialized Eye Center during the period from 2018-2020 and analyzed in January 2021. The study sample was 38 patients who fulfilled the inclusion criteria of the study. Data was collected using a questionnaire which was filled after taking informed consent.

Results

There was statistically significant reduction of intraocular pressure post Ahmed valve implantation, The mean preoperative intraocular pressure was 30 mmHg and the mean postoperative intraocular pressure at day one, one week, one month, three months and six months of follow-up were 12.05, 12.37, 12.42, 11.11 and 10.92 mmHg respectively (p value<0.05). The mean values of the number of anti-glaucoma medications were 2.71 preoperatively and 1.61 postoperatively (p value<0.05). In the majority of patients 28 (74%) there were no serious postoperative complications. Postoperative complications were reported in 10 (26%) of patients which were malignant glaucoma in 3(8%) patients, hypotony and shallow anterio chamber in 2(5%), choroidal effusion and detachment in 2(5%), malposition in 1(3%), drainage failure in 1(3%) and malposition with drainage failure in 1(3%).

Conclusions

The study concluded that among patients of refractory glaucoma who underwent Ahmed valve implantation, mean intraocular pressure was significantly reduced as well as the number of anti-glaucoma medications. Moreover, the majority of patients had no serious postoperative complications.

P-402

1+1 ≥ 2: DYSTHYROID OPTIC NEUROPATHY (DON) - THE SILENT MIMIC OF GLAUCOMA PROGRESSION

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Purpose

In patients with both Thyroid Eye Disease (TED) and glaucoma, it is difficult for clinicians to differentiate Dysthyroid Optic Neuropathy (DON) from progression of Glaucoma Optic Neuropathy (GON), particularly when there are no inflammatory signs and the target intraocular pressure is well maintained.

We would like to report a series of patients with “Inactive” TED and “glaucomatous” visual deterioration while having good IOP control and no apparent radiological signs of compressive optic neuropathy needing orbital decompression.

Methods

The medical records of consecutive patients with orbital decompression for TED in a national center, between 1st January, 2020 and 31st December, 2022 were reviewed. TED was defined as a combination of any of the following: raised serum Thyroid Simulating Immunoglobulin (TSI) / Thyrotrophin receptor antibody (TRAb), radiological findings of extraocular muscles enlargement / expansion of orbital fat and clinical features of proptosis, eyelid retraction, eyelid lag, restrictive myopathy with or without inflammation according to Clinical Activity Score (CAS). Glaucoma was defined as vertical cup-to-disc ration ≥ 0.6, asymmetry of the cup-to-disc ratio ≥ 0.2 between eyes, presence of localized retinal nerve fiber layer and/or neuroretinal rim defects and disc haemorrhage. The onset of TED and glaucoma is arranged chronologically according to the date of confirmed diagnosis of each condition.

Results

Twenty-one patients had orbital decompression for TED over the period of 3 years. Five of them have concomittent glaucoma conditions; 1 Ocular hypertension (ONT), 2 Primary Angle Closure Glaucoma (PACG) and 2 Primary Open Angle Glaucoma (POAG). Three of the orbital decompression (60%) were for DON (2 POAG and 1 PACG); 1 for proptosis (PACG) and 1 for restrictive myopathy (OHT). These DONs has no classical apical compression on radiology, the diagnosis and management of it required high index of suspicion and close collaboration between Glaucomatologists and Orbital surgeons.

Conclusions

In patients with both TED and glaucoma, despite the lack of inflammatory and radiological signs, the possibility of DON mimicking glaucomatous visual deterioration cannot be excluded. Timely orbital decompression not only restores the visual functions, it also confirms the diagnosis. High index of suspicion is required in managing patients with progressive ”glaucoma” and a background of Graves’ disease.

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P-404

COMPARISON BETWEEN MANUAL COUNTING AND CUSTOMIZED SOFTWARE ANALYSIS OF LENS EPITHELIAL CELL DENSITY

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Purpose

To compare lens epithelial cell density (LECD) in excised capsules according to enumeration by manual counting versus customized software analysis, while determining factors that affect LECD.

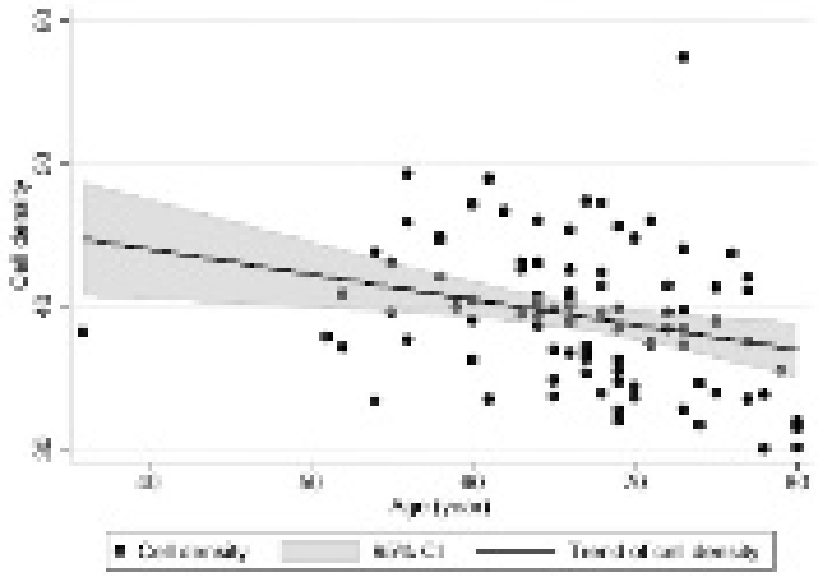
Methods

In this prospective cross-sectional study, good quality light micrographs of the lens epithelium from each harvested anterior lens capsule were subjected to enumeration via manual counting and customized software analysis. Pearson correlation coefficients and interrater correlation coefficients were calculated to explore correlations between the two methods. The effects of age, sex, and interval from capsule harvest to examination were evaluated by multilevel mixed-effects linear regression analysis.

Results

One hundred excised capsules in eyes with age-related cataract were analyzed. The mean LECDs in eyes with age-related cataract, according to manual counting and customized software analysis, were 3,935 ± 681 and 3,346 ± 359 cells/mm^2, respectively. A strong linear correlation was observed between the two methods (r = 0.83 [95% confidence interval, 0.31–1.35], P = 0.002). The LECD gradually decreased after the age of 60 years (P < 0.05), and was lower in men than in women (P<0.001).

Image



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Conclusions

The results of manual counting and customized software analysis of LECD showed a strong linear correlation with moderate agreement in excised capsules. There was a gradual decrease in LECD with advancing age in eyes with simple senile cataract.

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P-406

TREATMENT-RESISTANT GLAUCOMA SECONDARY TO ACANTHAMOEBA ENDOPHTHALMITIS FOLLOWING INTRAVITREAL INJECTION

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Purpose

Acanthamoeba spp. often causes painful keratitis.In this study, we aimed to present a case that developed Acanthamoeba endophthalmitis and treatment-resistant glaucoma after an intravitreal dexamethasone implant injection.

Methods

The patient who presented with severe pain in the eye and decreased vision after intravitreal dexamethasone implant application due to diabetic macular edema was evaluated. Differential diagnoses were determined by taking the patient's history and performing a detailed eye examination. Vitreous samples were evaluated for the diagnosis of bacterial, fungal, and amoebic agents with the preliminary diagnosis of endophthalmitis after intravitreal injection

Results

The patient, who had an intravitreal dexamethasone implant applied to his left eye had a visual acuity of counting fingers from 4 meters and an intraocular pressure (IOP) of 47 mmHg at the 1st-week follow-up. There were +2 cells in the anterior chamber, posterior synechia, and pigmented keratic precipitates and striae in the endothelium. His conjunctiva was mildly hyperemic, and he had severe pain. Fundus could not be evaluated due to +1 vitritis. Herpetic endothelitis, bacterial endophthalmitis, fungal endophthalmitis, and low virulence endophthalmitis were considered in the initial differential diagnosis. When the patient did not benefit from the antiviral and endophthalmitis treatment protocol respectively, diagnostic pars plana vitrectomy was performed together with dexamethasone implant removal. Acanthamoeba cysts were observed in the direct smear of the vitreous sample with the Calcaflour stain. Systemically azithromycin, metronidazole, and fluconazole; topically, Propamidineisetionate 0.1%, ofloxacin, cyclopentolate, and dexamethasone drops were administered. Systemic treatment and topical treatment were continued for 6 and 4 months respectively. At the post-op 6-month clinical evaluation of the patient, anterior and posterior segment findings improved, and IOP was reduced to 19 mmHg.

Conclusions

Inflammation caused by the microorganism in the anterior segment by acanthamoeba can further contribute to the elevation of IOP together with the intravitreal dexamethasone implant. It should be noted that Acanthamoeba endophthalmitis, although very rare, should be examined in detail by performing diagnostic vitrectomy in cases with refractory glaucoma and unresponsive to standard endophthalmitis treatment by evaluating the differential diagnoses correctly.

P-407

BILATERAL PRIMARY CONGENITAL GLAUCOMA ASSOCIATED WITH PHACE SYNDROME: A CASE REPORT

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Purpose

PHACE syndrome is a rare neurocutaneous vascular disorder. The most common manifestation is the presence of facial hemangiomas in early childhood. It is a poorly understood condition with ocular involvement in about one third of cases and the association with glaucoma reported in the literature is scarce. The purpose is to present the case of a patient with PHACE syndrome and bilateral primary childhood glaucoma.

Methods

The diagnosis of childhood glaucoma was made according to the definitions of the 9th Consensus report of the World Glaucoma Association (WGA) and the axial lenght (AL) of the eye was classified through Sampaolesi's eye growth chart. An ophthalmic examination was performed under anesthesia with sevoflurane and propofol. The intraocular pressure (IOP) was measured with Perkins applanation tonometer. The pachymetry measurement and ocular echography were done by Ultrasonic A-SCAN/ Pachymeter DGH 4000B IOL COMPUTATION MODULE, USA.

Results

The 2 years old male patient had an extensive facial hemangioma, an apparent buphthalmo, more evident on the right side and binocular horizontal nystagmus. Visual acuity without correction by binocular Teller's test at 38 cm was 3.4 cy/cm (20/360). The IOP was 25mmHg in the right eye (RE) and 18mmHg in the left eye (LE) using Timolol Maleate 0.5% and Xalatan®. Anterior segment evaluation in both eyes was within normality, despite areas of sectorial iris atrophy. Both eyes gonioscopy showed an open angle in all 4 quadrants,with pectineal ligaments and anterior insertion of the iris. Horizontal corneal diameter was 13 mm in the RE and 12.5 mm in the LE. Retinal findings were unremarkable bilaterally and optic discs had a vertical cup-to-disc ratio (CDR) of 0.8-0.9 in both eyes. The pachymetry measurement was 590 µ and 570 µ and the AL was 24.51 mm and 24.11 mm in the RE and LE, respectively (above the 95th percentile in Sampaolesi's eye growth chart). An Ahmed valve FP8 was implanted on the RE and the LE is being monitored using anti glaucomatous eye drops. RE's IOP was 16 mmHg six months after de surgery.

Image



Conclusions

This report is the first case of bilateral primary congenital glaucoma associated with PHACE syndrome. Glaucoma may be present on the contralateral and/or ipsilateral side of the facial hemangioma. An active, early and periodic search for glaucomatous changes should be performed in all patients with the syndrome, in order to make an early diagnosis and prevent irreversible blindness.

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P-409

TRAINING THE NEXT GENERATION OF PEDIATRIC GLAUCOMA SURGEONS: AN INTERNATIONAL EFFORT

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Purpose

To present an international educational program with a structured curriculum for teaching pediatric glaucoma surgery, that maximizes physician learning for ophthalmologists expanding their skills set into pediatric glaucoma surgery while enhancing patient safety.

Methods

17 glaucoma specialists from 4 different continents taking care of pediatric glaucoma patients were recruited to join a training program for 3 weeks to 3 months (depending on the level of expertise).

A structured curriculum consisting on clinical and surgical direct observation and didactic modules with slide sets, photos, surgery videos, followed by a wetlab curriculum using both a 3D printed artificial eye and cadaver eyes were used to practice clinical and surgical skills. A rubric was used to assess how the trainee's performance improved.

Results

Trainees expanded their skillsets, learned new surgical techniques, improved their proficiency, surgical time and confidence performing different angle and filtering surgeries. Upon return to their home countries they practiced and teach the techniques learned.

Conclusions

An international training program for pediatric glaucoma can highly improve the preparation and proficiency of the next generation of pediatric glaucoma surgeons.

P-410
UNILATERAL HYPERTENSIVE ZOSTER PAN UVEITIS: A CASE REPORT

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Purpose
diagnosis and management of hypertensive zoster panuveitis

Methods
We report the case of a 67 year old patient, followed for autoimmune haemolytic anaemia for 1 year under long term corticosteroid therapy and who presented 6 months ago with intercostal herpes zoster for which she was put on antivirals with a clear improvement.

The patient presented to the emergency room with a painful red eye with a profound decrease in visual acuity associated with photophobia.

She underwent a complete ophthalmological examination including a visual acuity measurement, a bio-microscopic examination with measurement of ocular tone and then completed by a biological assessment.

Results
The ophthalmological examination showed visual acuity in the right eye with finger movement at 1 m and ocular hypertonia up to 28 mmhg.

The examination of the adnexa showed the absence of vesicular eruptions, while the anterior segment showed conjunctival hyperhaemia with anterior uveitis made up of several granulomatous retro-corneal precipitates and the presence of a one-crossed Tyndall in the anterior chamber. The fundus was difficult to examine, showing a three-crossed hyalite which impeded the visibility of some peripheral chorio-retinal foci.

The examination of the adelphic eye revealed a visual acuity of 10/10, an ocular tone of 11mmhg.

Biological work-up in favour of a varicella-zoster virus infection.

The diagnosis of hypertensive zoster pan-uveitis was made.

The treatment consisted of slow intravenous acyclovir at a dose of 10mg/kg*3/day for 10 days and a local corticosteroid therapy based on dexamethasone 1 drop/hour for 48 hours and then a 1 drop*8/day followed by a gradual reduction with a local hypotonising treatment based on brinzolamide 1 drop*2/day associated with a cycloplegic and artificial tears and a local antihistamine.

The clinical evolution was favourable after 20 days of well conducted treatment giving an improvement of the visual acuity to 4/10 and a balance of the ocular tone, a clear regression of the clinical manifestations of pan-uveitis

Conclusions
Pan-uveitis zoster is one of the serious manifestations of herpes zoster ophthalmicus and therefore early and adequate management is necessary

P-412

VISUAL FIELD DEFECTS AND GLAUCOMATOUS OPTIC DISC IN A YOUNG WOMAN: DOES IT ALWAYS WARRANT TREATMENT?

K Raghav, J Singh, A Singh, F TT, S Kaushik, S Pandav

Purpose

To describe a case of non-progressive glaucomatous optic disc cupping in a young woman

Methods

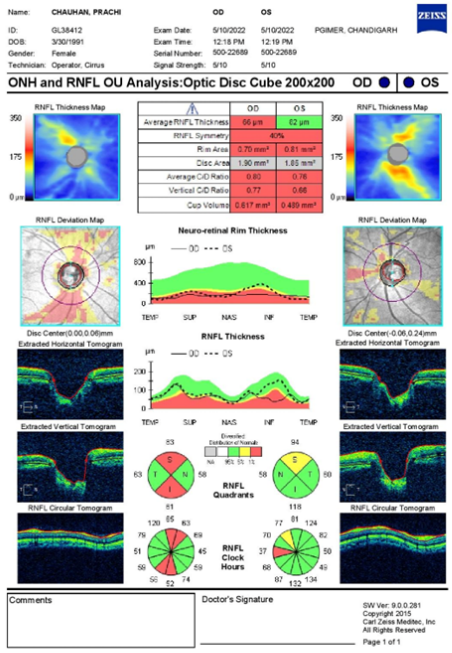
A case report

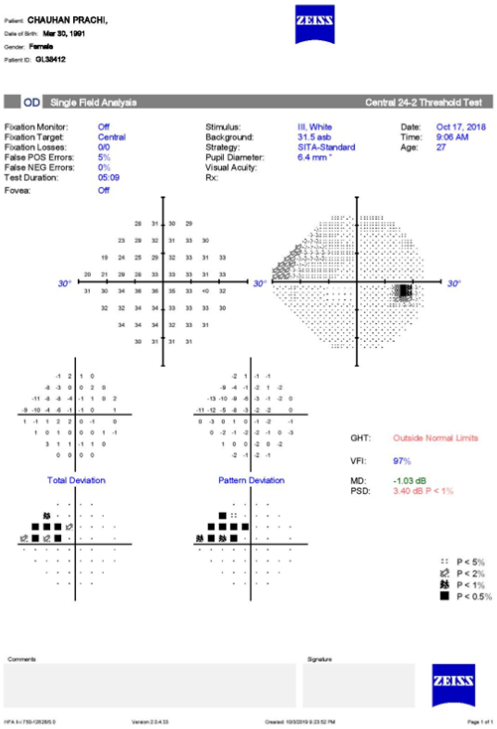
Results

We report a case of a 30-year-old woman who was referred to the glaucoma specialty clinic as a case of suspected juvenile open-angle glaucoma. At presentation, her best corrected visual acuity was 6/6 with intraocular pressure(IOP) of 14 mm Hg in both eyes, and she was instilling eye drop Dorzolamide (2%) TDS in the Right eye. She had open angles on gonioscopy and optic disc cup-to-disc ratio(CDR) of 0.8 with a thin inferior neuro-retinal rim and retinal nerve fibre layer (RNFL) defect in the right and a CDR of 0.7 in the left eye. The right eye had a corresponding Visual field(VF) defect in the superonasal quadrant and RNFL thinning on Optical coherence tomography(OCT). In contrast, VF and OCT in the left eye were normal. Her VF and OCT over three years remained stable, and IOP was never documented to be above 16 mm Hg. Her anti-glaucoma medications(AGM) were stopped, and her records were reviewed. Retrospectively, she gave a history of undergoing Laser-Assisted in situ Keratomileusis (LASIK) for myopia, and her old records revealed the presence of disc cup asymmetry. However, there were no pre-LASIK optic disc pictures to corroborate the same. She also gave a family history of glaucoma in her father and aunt. Her central corneal thickness was 440 microns in both eyes. Her IOP was 14 and 16 mm Hg three months after stopping AGM. We speculate that the sudden and transient rise in IOP during the LASIK procedure might have caused further optic nerve damage in her. Furthermore, steroids given after refractive surgery can increase IOP, especially in patients with a family history of glaucoma. However, this was a one-time episode which explains her stable IOP and VF over the course.

Image







Conclusions

Individuals with risk factors for glaucoma are at a greater risk of developing permanent optic disc damage post-LASIK and may not be appropriate for LASIK. Refractive surgeons should also consider giving patients photos of their optic nerve or an objective record of their preoperative examination. Following LASIK, a glaucoma specialist must be cautious that future measurements of IOP must be adjusted to determine an accurate reading. Also, merely having an optic disc cupping with a VF defect does not necessarily warrant treatment in all subjects

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P-413

STEROID OPHTHALMIC HYPERTENSION AGAINST THE BACKGROUND OF METHYLPREDNISOLONE ADMINISTRATION IN PATIENT WITH SYSTEMIC LUPUS ERYTHEMATOSUS: CASE REPORT

A Kozlova, A Nikiforova, M Alvares, K Sergey Aleksandrovich

Purpose

Development and clinical course dynamics of secondary steroid ophthalmic hypertension evaluation in a patient with systemic lupus erythematosus.

Methods

Primary clinical case medical records analysis.

Results

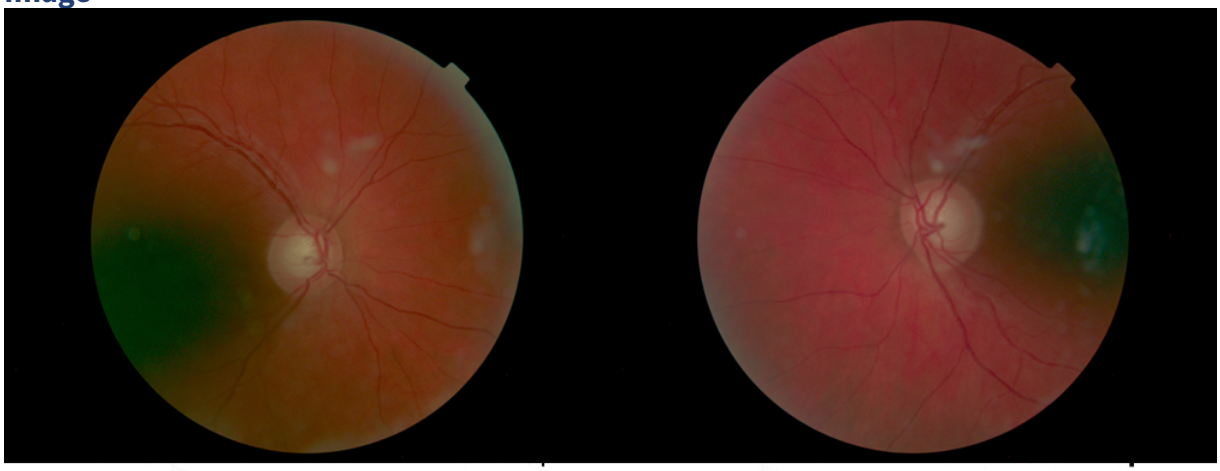
33-year-old woman first visited an ophthalmologist in February 2022 with complaints of redness, swelling, and itching of the upper eyelids of both eyes. She independently had started instillation of 0,1% dexamethasone and application of 1% tetracycline ointment in both eyes. At the appointment, pneumotonometry value of IOP was OD 42 mm Hg and OS 36 mm Hg; Patient was diagnosed with allergic blepharitis, both eyes upper eyelid chalazions, and steroid ophthalmohypertension. Olopatadin twice a day, Dorzolamide 20 mg / l + Timolol 5 mg / l twice a day in both eyes was prescribed. Dexamethasone drops were discontinued.

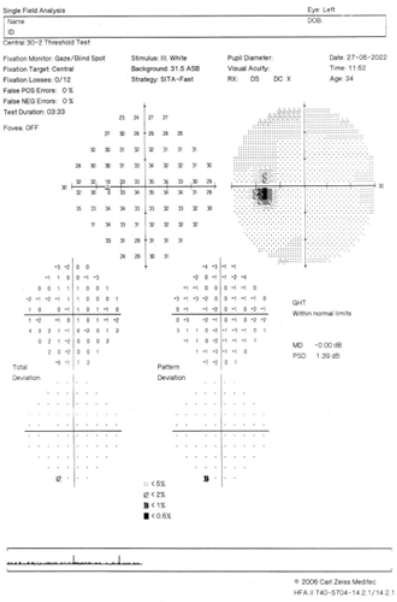
At the time of her visit to our clinic in March 2022, the patient did not notice a positive dynamic from the treatment. During the history taking, we found out that the patient has been taking methylprednisolone orally at a dose of 8 mg/day as a treatment of systemic lupus erythematosus. BCVA OD=20\20 OS=20\20. Reichert pneumotonometry: OD 29/OS 26; tonometry (iCare): OD 28/OS 26.

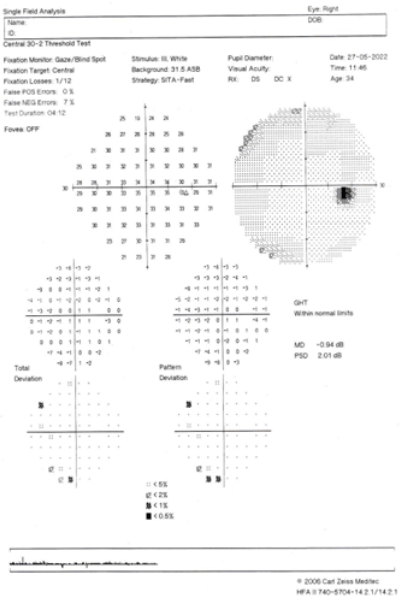
Based on the complaints, anamnesis, objective examination and instrumental examination data (perimetry Humphrey (test 30-2), OCT GCC/ONH), the patient was diagnosed with chalazion of an upper eyelid, chronic blepharitis of both eyes. Steroid ophthalmic hypertension, suspicion of secondary open-angle steroid glaucoma in both eyes.

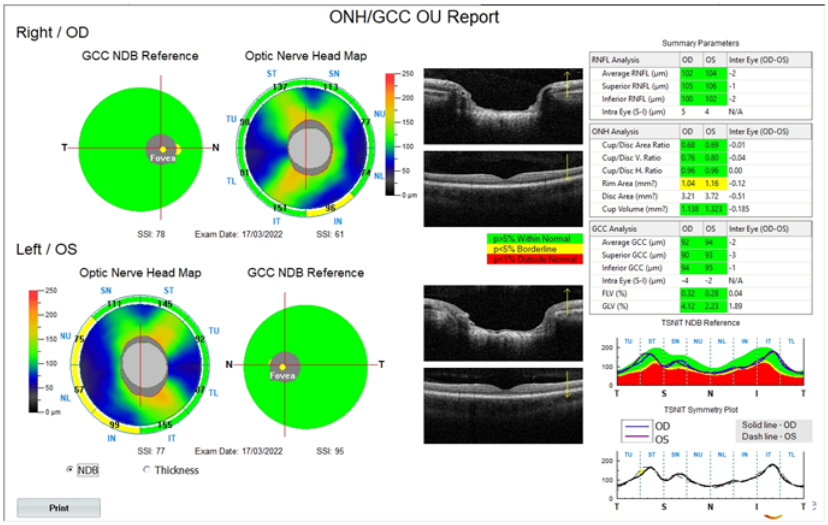
The following recommendations were given to the patient: Proper hygiene of the eyelids. Eyelid massage with Blefaklin® wipes. Lubrication of the edges of the eyelids. Moisturizing drops containing mineral oils, glycerol. Antihypertensive therapy: 1% Brinzolamide + 0,5% Timolol and 0,2% Brimonidine 2 twice a day in both eyes. On the re-examination 1 month later, the patient noted a positive trend. iCare tonometry (in the background of 2 weeks antihypertensive therapy): OD 15 mm Hg. OS 16 mmHg

Image









Conclusions

This clinical case is of interest to practitioners, as it reflects a multidisciplinary approach to the treatment and management of patients with rheumatological pathology

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P-415

THE BIG CHALLENGES IN A SMALL EYE: MANAGEMENT OF SECONDARY ANGLE CLOSURE GLAUCOMA AND AQUEOUS MISDIRECTION IN A NANOPHTHALMIC PATIENT, A CASE REPORT

C Ortega, J Cruz

Purpose

Nanophthalmos is a rare ocular disorder presenting with a short axial length and a high lens/eye volume ratio, wherein patients are predisposed to develop secondary angle closure glaucoma (SACG). This report discusses the management of a challenging case of a nanophthalmic patient with SACG, who subsequently developed aqueous misdirection.

Methods

A 40-year-old female with nanophthalmos presented with left eye pain, blurring of vision and elevated intraocular pressure (IOP). Anti-glaucoma medications were given, and two laser procedures were done prior to and in preparation for incisional surgery: (1) laser iridotomy, and (2) MicroPulse transscleral cyclophotocoagulation. Two incisional procedures were performed to manage SACG: (1) trabeculectomy with mitomycin, and (2) phacoemulsification with intraocular lens implantation combined with glaucoma drainage device (GDD) implantation (Paul Glaucoma Implant, PGI).

Results

Despite maximum tolerated anti-glaucoma medications, laser procedures and trabeculectomy, the IOP remained fluctuating, hence the need to perform a second incisional procedure in the form of lens extraction with GDD implantation. However, the IOP and AC were still rising and progressively shallowing, respectively. Ultrasound biomicroscopy revealed findings suggestive of aqueous misdirection, for which pars plana vitrectomy combined with GDD repositioning, synechiolysis, surgical iridectomy and transeptal injection of steroids was performed. Post-surgery, the AC deepened and the IOP stabilized until 10 days post-surgery.

Conclusions

Management of glaucoma in nanophthalmos can be quite challenging and results can be very unpredictable. The outcomes of this report suggest that a meticulous tailor-fit approach and a very careful vigilance for complications, even many weeks post-surgery, are required so prompt management can be performed.

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P-416
IMPACT OF MIGS ON THEATRE CAPACITY IN GLAUCOMA

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Purpose
MIGS procedures require shorter surgical time and sometimes offer an alternative surgical solution with shorter recovery time and smaller number of post operative follow up visits in comparison to traditional glaucoma interventions, such as trabeculectomy or tube implantation.

The purpose of study was to assess impact of MIGS procedures on surgical lists and efficiency of theatre time during COVID and non-COVID years.

Methods
We retrospectively analysed all glaucoma procedures performed by one surgeon on glaucoma surgical list. If there was spare surgical time, that was filled with cataract procedures from glaucoma clinic or main pool. We looked at content of lists from 2014-2021. We analysed type of surgeries performed, number of surgeries performed and number of follow up required.

Results
In each year analysed, trabeculectomy was performed on average in 20% of patients and was the most commonly performed glaucoma surgery. The number of tube implanted and cyclodestructive procedures required remained flat in non-COVID years, respectively at the level of 11% and 13.4%. Complex cataract still remained the most common surgery performed. During the lock down, the most common performed glaucoma surgery was phacoemulsification with istent – 21%, followed by microshunt – 8%, cyclodiode -7%, ECP- 4%. Trabeculectomy rate was reduced to 7% and tube insertion to 5%.

Conclusions
MIGS devices played important role during limited access to operating theatre and limited ability to follow patients up in the clinic. They allowed to efficiently use theatre time and offer patients shorter procedures with quick recovery time and also ‘buy’ time as to prevent glaucoma deterioration, so further more invasive surgery can be planned in safer, post pandemic time.

P-417

THREE CASES OF GLAUCOMA WITH IMPROVEMENT OF VISUAL FIELD DEFECTS AFTER EXTENDED ENDOSCOPIC TRANSSPHENOIDAL APPROACH FOR PITUITARY ADENOMA

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Purpose
Pituitary adenoma is one of the most common benign tumors, accounting for 14-16% of primary brain tumors. The surgery of pituitary adenoma is generally indicated when the size of the tumor increases to 10 mm or more and a visual field defect is observed. We report three glaucoma patients with an initially visual field defect, concomitant with pituitary adenomas that were extracted by extended endoscopic transsphenoidal approach (EEA).

Methods
Case series

Results
Case 1: A 70-year-old woman with high intraocular pressure (IOP) due to suspected Posner-Schlossman syndrome. Although IOP was normalized with medical therapy, Goldmann perimetry revealed bilateral hemianopsia and MRI revealed pituitary adenoma. After the EEA was performed, bilateral visual acuity and visual field defects were improved.

Case 2: A 56-year-old man visited the referring ophthalmologist because of his visual field defects. Goldmann perimetry showed homonymous hemianopsia and glaucomatous visual field defects. MRI revealed a pituitary adenoma. After the EEA excision, his visual field recovered and has been maintained long-term under topical glaucoma treatment.

Case 3: A 55-year-old woman was diagnosed with normal tension glaucoma by her primary care ophthalmologist and initiated medical treatment. Even after that, the visual field defect in the temporal field of the left eye was progressed, she was referred to our clinic. Since visual field defect was limited temporal hemifield, she underwent MRI, that revealed a pituitary adenoma. After the EEA tumorectomy, her visual field defect and impaired visual acuity recovered.

Conclusions
We report three cases of pituitary adenoma concomitant with glaucoma. Visual field tests should be interpreted carefully to reveal the the causative diseases associated with visual field defects. In all three cases, visual function damage due to pituitary adenoma was considerably recovered with EEA tumorectomy, but glaucomatous visual field defects still remained and glaucoma treatments should be continued.

P-418
MULTIDIMENSIONAL MODEL FOR OVERVIEW OF GLAUCOMA

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Purpose
To design a multidimensional overview and summarization model for purpose of Glaucoma case follow up over entire clinical course

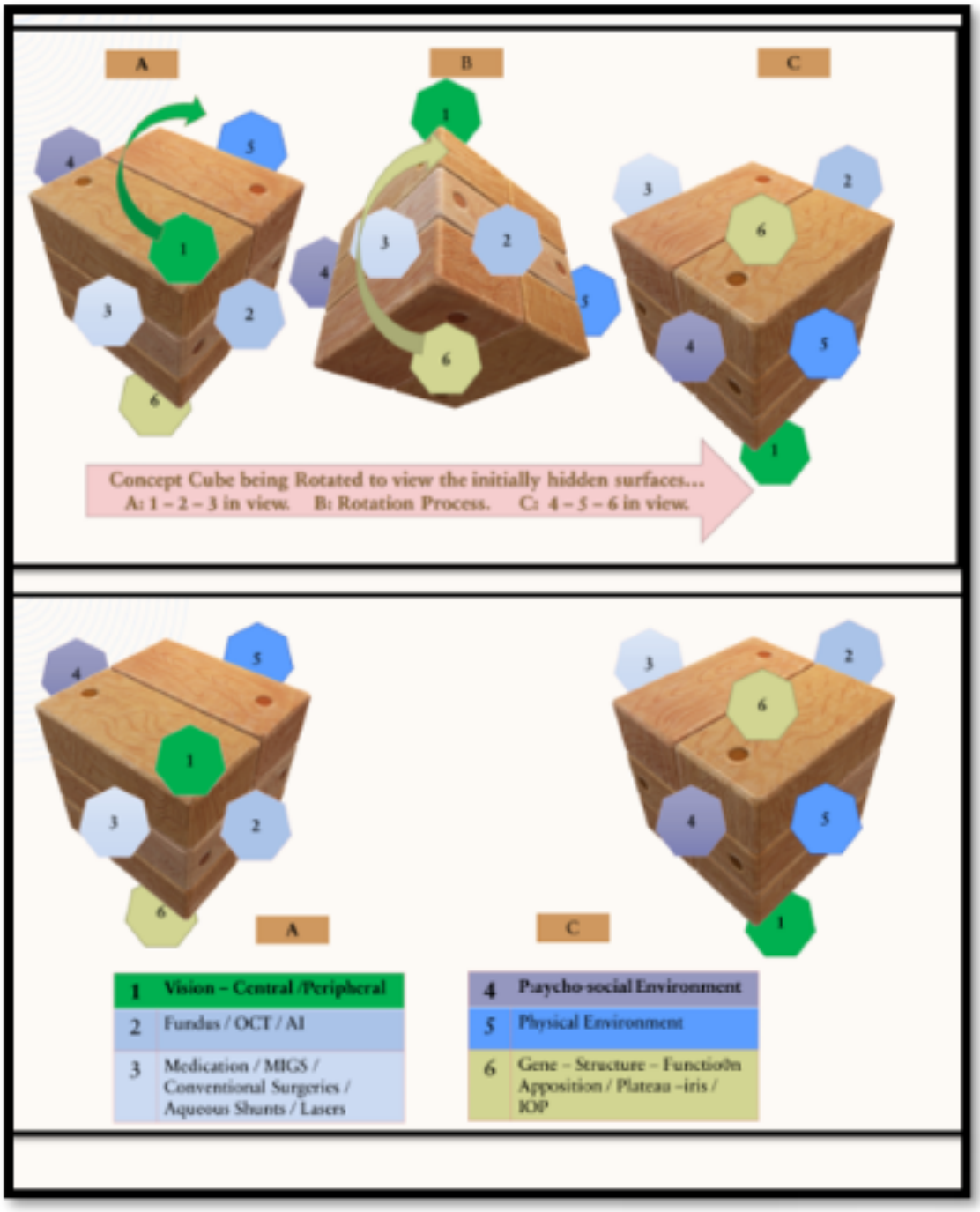
Methods
The sides of a cube are assigned the factors related to underlying Clinical condition, course, predictions, management strategies & clinical Course so as to be able to connect the factors in an intuitive manner.

In a cube, of the 6 surfaces, 3 that are visible in perspective are selected for assignment first: [A] factors related to (1) Vision, (2) Ocular Fundus, (3) Treatment; then the remaining 3 hidden surfaces are represented by [B] (4) Psycho-social, (5) Environmental & (6) Genetic aspects.

Results
Illustrations of the graphical depiction of clinical decision making concepts and concerns are presented for discussion, comments and further development.

Further 2 dimensional charts are demonstrated for grading and staging, by use of clinical findings of varying specificities, to be able to define the status of each timepoint in the eye.

Image



Conclusions

The variations in perspectives can be insightful and useful for understanding and potential developments.

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P-419
IRIDOCORNEAL ENDOTHELIAL SYNDROME (ICE) - CASE REPORT

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Purpose
To present a clinical case of a patient with iridocorneal endothelial syndrome , with fluctuating IOP unresponsive to maximal medical therapy with a successful outcome after trabeculectomy surgical treatment.

Methods
We present a clinical case of a 46- years-old male patient, who came to the clinic with IOP of 50 mmHg in the right eye. Iridocorneal Endothelial Syndrome has been diagnosed. Full ophthalmological examination including visual field test and optical coherence tomography. Maximal topical and systemic antiglaucoma therapy was initiated without sufficient therapeutical success. Patient was planned for trabeculectomy.

Results
Intraocular pressure after surgical treatment was 16 mmHg on the treated eye 7 days post-op and 15 mmHg 1 month post-op. A well-formed anterior chamber and a functioning filtering bleb was observed.

Conclusions
Iridocorneal Endothelial Syndrome (ICE) syndrome is a unique ophthalmic disorder that involves an irregular corneal endothelium that can lead to different level of corneal edema, iris atrophy, and secondary angle-closure glaucoma. It's very important to have a good monitoring of IOP at least every 3 months. If target IOP can't be reached with topical antiglaucoma therapy, then trabeculectomy is a good therapeutical option.

P-420
NEOVASCULAR GLAUCOMA WITH RETINITIS PIGMENTOSA IN A 58-YEAR-OLD FEMALE: A CASE REPORT

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Purpose
Neovascular glaucoma is associated with vascular and inflammatory retinal pathologies due to ischemia. Retinitis pigmentosa (RP) is a progressive disease of photoreceptor degeneration causing peripheral visual field loss and nyctalopia which may cause clincal overlap in glaucoma patients. There have been several studies of patients with RP associated with glaucoma. There are only few reports of patients with RP with retinal vascularization and even fewer cases wherein they developed neovascular glaucoma. This case aims to discuss the clinical presentation, causitive factors, and pathophysiological association of neovascular glaucoma and RP.

Methods
This is a descriptive case study presenting a 58-year-old female with progressive blurring of vision and nyctalopia of both eyes. Patient is a previously diagnosed case of glaucoma that had poor compliance and then poor response to topical intra-ocular pressure (IOP) lowering medications. External eye examination of the right eye showed a slightly hazy cornea with neovascularization of iris and angles. IOP was increased and angles were closed on both eyes. Fundus examination of both eyes showed bony spicules, arteriolar narrowing, and optic disc pallor showing signs of RP.

Results
Diagnostic procedures done revealed multiple areas of blocked fluoresence corresponding with the hyperpgimented lesions and constricted visual fields with a central island of vision for both eyes. Maximum topical glaucoma medications were advised for the patient and Anti-VEGF injection was given for the right eye which provided regression of neovascularization. Trabulectomy in the right eye was also done due to the uncontrollable increase in IOP and immediate unavailability of a glaucoma drainage device.

Conclusions
Previous case reports discussed the possibility that photoreceptor degradation in RP could mask ischemic retinopathies due to changes in the retinal or choroidal circulation. The arteriorlar constriction, loss of receptor cells, approximation of the retinal vascular bed to the pigment epithelium, and pigment epithelial dysfunction may have caused a chronic state of inflammation and ischemia leading to neovascularization. It is essential still to rule out other causes of retinal ischemia, but the ocular ischemia from the patient's chronic uncontrolled glaucoma along with the RP, could have been contributory to the neovascularization in this case.

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P-422
THE PROBLEM OF GLAUCOMA CARE IN UKRAINE DURING WARTIME

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Purpose
To conduct a primary analysis of the problem of managing patients with glaucoma in conditions of war and wartime in Ukraine.

Methods
Analysis of the work of ophthalmologists and patients with glaucoma survey.

Results
A number of primary and secondary problems with glaucoma patients care in Ukraine were identified.

Main primary problems included: deficiency of pharmacy and medications, absence or deficiency of ophthalmological ambulance and eye clinics for IOP control, examination and surgical treatment. Secondary problems included constant stress and serious changes in these patients life priorities, great changes in attitudes towards health and disease.

It results in the significant destruction of our system for revealing and monitoring patients with glaucoma.

Conclusions
Adaptation to our realities of wartime and thanks to significant assistance from international organizations, in particular EGS, ESCRS, the work of ophthalmological and social services gradually stabilize and improve the system of diagnosis and medical support for patients with glaucoma.

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P-424

GENOMIC RESEARCH IN SOUTHEAST NIGERIA: ATTITUDES AND PREFERENCES AMONG OPHTHALMIC PATIENTS FOR FEEDBACK ON RESEARCH- A CROSS SECTIONAL STUDY

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Purpose
To determine the attitudes of ophthalmic patients to genomic research as well as preferences regarding feedback on research results

Methods
This is a cross sectional study conducted at the two tertiary hospitals in Enugu southeast Nigeria. Data from consenting adults was obtained using a structured questionnaire as follows: demographics, awareness of genomic research and expectations for the return of research results. Data was analyzed using Statistics and Data (STATA) version 17 and summarized using means, frequencies and standard deviations. Associations between the outcome variable-preference for feedback and covariates were evaluated with Chi-square and multivariable logistic regression. The level of significance was set at the 0.05 level.

Results
Among 335 adult subjects who participated in our study,123[37%] were male and 210 [63%] were female. The mean age was 59.4 ± 11.2 years, range 33-90 years. 134[40.3%] subjects had tertiary education. Majority of the subjects 197[60.6%] were currently receiving treatment for glaucoma and 270[80.8%] of them had prior knowledge of genomic research. 278 [83.2%] subjects expressed willingness to participate in a genetic research, while 233 [72.1%] will encourage family members to participate as well. 258 [99.2%] participants expect to be informed about findings from genetic research. Males reported more willingness to take part in genetic research if they would receive feedback of their results when compared to females. [p<0.02]. Participation in genetic research was associated with sex [p<0.02], and having a diagnosis of glaucoma [<0.001]. Expectation of research results was not associated with Age[p=0.22], and educational status [p=0.5].

Conclusions
Our results suggest that ophthalmic patients from southeast Nigeria are more likely to participate in genomic research if they would receive feedback on the results.

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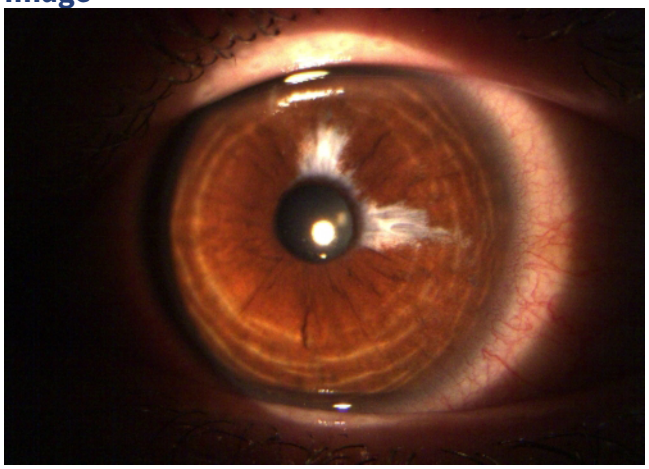
P-425
OPHTHALMOHYPERTENSION IN BILATERAL ACUTE DEPIGMENTATION OF THE IRIS

D Makhkamova

Purpose
To study the state of the organ of vision with bilateral acute depigmentation of the iris

Methods
A man A. Kh., born in 1989 came to our center with complaints of discoloration of the left eye for several weeks. The patient underwent standard ophthalmic and special research methods. Standard ophthalmic methods included visiometry, tonometry, computed perimetry, biomicroscopy, biomicro-ophthalmoscopy, ultrasound biomicroscopy and optical coherence tomography with angiography mode.

Results
Ophthalmic status: Visus:OD-0.9;OS-0.8n/c, IOP-OD/OS=25/28mmHg. Biom-y:OU-The conjunctiva is pale pink, there is no discharge. The cornea is normal, the epithelium does not stain when stained with fluorescein. The anterior chamber is symmetrical, of medium depth, the moisture is transparent. The iris is structural, has symmetrical, diffuse depigmentation - OD from 11:45 to 16:25 hours, OS - from 14:30 to 15:00 hours. The pigment border is preserved. The pupil of the correct form, round, 3.0 mm in diameter, in the center, the reaction to light is preserved. The lens is transparent, the anterior capsule is clean. When conducting gonioscopy, it was noted that the angle of the anterior chamber was open, an uneven redistribution of pigment clumps in all segments of the anterior chamber angle was visualized. OU: fundus no pathology. During static computer perimetry, there was a slight general decrease in the threshold light sensitivity of the retina OU. In this case: OD - MD: -3.77 dB; PSD: 1.32 dB. OS - MD: -5,00 dB; PSD: 1.10 dB. OCT showed: OU - no pathology.

Image


Conclusions
In clinical ophthalmological practice, BADI syndrome occurs very rarely and most often in young women, but in our practice this syndrome occurred in a young man, which led to the development of ophthalmohypertension due to blockage of the iris pigment in the anterior chamber angle. This patient was recommended the use of antihypertensive and NSAI drugs, and observation by an ophthalmologist

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P-427

INVESTIGATING THE EFFECT OF CROCIN IN PRIMARY OPEN ANGLE GLAUCOMA: A RANDOMIZED, TRIPLE-BLIND, PLACEBO-CONTROLLED CLINICAL TRIAL

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Purpose
Glaucoma is the leading cause of irreversible visual loss in the world. The present study was designed to evaluate the beneficial effects of crocin, as a supplement, in the management of primary open-angle glaucoma (POAG).

Methods
In total, 50 POAG patients within the age range of 30-71 years with intraocular pressure (IOP) between 12 and 21 mmHg were entered into the study, and ultimately, 40 patients (49 eyes) finished the clinical trial. The participants were randomly divided into crocin and placebo groups. Patients in the crocin group received a 15 mg crocin tablet per day for four months while others, in the placebo group, received a placebo tablet per day for four months besides the main medications during the study. After four months, all patients underwent a two-month washout period. The IOP level and optical coherence tomography of the retinal nerve fiber layer (RNFL), cup-to-disc ratio (CDR), and the best-corrected visual acuity (BCVA), as the secondary outcomes, were measured at baseline, as well as four and six months later. The trial was registered in the Iranian Registry of Clinical Trials (submission code: IRCT2017030113058N6)

Results
The IOP value decreased significantly in the crocin group after four (P=0.0001) and six months (P=0.003). The difference in CDR changes after four and six months was significant between the two groups (P=0.00009). The crocin and placebo groups did not have a statistically significant difference regarding the changes in BCVA values and RNFL thickness (P=0.092); however, the optical coherence tomography results showed stable conditions in the retinal nerve fiber layer.

Conclusions
This study indicated that administration of crocin, as a potent neuroprotective and antioxidant ingredient of saffron, could be useful as a supplement for the prevention of the POAG progression.

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P-428

RISK OF GLAUCOMA IN PATIENTS WITH RETINOPATHY OF PREMATURITY: A POPULATION-BASED COHORT STUDY

Y Chen

Purpose

We compared the subsequent risk of glaucoma among patients with retinopathy of prematurity (ROP) and those without prematurity. We also investigated if laser treatment was associated with an creased risk of glaucoma development among those with ROP.

Methods

From the Taiwan national health insurance research database, we identified newborns with ROP between 2008 and 2020. We randomly selected individuals without prematurity (comparison group) who were matched 4:1 to the ROP group based on age, sex and year of enrolment. Using Cox regression, hazard ratios (HRs) for subsequent glaucoma were computed. Furthermore, we focused on the stage III ROP patients and classified them into two subgroups according to whether the had received laser treatment or not. The risk of glaucoma development was compared between the laser group and group with intravitreal injection of antii-vasccular growth factor (IVI anti-VEGF group).

Results

2841 patients with ROP were included in the ROP group and 11364 age- and gender matched individuals were included in the comparison group. During the study period, 336(11.8%) of the ROP group and 1.9% of the comparison group developed glaucoma ($p<0.001$). Cox regression revealed that the hazard of glaucoma was significantly greater in the ROP group than in the comparison group [HR = 6.08; 95% confidence interval (CI), 5.49–6.61]. Among patients with stage III ROP, those receiving laser treatment was significantly associated with an increased risk of glaucoma compared to the IVI anti-VEGF group (HR = 2.61; 95% CI, 1.84–3.48).

Conclusions

This nationwide population-based cohort study revealed that patients with ROP had a significantly higher risk of subsequent glaucoma than those without prematurty. Among patients with ROP, laser treatment was a significiant risk factor of glaucoma compared to IVI anti-VEGF treatment.

P-429

CENTRAL VISUAL FIELD DAMAGE IN GLAUCOMA EYES WITH CHOROIDAL MICROVASCULATURE DROPOUT WITH AND WITHOUT HIGH AXIAL MYOPIA

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Purpose

To characterize the relationship between a deep-layer microvasculature dropout (MvD) and central visual field (VF) damage in open-angle glaucoma (POAG) patients with and without high axial myopia.

Methods

Seventy-one eyes (49 patients) with high axial myopia and POAG and 125 non-highly myopic POAG eyes (97 patients) were enrolled. Presence, area, and angular circumference of juxtapapillary MvD were evaluated on optical coherence tomography angiography B-scans and en-face choroidal images.

Results

Juxtapapillary MvD was detected more often in the highly myopic POAG eyes (43 eyes, 86%) than in the non-highly myopic eyes (73 eyes,61.9%; P=0.002). In eyes with MvD, MvD area and angular circumference (95%CI) were significantly larger in the highly myopic eyes compared to the non-highly myopic eyes [area: [0.69 (0.40, 0.98) mm^2 vs. 0.31 (0.19, 0.42) mm^2, P=0.011] and [angular circumference: 84.3 (62.9, 105.8) vs. 74.5 (58.3, 90.9) degrees, P<0.001], respectively. 24-2 VF mean deviation (MD) was significantly worse in eyes with MvD compared to eyes without MvD in both groups (P<0.001). After adjusting for 24-2 MD VF, central VF defects were more frequently found in eyes with MvD compared to eyes without MvD (82.7% vs. 60.9%, P<0.001). In multivariable analysis, higher intraocular pressure, worse 24-2 VF MD, longer axial length, and greater MvD area and angular circumference were associated with worse 10-2 VF MD.

Conclusions

MvD was more prevalent and larger in POAG eyes with high myopia than in non-highly myopic POAG eyes. In both groups, eyes with MvD showed worse glaucoma severity and more central VF defects.

P-430

NEUROPROTECTIVE EFFECT OF NON-INVASIVE GAMMAFLICKER LIGHT STIMULATION IN GLAUCOMA DISEASE

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Purpose

Glaucoma is one of the most common cause of the permanent blindness. It is a complex disease, and its pathophysiology has not been explained extensively yet. In this study, we demonstrate the effect of the non-invasive gamma-flicker light treatment on glaucoma disease to prevent the disease progression by comparing the electrophysiological measurements.

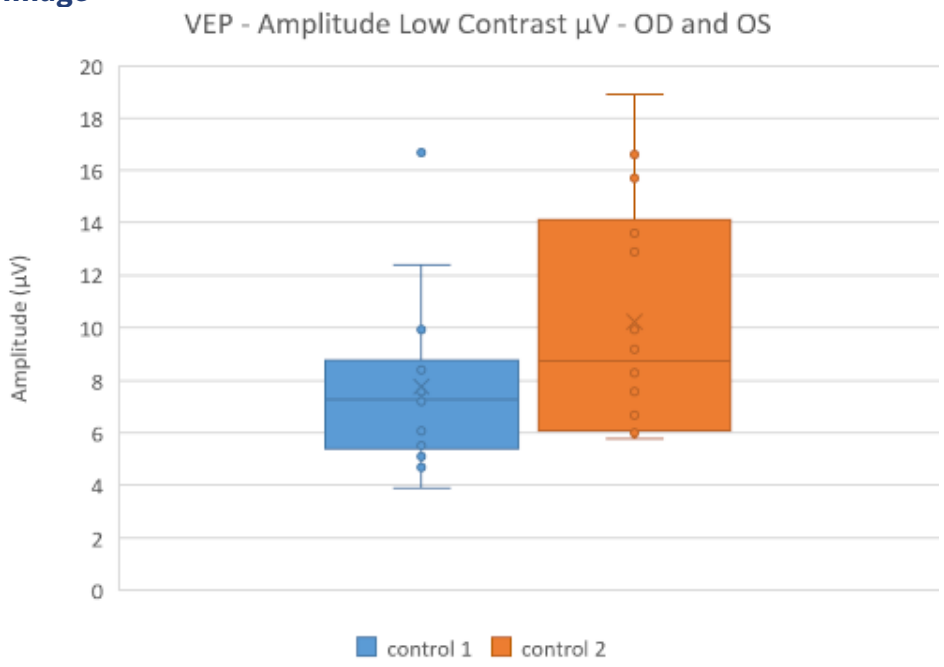
Methods

For this study, 16 early and mild stage glaucoma patients were recruited. IOPs of all patients are regulated with standard medical treatment. Only primary open angle and normal tension glaucoma patients were included in the study. Before starting the gamma-flicker light treatment, VEP, pERG, OCT RNFL, and OCT GCC values are measured during the first control visit. Afterwards, patients were given 1 hour per day gamma flicker light treatment for a month with GlaucoT v1 wearable treatment devices (GlaucoT Teknoloji AS, Turkey). After one month, the same measurements were repeated in the second control visit.

Results

16 patients (9 female and 7 male) were included in the study. The ages are between 25 and 71 with an average of 53. VEP and pERG measurement results demonstrate that 15 patients increased their electrophysiological activity on the visual path in one month (See Figure). Average VEP measurements were (8.05 +- 3.02) and (10.25 +- 3.95) µV in the first and second control, respectively. Additionally, average pERG values were measured as (1.35 +- 0.44) and (1.66 +- 0.47) µV for first and second control, respectively. In OCT RNFL and OCT GCC measurements, we observed a tendency to increase however they were not significant.

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Conclusions

Some of the pathophysiological reasons of glaucoma can be mentioned as increase in intraocular pressure, decrease in ocular blood flow, and neurodegeneration. Many studies report that glaucoma is a neurodegenerative disease that affects the brain even in early stages. Similar to Alzheimer's and Parkinson's diseases, gamma rhythm is disrupted due to the neurodegeneration in the brain in also glaucoma patients. The increase in microglial activity causes to neuroinflammation that creates a vicious cycle disrupting the gamma rhythm. The progress in glaucoma in spite of the IOP regulation can be explained with this vicious cycle.

The gamma-flicker light situmulation treatment results presented here constitute evidence to slow down the disease progression as a new treatment modality. In order to elaborate the effects, future clinical studies should focus on extending the clinical evidence.

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P-431

METABOLIC HEALTH, OBESITY, AND INTRAOCULAR PRESSURE: METABOLICALLY HEALTHY OBESE VS METABOLICALLY UNHEALTHY NORMAL WEIGHT INDIVIDUALS

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Purpose

Obesity has been associated with increased intraocular pressure (IOP), however, a subgroup of obese individuals with good metabolic profile has been suggested to have different pathophysiology and better clinical outcomes than normal weight individuals with metabolic diseases. The purpose of this study was to compare the intraocular pressure among groups with different combinations of obesity status and metabolic health status in a large cohort.

Methods

We examined 20,385 adults aged 19 to 85 years at the Health Promotion Center in Seoul St. Mary's Hospital between May 2015 and April 2016. Individuals were categorized into 4 groups according to obesity and metabolic health status. Obesity was defined as body mass index(BMI) greater than 25 kg/m^2 and metabolic status was defined based on prior medical history or abdominal obesity, dyslipidemia, low high-density lipoprotein cholesterol, high blood pressure, or high glucose level on medical examination. ANOVA and ANCOVA were performed to compare the IOP among the subgroups.

Results

The IOP of the metabolically unhealthy obese group(14.38 ± 0.06 mmHg) was the highest followed by metabolically unhealthy normal weight(MUNW, 14.22 ± 0.08 mmHg), then metabolically healthy groups($P < 0.001$; 13.50 ± 0.05 mmHg and 13.06 ± 0.03 mmHg in metabolically healthy obese[MHO] and metabolically healthy normal weight groups, respectively). Individuals who are metabolically unhealthy showed higher IOP compared to their counterparts who are metabolically healthy regardless of BMI levels, and there was a linear increase in IOP as the number of metabolic disease components increased, but no difference between normal weight vs obese individuals.

Conclusions

While obesity, metabolic health status, and each component of metabolic disease were associated with higher IOP, those who were MUNW showed higher IOP than those who were MHO, indicating that metabolic status has greater impact on IOP than obesity.

P-432

PERSONALIZED CHOICE OF TREATMENT FOR PATIENTS WITH PRIMARY ANTERIOR CHAMBER ANGLE CLOSURE

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Purpose

To develop a methodology for personalized choice of an effective method of primary angle closure (PAC) treatment based on comparing the prognosis of intraocular pressure (IOP) decrease due to laser peripheral iridotomy (LPI) or lens extraction (LE).

Methods

The multivariate data analysis is used to develop models that predict the outcome of the primary angle closure (PAC) treatment with LPI and LE. The change of intraocular pressure (ΔIOP) after treatment is chosen as a measure of success (response variable). Two (30×37) predictor matrices X contain the 37 anatomical parameters including lens vault, the choroidal thickness, anterior chamber angle and iris specifications, were obtained in a prospective study on 30 (LE)+30 (LPI) patients with PAC.

A one-class classifier named Data Driven Soft Independent Modeling of Class Analogies (DD-SIMCA) is applied to remove outliers and to confirm the similarity between the LE and LPI trial groups. The regression models are developed using traditional Principal Component Regression followed by the new Procrustes cross-validation method suitable for short datasets.

Results

We propose two quantitative approaches to personalized PAC treatment based on simple linear equations. The comprehensive approach takes into account an expanded set of thirty-seven parameters for each patient and allows predicting a decrease in IOP after LE or LPI with an accuracy of 1 mmHg. The simplified approach takes into account only 4 easily available parameters: gender, IOP, axial length (AL) and anterior chamber depth (ACD):

Ind = B0 + B1·Gender +B2·IOP + B3·AL + B4·ACD, where B0 = 16,8; B1 = -0,28; B2 = 0,24; B3 = -0,65; B4 = -2,36; male – value 0 (zero), female – value 1. This simplified approach can predict the benefit of one treatment over another and allows to make an individual treatment plan for each patient as follows: if Ind < 0, then the LPI method is preferable, otherwise, the LE method should be chosen.

Conclusions

Based on the anatomical and topographic features of the patients with PAC, mathematical models have been developed providing a personalized choice of LE or LPI in the treatment.

P-433

POSTOPERATIVE COMPLICATIONS AND REOPERATIONS FOR GLAUCOMA IN MICROSHUNT VS TRABECULECTOMY STUDY DURING 2-YEAR FOLLOW-UP

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Purpose

To describe postoperative complications and reoperations after treatment with MicroShunt versus trabeculectomy (trab) in patients with glaucoma during a 2-year follow-up. This study is the first prospective, head-to-head study comparing the safety and effectiveness of these treatments in patients with primary open-angle glaucoma.

Methods

In this randomized, prospective, multicenter study conducted in the USA and Europe (NCT01881425), patients with primary open-angle glaucoma (uncontrolled intraocular pressure [IOP] ≥15 to ≤40 mmHg) were randomly assigned 3:1 to receive MicroShunt (n=395) or trab (n=132). Postoperative interventions including bleb needling, reoperation rates, early postoperative complications (defined as occurring on or before day 98), and late postoperative complications (defined as occurring after day 98) were recorded at each visit through 2 years.

Results

Treatment with MicroShunt led to fewer postoperative interventions vs trab (55.4% vs 70.5%; p=0.001) but was associated with a higher incidence of needling (24.8% vs 9.1%; p<0.001) and reoperation (18.7% vs 10.6%; p=0.014); the most common reoperation was bleb revision (10.1% vs 7.6%). The incidence of early postoperative complications was significantly lower in the MicroShunt vs trab group for bleb leak (6.6% vs 13.0%; p=0.045; mean resolution time [SD]: 21.5 [44.4] vs 12.5 [11.1] days) and hypotony (defined as an IOP <6 mmHg at any time; [26.6% vs 48.1%; p<0.0001]; mean resolution time [SD]: 34.2 [86.9] vs 49.7 [95.0] days). Late complications of hypotony were significantly higher with the trab vs the MicroShunt group (20.6% vs 9.1%; p=0.0026; mean resolution time [SD]: 61.6 [61.2] vs 43.3 [73.9] vs days), respectively. No difference existed between the MicroShunt and trab groups in the rate of late complications of bleb leak (2.8% vs 5.3%; p=0.2301; mean resolution time [SD]: 25.6 [45.3] vs 64.8 [60.2] days) or cataract formation (defined at the principal investigator's discretion [12.9% vs 16.0%; p=0.3892]).

Conclusions

Most complications were transient and self-limited in both treatment groups. Rates of reoperation for glaucoma and needling were higher in the MicroShunt group. Early postoperative complications and late complications of hypotony were more common with trab, while the rates of late postoperative complications, excluding hypotony, and cataract extraction were similar in both groups after 2 years of follow-up.

P-434

CORRELATION BETWEEN OPTIC DISC AREA AND AXIAL LENGTH IN GLAUCOMA SUSPECTS AND PATIENTS

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Purpose

To determine whether optic disc area in relation to axial length is a predictive factor for the development of glaucoma.

Methods

Optic disc area was measured using Topcon Maestro2 spectral domain optical coherence tomography (SD-OCT; 12x9 mm widefield scan) in glaucoma suspects and patients with no axial myopia (Axial length (AL) ≤ 24.0 mm), mild to moderate axial myopia (24.0 mm < AL ≤ 26.0 mm), and high axial myopia (AL >26.0 mm) during scheduled ocular examinations at the Illinois College of Optometry. AL was estimated from the reference mirror position of the SD-OCT data capture within ± 1 mm error. The association between optic disc area and AL was analyzed using analysis of variance (ANOVA) and linear regression after the correction of ocular magnification. Ocular magnification was corrected using a geometric adjustment from a test eye with known distance and AL.

Results

A total of 223 eyes of 181 glaucoma suspects and patients were included in this study. The mean age (±SD) was 55.00 ± 16.26 years. Mean AL (± SD) was 23.18 ± 0.67 mm in no axial myopia, 24.75 ± 0.51 mm in mild to moderate myopia, and 26.70 ± 0.62 mm in high axial myopia patients. Optic disc area for all groups increased as AL increased in glaucoma suspects (R^2= 0.066) and glaucoma patients (R^2= 0.095). The correlation was strongest in non-myopes of both groups. In glaucoma patients, the mean optic disc area (± SD) was 2.41 ± 0.49 mm^2 in high axial myopes, 2.30 ± 0.47 mm^2 in mild-moderate and 2.35 ± 0.48 mm^2 in non-myopes. Although high myopes had slightly larger optic disc area, there was no significant difference in the optic-disc area of the different glaucoma groups. The mean optic disc area was similar for glaucoma suspects with high (2.65 ± 0.94 mm^2) and no (2.67 ± 0.62 mm^2) axial myopia and smaller in mild to moderate myopes (2.56 ± 0.51 mm^2).

Conclusions

Glaucoma patients with high axial myopia have slightly larger optic disc area. However, optic disc area is independent of axial length and may not be a predictive factor in determining whether myopia is associated with glaucoma.

P-435

PATIENT-REPORTED OUTCOMES AFTER INCISIONAL GLAUCOMA SURGERY VERSUS MINIMALLY INVASIVE GLAUCOMA SURGERY

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Purpose
To evaluate patient-reported outcomes (PROs) after incisional glaucoma surgery versus minimally invasive glaucoma surgery (MIGS).

Methods
An 18-item questionnaire was developed and validated to assess visual and non-visual ocular symptoms, daily activities, self-care and social life, emotional symptoms, surgical outcomes, and patient satisfaction. The questionnaire was applied to patients over 18 years who underwent incisional glaucoma surgery or MIGS with or without cataract extraction with at least 3 months of follow-up. Comparisons of PROs between MIGS and incisional glaucoma surgery were performed.

Results
Three hundred and twenty patients were included. The median of age was 67 years (IQR: 57-76.5), most patients were female (192, 60%). One hundred eighty-seven (58%) patients underwent incisional surgery and 133 (42%) MIGS. Incisional surgery included trabeculectomy (98, 53%), Ahmed Valve Implant (73, 39%), Ex-press shunt (8, 4%), non-penetrating deep sclerectomy (4,2%), and Baerveldt implant (4, 2%); MIGS included Kahook Dual Blade (54, 40%), Gonioscopy Assisted Transluminal Trabeculotomy (46, 35%), Endocyclophotocoagulation (32, 24%), and iStent (1, 1%). Regarding visual ocular symptoms, the perception of worsening in visual acuity after the surgery was higher in the Incisional group (p=0.0036). Surgery interference with daily activities differed in watching TV and night vision, rated as lower in the MIGS group. Regarding nonvisual ocular symptoms between groups, only dry eye and redness were less reported in MIGS group (p=0.0151). Self-care and social life were significantly rated better in the MIGS group (p=0.0001), the perception of loss of independence, was also lower in MIGS group (p<0.001). Regarding emotional symptoms, a higher stress perception was observed in the Incisional group (p=0.0051) as well as negative moods (p<0.001). The number of eye drops and follow-ups after surgery were perceived as significantly lower after MIGS (p=0.0002 and p=0.0021, respectively). More patients in the MIGS group fulfilled the expectation to decrease drops after the surgery (p<0.0001) and reported higher satisfaction with the surgical outcome(p=0.0012).

Conclusions
MIGS had significantly better PROs regarding visual and nonvisual ocular symptoms, less impact in self-care and social life, lower rates of negative postoperative mood, perception of less medications and follow-ups, and higher satisfaction.

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P-436

'EYE MG 3D' APP - A 3D GLAUCOMA APP WITH TRUE COLOUR CONFOCAL IMAGES TO ENHANCE PEDAGOGY & COUNSELLING

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Purpose

To make glaucoma concept learning & patient counselling better, we have innovated a totally 3D app (Eye MG 3D), depicting the ocular anatomy and pathophysiology, pertaining to glaucoma.[1] Currently, most of the apps use (two-dimensional) 2D animated or (three-dimensional) 3D animated ophthalmic images.

Methods

In this app, we have used real-time, high resolution, TrueColor, confocal images for constructing the eye models and have built it on an interactive 3D touch interface.

Results

Concepts of glaucoma have lots of theoretical framework; thus, students and patients may have to mentally visualise them. Only a powerful cognitive tool like a 3D atlas with real unanimated images, where users can choose their optimal frame, cross-section, and amount of zoom to visualise various parts of the eye, can fill in these mental theoretical gaps. Currently, this app is available free of cost for Android users from Google Play Store. For a bigger display, the windows version of the app is also available and it is provided free of cost.

Image



"Eye MG 3D" App being used for e-Counselling

Conclusions

These applications simplifies glaucoma learning and aids in e-counselling, allowing users to not have any dark side of oculus uterque pertaining to glaucoma.

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P-437

MICROSHUNT VS TRABECULECTOMY: INTERIM SAFETY OBSERVATIONS FROM AN ONGOING OPEN-LABEL EXTENSION STUDY IN PATIENTS WITH PRIMARY OPEN-ANGLE GLAUCOMA

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Purpose
The objective of this ongoing extension study is to evaluate the long-term safety of MicroShunt (MS) vs trabeculectomy (trab) plus mitomycin C in patients with primary open-angle glaucoma and uncontrolled intraocular pressure (IOP; ≥15 to ≤40 mmHg) on maximum tolerated medication at 48 months.

Methods
Patients from a 2-year, prospective, randomized, multicenter, non-inferiority study (NCT01881425) who underwent MS implantation or trab were evaluated 48 months postoperatively. The primary safety outcome was the incidence of sight-threatening adverse events (AEs) after enrollment. Endothelial cell density (ECD) loss was evaluated in all enrolled patients. This interim evaluation analyzed data on ECD loss strictly due to MicroShunt only, by excluding data from qualifying events (reoperation with trab, implantation of other glaucoma drainage device, iridotomy/iridectomy, cataract extraction or MS explantation). The proportion of patients requiring glaucoma-related postoperative interventions were also examined.

Results
In total, 203 patients who underwent MS implantation (n=160) or trab (n=43) were analyzed. Four sight-threatening serious AEs were reported in the MS group (ECD loss, pseudophakic bullous keratopathy, central retinal artery occlusion, and choroidal hemorrhage); none were reported in the trab group. The mean percentage change from screening to month 48 in ECD was −16.2% and −13.9% in the MS and trab groups, respectively (difference = −2.3%; p=0.498) and when excluding data after qualifying events, the respective differences were similar (−10.7% and −9.3%; difference = −1.4%; p=0.685). The proportion of patients who experienced a ≥30% ECD loss from screening was 21.9% and 18.6% in the MS and trab groups, respectively (difference = 3.2%; p=0.645) and was 12.5% and 10.0% (difference = 2.5%; p=0.712) when excluding data after qualifying events. At month 48, 7.9% and 7.0% of patients in the MS and trab groups had an ECD of <1000 cells/mm2 (4.2% and 6.7% of patients when excluding data after qualifying events), respectively. Glaucoma reoperation was required in 36.4% and 26.2% patients with MS and trab, respectively.

Conclusions
These interim safety results indicate no significant safety issues with MS. ECD loss was comparable between groups. Glaucoma reoperation rates were higher with MS than with trab.

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P-438

THE EUROPEAN GLAUCOMA SOCIETY (EGS) PATIENTS INVOLVEMENT INITIATIVE. PATIENTS' PERCEPTION OF GLAUCOMA CARE

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Purpose

There is often low adherence to disease management in glaucoma, as other chronic diseases, which may arise from shortcomings in care provision. The EGS therefore initiated a patient involvement initiative to identify patient needs so that these may be addressed to improve glaucoma care. The first phase of the initiative consists of a Europe-wide glaucoma patient survey.

Methods

Glaucoma patients across Europe were given access to an electronic questionnaire, available in ten languages between May and December 2022. The survey consists of 23 questions. We focus here on the results of the patients' perception of glaucoma care.

Results

We received 579 responses from 22 European countries, 89.6% from the UK, Switzerland, France or Germany. 312 (53.9%) patients were female and 512 (88.4%) were White European. 356 patients (61.4%) were between 60-79 years of age and 403 (69.6%) responders had received higher education. 493 (85.1%) had been diagnosed with glaucoma and 86 (14.9%) with ocular hypertension. Although 416/501 (83%) of the responders were satisfied with their knowledge of glaucoma, 179/501 commented that information about glaucoma had to be sourced by themselves, that they had little access to glaucoma specialists and/or that they received insufficient simple explanations during their consultations. 432/500 (86.4%) of responders stated that they were satisfied with the glaucoma care received in their country, despite negative comments by 153/500 (30.6%) on long intervals between appointments, long waiting times in clinics and rushed consultations with limited discussion on alternative treatment options. Some important findings are that 55% of the UK responders stated that access to glaucoma specialists is easy but the wait is long. On the contrary, 48.1% of the responses from France indicated that access to glaucoma specialists in both the private and public sectors is difficult. 41.7 % of the patients in Germany stated that it is very easy to get a glaucoma appointment in the private sector, but the waiting time for an appointment in the public sector is long.

Conclusions

Key knowledge gained from this survey is that patients, in many parts of Europe, are often not given simple to understand explanations about their condition, they feel rushed and they source information about glaucoma by themselves, which is not ideal. The EGS will continue its collaboration with patients to better integrate patients' needs into daily glaucoma management and further improve glaucoma care.

PLB-019

THE EYES SEE WHAT THE MIND KNOWS - A STUDY TO ANALYZE THE COGNITIVE FUNCTION IN NORMAL TENSION GLAUCOMA PATIENTS

N Balakrishnan, J MS

Purpose

This study aims to analyze the cognitive function in Normal tension glaucoma (NTG) compared to High tension Glaucoma (HTG).

Methods

It is a case control, cross sectional analytical study of 28 patients with NTG with 28 age matched HTG controls between the ages 45-60years. Patients with vision related or neurological conditions were excluded. A detailed glaucoma evaluation was done which included vision, IOP, Gonioscopy, CCT, HVF, anterior and posterior segment examination. Both the groups underwent a Montreal Cognitive Assessment Test (MoCA) and their cognition was documented. A cognitive function of <26/30 was considered significantly poor.

Results

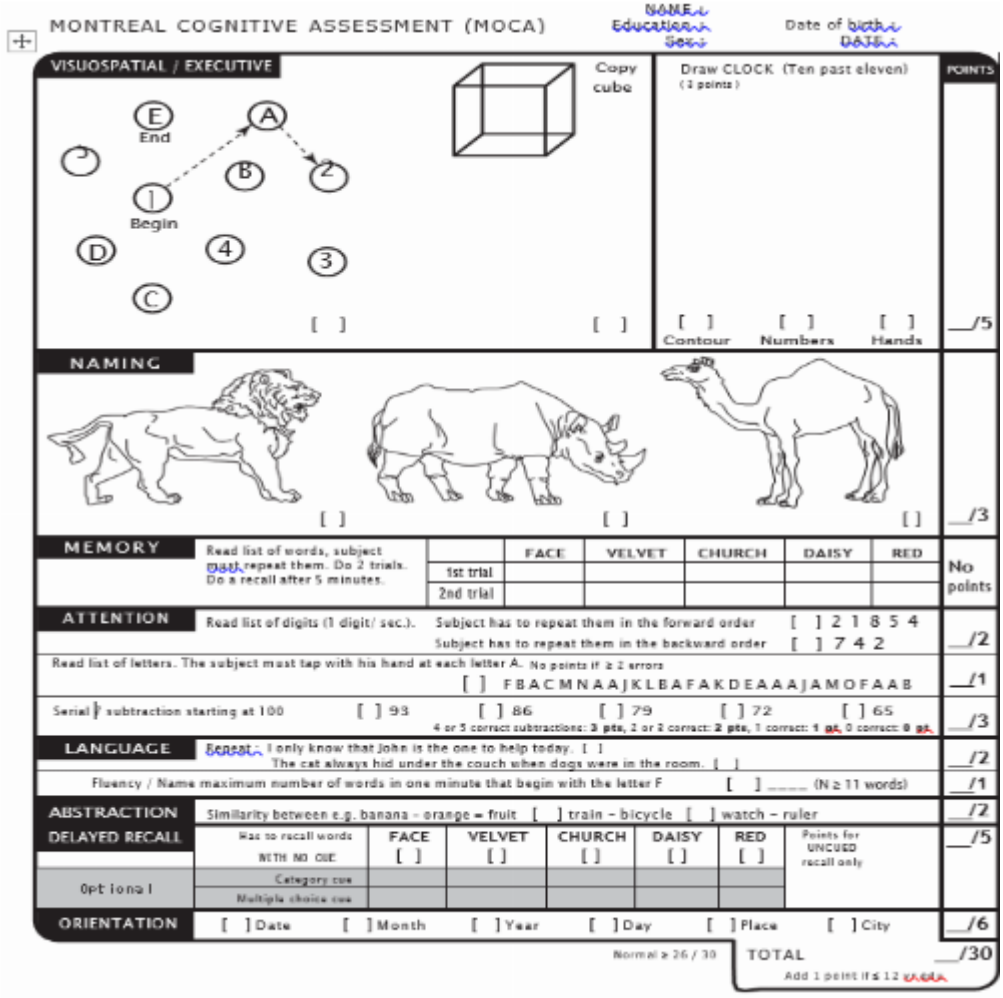
All baseline characteristics in both groups were matched. The overall cognitive function was impaired in the NTG group as compared to the HTG group and this value was statistically significant. More patients in the NTG group had a score of <26/30. The mean MoCA score of <26/30 was found in 22 NTG (78.6%) and 12 HTG patients (42.9%). This was statistically significant (p<0.006).The mean deviation (MD) and pattern standard deviation (PSD) were significantly associated with poorer cognitive function and scoring on the MOCA chart in the NTG group. However, Central corneal thickness (CCT) did not show any correlation. On calculating the odd's ratio, NTG group had 2.4 times greater risk of developing cognitive impairment compared to HTG group (OR= 2.4, 95% CI: 1.148 to 4.904).

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Image



Conclusions

NTG patients have poorer cognition as compared to high tension glaucoma and may be associated with a risk of developing dementia in the future.

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PLB-020

AN EXTENSIVE IOP PROFILE COMBINING 24-HOUR IOP CURVE WITH ICARE HOME AND WATER-DRINKING TEST. IMPACT ON DECISION-MAKING USEFULNESS TO TREAT GLAUCOMA

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Purpose

Measurement of IOP is crucial to the diagnosis and management of glaucoma due to the fact that such biological variable is a major risk for the development and progression of glaucoma. On a similar matter, the mainstay of glaucoma treatment is to decrease IOP to a target level. Although several approaches to assess the impact of IOP, as the 24-h profile of IOP (24HP) and the water-drinking test (WDT), has been used in glaucoma patients and glaucoma suspects, a combination of such tests have not been studied as determinants of therapeutical decisions. The purpose of this study was to determine if am extensive assessment of IOP (by combining a 24HP of IOP with the device Icare Home and a WDT), is a useful approach to make clinical decisions in regards of glaucoma management.

Methods

A retrospective study of 118 consecutive glaucoma patients who underwent an extensive profile of IOP (EPIOP) consisting of a combination of a 24HP of IOP with Icare Home and a traditional WDT. IOP results for each test per eye were analyzed. Central corneal thickness, clinical examination data, including prior applanation IOP, were also assessed. The clinical impact for each test interpretation was determined.

Results

Patients had a mean age of 61.4 ± 15.7 years. A larger proportion of female patients (72%), with a primary open-angle glaucoma diagnosis (68.6%), and usage of antiglaucoma medication (83%) were observed. Mean previous highest IOP values were 15.2 ± 5.1 mm Hg (RE) and 15.5 ± 4.9 mm Hg (LE). Mean CCT values were 538.3 ± 31.7 microns (RE) and 540.1 ± 33.0 (LE). Clinically significant results with the 24HP with Icare Home were obtained in 83.1% of the RE and 85.6% of the LE. WDT abnormality was found in 56.8% of the RE and 54.2% of the LE. Mean IOP fluctuation was significantly different in both eyes (10.50 ± 4.55 mm Hg, RE; 11.05 ± 4.81mm Hg; P = 0.0001). Integrated information with results derived from both tests supported the decision of starting antiglaucoma medications in 34 eyes, adding medications in 21 eyes, indicating SLT in 15 eyes, performing peripheral iridotomy in 4 eyes, re-treating 8 eyes with SLT, and undergoing filtering surgery in one eye.

Conclusions

An EPIOP (combined approach of 24HP of IOP with the Icare Home device and a WDT) seems to be a useful, although time-consuming, way to support the clinicians decision-making process in the management of glaucoma.

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PLB-021

SCREENING FOR ANXIETY AND DEPRESSION AMONG GLAUCOMA PATIENTS USING THE HOSPITAL ANXIETY AND DEPRESSION SCALE (HADS-P)

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Purpose
The purpose of this research was to determine the percentage of anxiety and depression among glaucoma patients seen at the Rizal Medical Center Eye Training and Facilities Center (RMC-ETFC) using the Filipino version of the Hospital Anxiety and Depression Scale (HADS-P) as a screening tool. This study also sought to identify and correlate the risk factors associated with anxiety and depression among glaucoma patients.

Methods
This research utilized an analytical cross-sectional study where all patients diagnosed with glaucoma within the past 25 years with an age of 18 to 90 years old were recruited. Patients with coexisting eye problems and psychiatric disorders were excluded from the study. Patients underwent a standard ophthalmologic exam which included Visual Acuity (VA), slit lamp biomicroscopy, Intraocular Pressure (IOP) measurement, gonioscopy, direct funduscopy, Automated Visual Field (AVF), Optical Coherence Tomography (OCT) of the optic nerve, and central corneal thickness measurement. The Filipino version of the Hospital Anxiety and Depression Scale (HADS-P) was ued to screen for depression and anxiety. Data were analyzed using Medcalc Statistical Software Version 18.5, and the percentage of anxiety and depression was tabulated at 95% confidence interval. The correlating risk factors were analyzed using odds ratio and logistic regression.

Results
A total of 63 Patients were included in the study, with an average age was 64.0 ± 11.6 years old (range, 18 to 88 y/o), and 66.7% were female and 33.3% were male; 46% had comorbidities. The HADS-P screening tool revealed that 17.5% of patients screened positive for anxiety, while 3.1% screened positive for depression. The analysis indicated that anxiety was significantly associated with having secondary glaucoma ($p = 0.046$), higher Mean Deviation (MD) of the worse eye ($p = 0.034$), and greater difference in MD between the 2 eyes of the same patient ($p = 0.016$). However, no significant risk factors associated with depression were identified. Patients who screened positive for depression or anxiety using the HADS-P were given the option to consult with psychiatry. Only 1 patient agreed to consult with psychiatry. The patient was diagnosed with clinical depression and treated.

Conclusions
This pioneer study in the Philippines showed that out of a total of 63 glaucoma patients screened at the RMC-ETFC using the HADS-P, 17.5% screened positive for anxiety and 3.1% screened positive for depression. The percentage of anxiety was greater than depression which was comparable to previous studies.[4-7] This study revealed that risk factors for anxiety were the presence of secondary glaucoma, a higher MD of the worse eye, and a greater difference in MD between the 2 eyes of the same patient. However, there were no significant risk factors associated with depression. The results suggest that the HADS-P may be a useful screening tool in identifying patients who may require a referral to psychiatry for confirmation of diagnosis and treatment.

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PLB-022

A NOVEL DRUG-ELUTING CONTACT LENS FOR THE CONTROLLED DELIVERY OF BIMATOPROST FOR THE TREATMENT OF OPEN-ANGLE GLAUCOMA

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Purpose

There are 80 million people worldwide with glaucoma, and this number is expected to increase to over 111 million by 2040. Contact lenses are a candidate for the delivery of ophthalmic drugs with high bioavailability and low risk of side effects. Previous studies have shown that the residence time of drugs in the tear film of the eye can be increased from 2 minutes for eye drops, to 30 minutes for drug-eluting contact lenses. We propose a novel drug delivery contact lens material that can achieve a controlled release kinetic profile of bimatoprost for the treatment of open-angle glaucoma.

Methods

Bimatoprost-eluting contact lenses were synthesized using a mold-casting method by optimizing the hydrophobic domain composition of the lens material. Lenses were soaked in aqueous solutions containing bimatoprost at different concentrations for uptake. In vitro drug release experiments were performed by immersing each drug-loaded lens in phosphate buffer saline media at 7.4 pH. Drug concentration as a function of time was monitored by using Ultraviolet-Visible Spectrometry at the wavelength of 210 nm. In vivo efficacy studies were conducted in New Zealand white rabbits to evaluate the ability of the bimatoprost-eluting lenses to reduce intraocular pressure for 28 days.

Results

In vitro release kinetics demonstrated optimized dosage control with the developed contact lenses to a range between 2.5 and 8 µg of bimatoprost per lens for a 7-day supply. The dose is equivalent to one daily eye drop of bimatoprost owing to the much higher anticipated bioavailability for the drug-eluting contact lenses. Initial burst was significantly less with our developed contact lens material in comparison to commercial contact lens materials. Our developed bimatoprost-eluting contact lens accomplished the following milestones: (i) Reducing burst release to less than 20%, (ii) Extending delivery time to more than a week, (iii) Precisely controlling delivery dosage rate to between ng to µg. The *in vivo* efficacy studies in New Zealand rabbits indicated that our drug-eluting contact lenses consistently outperformed the daily drop dosing of bimatoprost with no significant indications of toxicity or new side effects from the contact lens device.

Conclusions

We demonstrated the use of drug-eluting contact lenses for the controlled 7-day delivery of bimatoprost for the treatment of open-angle glaucoma. Even though animal studies did not show any signs of discomfort or corneal damage, further examination is needed to ensure whether the lenses are suitable for extended wear.

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PLB-023

CLINICAL OUTCOMES OF GLAUCOMA DRAINAGE DEVICES (GDD) IN PATIENTS WITH REFRACTORY GLAUCOMA

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Purpose
To study the clinical outcomes in terms of surgical success and failure of Glaucoma Drainage Devices (GDD) in patients with refractory glaucoma

To determine the long term intra-ocular pressure control and need of post operative anti-glaucoma medications

To assess any post-operative complications and management of the same

To look for progression of glaucoma

To note changes in best corrected visual acuity (BCVA) if any

Methods
A total of 15 patients were included in the study,who had refractory glaucoma and were unresponsive to medical treatment for lowering intra-ocular pressure or traditional surgical procedures and underwent glaucoma drainage device insertion at our tertiary institute. Based on retrospective chart review,documentation for each patient was made on following grounds at visits on post-operative (POD)1, POD 1week,POD1 month,POD 3 months, POD 6 months: Best corrected visual acuity(BCVA),IOP on Goldmann Applanation tonometer,thorough anterior and posterior segment examination,noting progression of glaucoma , post-operative complications and number of pre and post-operative anti- glaucoma medications

Results
Out of 15 patients, 11(73.33%) were males and 4(26.66%) were females. Majority of patients(46.66%) were above 60 yrs of age followed by 33.33% patients in age group 40-60 yrs whereas 20% were below 20 years.Of all patients,majority were cases of secondary glaucoma - Post VR surgery (5cases) ,Post OPK (2cases), Steroid induced (1case)and ICE (1case) ,5 cases had POAG, 1 each of congenital and developmental glaucoma. Complete success was achieved in 5 cases whereas Qualified success was achieved in 8 cases. Failure was reported in 2 cases. GDD was implanted in 5 Post -Trabeculectomy cases . Most common complication was post operative hyoptony (3cases) which was managed by resuturing. There were 1 cases each of Tube exposure and Tube retraction. Decline in BCVA was seen only in 2 cases due to hypotony maculopathy and glaucoma progression. The average number of glaucoma medications was between one and two starting at three months following the surgery and lasting for the long term.

Conclusions
The success rate of Glaucoma Drainage Devices is high after the surgery with IOP levels that are relatively steady and remain in the mid teens with average number of glaucoma medications between one and two and lasting for long term

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PLB-024

PREDICTORS OF LOW UPTAKE OF GLAUCOMA SURGERIES AMONG GLAUCOMA PATIENTS IN A WEST AFRICAN POPULATION

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Purpose
To determine the predictors of low uptake of glaucoma surgeries among glaucoma patients at the Lions International Eye Centre(LIEC), Korle Bu Teaching Hospital(KBTH),Accra, Ghana

Methods
A prospective cross- sectional hospital-based study among consenting adult glaucoma patients at the LIEC(KBTH) from the 28th July to 24th August 2022. Data was analysed using SPSS version 26.Descriptive and inferential statistics were performed on the data. P-values <0.05 were considered statistically significant

Results
Males were 51.7%(62) of 120 participants. Most participants 60.8%(73) were aged 48 years and above. Of the 120 participants,31.7%(38) had lived with glaucoma for 5 years and above,56.7%(68) spent between 150 to 449 Ghana cedis(12.65 to 37.88 US dollars) monthly on glaucoma treatment and 50.8% had good knowledge on glaucoma. Sixty-five percent(78) of the participants were willing to accept surgery as a treatment option. Fear of surgery and blindness were reasons given for non-acceptance of surgery in 35%(42) participants. No statistically significant association was found between sociodemographic characterisctics(age, level of education, occupation, number of years lived with glaucoma or monthly expenditure on drops) and willingness of participants to accept surgery

Conclusions
Majority (65%) of glaucoma patients were willing to accept surgery. Fear of surgery and blindness were reasons for non acceptance.

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Structural & Functional Testing

P-439

THE IMPACT OF MYOPIC TILTED DISC ON THE PARAMETERS OF OPTICAL COHERENCE TOMOGRAPHY

V Zhang, P Chan

Purpose

To assess the impact of measuring optic disc torsion (ODT), horizontal disc tilt (HDT), and ovality index (OI) on ocular parameters of healthy myopic eyes.

Methods

We involved 550 eyes from 284 healthy myopic participants. Spherical equivalent (SE), axial length, ODT angle, HDT angle, and OI of the optic discs were measured. The peripapillary retinal nerve fiber layer thickness (pRNFLT), macular ganglion cell-inner plexiform layer thickness (mGCIPLT), position and thickness of superior and inferior RNFL peak were measured from optic nerve head images taken by fundoscopy and optical coherence tomography (OCT).

Results

Three-hundred and thirty-five eyes (60.90%) and 215 eyes (39.09%) had temporal and nasal ODT, respectively. The SE was a significant predictor for HDT angle (β = -0.875, P = 0.009) and OI (β = -0.010, P = 0.003; generalized estimating equation). For eyes with nasal ODT, the OI negatively correlated with pRNFLT in the nasal sector and positively correlated with the temporal sector. Furthermore, the OI is negatively associated with the thickness of the inferior RNFL peak. For eyes with temporal ODT, the HDT negatively correlated with mGCIPLT in the superior and superonasal sectors and pRNFLT in the nasal sector. The HDT is also associated with a more temporally positioned superior RNFL peak and negatively associated with the thickness of superior RNFL peak.

Conclusions

In healthy myopic eyes, temporal rotation was more common than nasal rotation. The distribution of pRNLFT and mGCIPLT were more affected by OI in eyes with nasal ODT, while pRNFLT and mGCIPLT were more affected by HDT angle in eyes with temporal ODT. These findings are important for the assessment of eyes with myopic glaucoma.

P-440

PROOF-OF-CONCEPT STUDY FOR REMOTE PERIMETRY IN A VIRTUAL REALITY METAVERSE ENVIRONMENT

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Purpose

The growing burden of visual impairment globally necessitates the development of better methods for early detection and treatment of the relevant eye diseases. However, access to the necessary tests are often limited and centralised to in-hospital settings, presenting an urgent need for remote solutions. Today there are no remote perimetry solutions in widespread availability. This study investigates a novel remote perimetry application designed in a virtual reality (VR) metaverse environment to enable functional screening in out-of-hospital primary care settings.

Methods

This prospective observational study investigated the performance of the novel remote perimetry solution in comparison with the gold-standard Humphrey Visual Field (HVF) perimeter. Subjects received a comprehensive Ophthalmologic assessment, HVF perimetry and remote perimetry testing. The primary outcome measure was agreement in classification of perimetry result by the HVF and the novel perimetry tool. Secondary outcome measures included concordance of individual testing points and perimetry topographic maps.

Results

10 subjects were recruited with an average age of 59.6 years (range 28-81 years). 7 (70%) subjects were male. Based on the HVF, 2 (20%) subjects had no visual field defect, 4 (40%) had mild visual field defect, 2 (20%) had moderate visual field defect, and 2 (20%) had severe visual field defect. The agreement in classification of overall perimetry result between remote perimetry and HVF was high (90%). The pointwise concordance in automated classification of individual test points was 83.3% $\pm$ 8.2% (range 75%-100%). In addition, there was good perimetry topographic concordance with the HVF in all subjects, as depicted in Figure 1.

Image

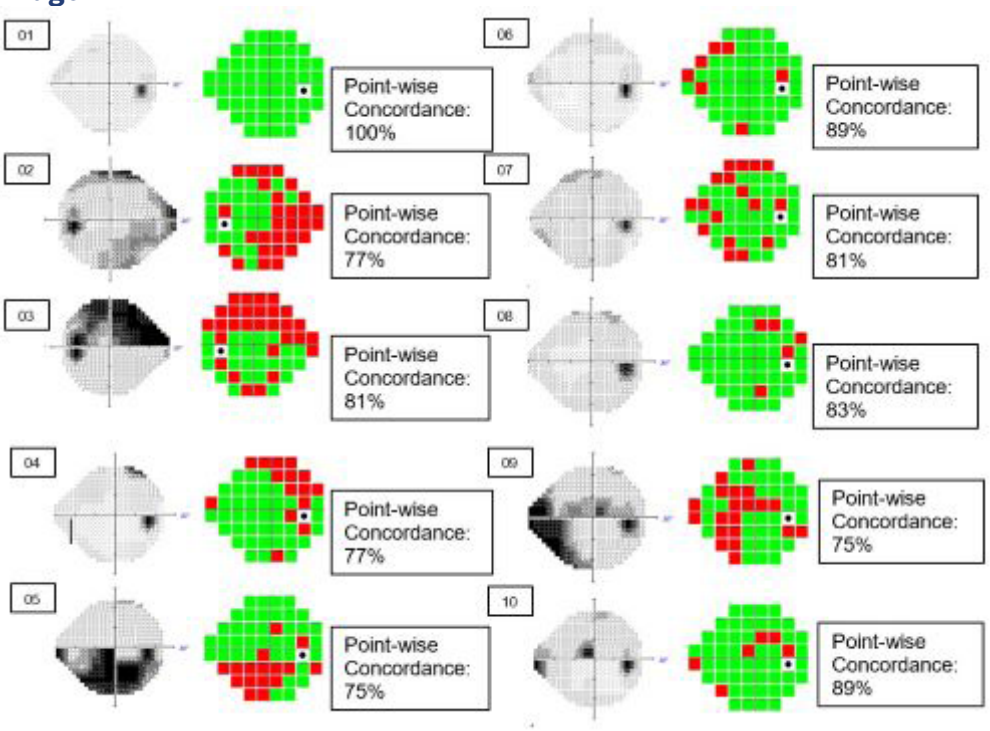


Fig 1: Corresponding perimetry topographic maps and pointwise concordance for automated classification of test points on Humphrey Visual Fields (SITA-Fast) (left) and remote perimetry in a virtual reality-based metaverse environment (right). If concordance is good, black areas on the HVF Greyscale appear as red areas on the remote perimetry topographic map.

Conclusions

Remote perimetry in a virtual reality (VR) metaverse environment had good agreement with the gold-standard HVF and good concordance for clinically-significant outcome measures. This approach could potentially avail functional eye testing in out-of-hospital settings for visual field deficits of patients with glaucoma.

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P-441

ONLINE PERIMETRY: VALIDATION, COMPARISON WITH STANDARD AUTOMATED PERIMETRY AND PATIENT APPRAISAL

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Purpose

Online perimetry via personal computers improves accessibility and affordability of perimetry, clinic flow and opens opportunities for at-home glaucoma monitoring and online screening.[1-3] We validate and compare the diagnostic accuracy and patient experience of a novel 24-degree, 52-loci online circular contrast perimetry (OCCP) application to standard automated perimetry (SAP).

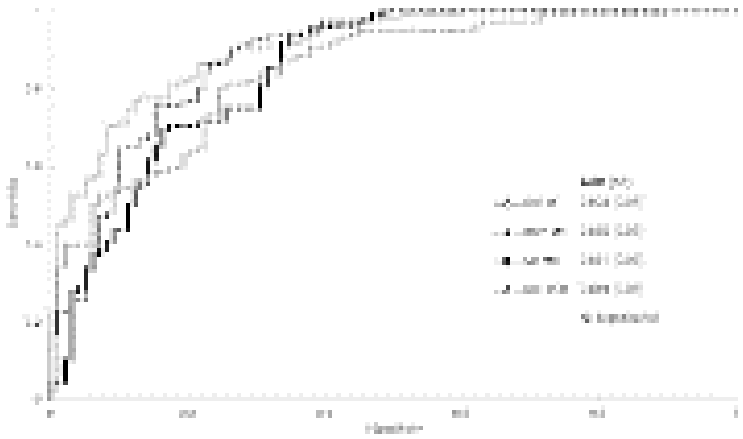
Methods

220 participants (125 normal controls, 95 open-angle glaucoma patients) were included. Agreement, correlation, sensitivity, specificity and area under receiver operating curves (AUC) were compared for parameters of OCCP, SAP and optical coherence tomography (OCT) for the retinal nerve fiber layer (RNFL) and macular ganglion cell complex inner plexiform layer (GCC). 95 participants (42 controls, 53 glaucoma patients) completed a user experience survey. Rasch analysis assessed the psychometric properties of the survey and intergroup variability.

Results

Pointwise sensitivity for OCCP was greater than SAP by 1.02 log units (95% CI 0.95 to 1.08); 95% limits of agreement (LoA) 0.860 to 1.17. Correlation and agreement for global indices and regional zones between OCCP and SAP were strong. OCCP mean deviation (MD) AUC was 0.885 ± 0.08, similar to other instruments' parameters with the highest AUC: SAP MD (0.851 ± 0.08), OCT RNFL inferior thickness (IT) (0.908 ± 0.07), OCT GCC IT (0.849 ± 0.08), P > 0.05 (Figure). At best cut-off, OCCP MD sensitivity/specificity were comparable to SAP MD (90/74 vs 94/65 %). 84.3% of participants preferred OCCP over SAP overall, and across 8/10 survey parameters (P<0.00001). Rasch analysis demonstrated no differential item functioning for clinical group, gender, or age.

Image



Conclusions

OCCP demonstrates similar perimetric sensitivities to SAP, similar AUC to SAP and OCT in distinguishing glaucoma patients from controls, and an improved user experience. OCCP holds promise as a glaucoma surveillance and screening tool, with the potential to be utilized for in-clinic and at-home perimetry and expand community testing.

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P-442

ASSOCIATIONS BETWEEN CLUSTERED VISUAL FIELD PROGRESSION AND LOCATIONS OF DISC HEMORRHAGES IN GLAUCOMA: A 3-YEAR PROSPECTIVE STUDY

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Purpose

To determine the influence of disc hemorrhages (DHs) at different locations on the clustered visual field (VF) progression of primary open-angle glaucoma (POAG).

Methods

In this multicenter prospective cohort study, VF examinations and fundus photographs were conducted at baseline and every 3 months for 3 years in a medically controlled POAG. Only eyes with over four reliable VF tests were included. Humphrey's 24-2 test points were divided into four clusters (superior, inferior, central, and nasal) according to modified Garway–Heath's mapping. The DH location was classified into four clusters (superior, inferior, temporal, and nasal) using a guide from the peripapillary optical coherence tomography scan. The effects of DH on the rates of mean deviation (MD) or clustered total deviation (TD) changes were evaluated using multivariable linear mixed-effects models with other potentially confounding variables.

Results

We enrolled 186 eyes from 109 patients. The mean age, intraocular pressure, and MD of the patients were 58.6 years, 13.1 mmHg, and −6.3 dB, respectively. DHs were detected in 61 eyes, with superior, inferior, temporal, and nasal clusters in 19, 31, 21, and two eyes, respectively, and at multiple locations in 12 eyes. The mean (95% confidence interval) MD slope in eyes without DH was −0.23 (-0.34, -0.11) dB/y, and the presence of DH (−0.24 [−0.40, −0.08] dB/y faster if present, P = 0.005) was significantly associated with a faster MD slope. Superior TD slope was significantly faster in eyes with inferior DH (−0.37 [−0.67, −0.07] dB/y faster if present, P = 0.017) but not in those with superior or temporal DH. Faster inferior TD deterioration over time was significantly associated with inferior TD at baseline (P = 0.010) and marginally associated with superior DH (−0.29 [−0.60, 0.01] dB/y faster if present, P = 0.059) but not with inferior or temporal DH. Faster worsening of the central TD was significantly associated with temporal DH (−0.69 [−1.01, −0.36] dB/y faster if present, P < 0.001) and inferior DH (−0.39 [−0.67, −0.10] dB/y faster if present, P = 0.008), even when both temporal and inferior DHs were included in the analysis. Superior DH showed no significant association with central TD deterioration.

Conclusions

DH was spatially associated with clustered VF progression. Temporal and inferior DHs were risk factors for the progression of central VF.

P-443

STRUCTURE FUNCTION RELATIONSHIPS OF VESSEL DENSITY AND RETINAL NERVE FIBER LAYER THICKNESS IN EARLY GLAUCOMATOUS EYES WITH HIGH MYOPIA

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Purpose

To evaluate the structure function relationship of circumpapillary vessel density (cpVD) with visual field sensitivity (VFS) and compare its characteristics with circumpapillary retinal nerve fiber layer thickness (cpRNFLT) in early glaucomatous (EG) eyes with and without high myopia (HM).

Methods

75 EG (mean deviation > -6 dB) eyes with HM (axial length (AL) > 26.5 mm) and 111 EG eyes without HM were enrolled in this retrospective cross-sectional study. All patients underwent circumpapillary optical coherence tomography (OCT) and angiography (OCTA) scanning with the Cirrus HD-6000 with AngioPlex OCTA (Carl Zeiss Meditec, Dublin, CA). Structure function correlations were determined by comparing global, superior, inferior and Garway-Heath sectoral values for cpVD and cpRNFLT with its corresponding 24-2 and 10-2 VFS of Humphrey Visual Field analyzer.

Results

CpVD showed no statistical difference between eyes with and without HM except for the nasal sector while cpRNFLT was thicker in the global, nasal and temporal sectors of HM eyes. In HM eyes, global and sectoral cpVD significantly correlated with corresponding VFS in all 24-2/10-2 VF sectors (all $p < 0.05$). CpVD-VFS correlation was significantly stronger than cpRNFLT-VFS in the nasal sector of HM eyes ($p = 0.006$) and temporal and inferior temporal sector of eyes without HM ($p = 0.008$, $p = 0.042$, respectively).

Conclusions

In EG eyes with HM, cpVD was less affected by HM in comparison to cpRNFLT and cpVD-VFS correlation was significant in all 24-2/10-2 VF sectors. HM-associated advantages of cpVD-VFS over cpRNFLT-VFS were observed.

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P-444

OVERESTIMATION OF RETINAL NERVE FIBER LAYER (RNFL) DEFECT SIZE BY OPTICAL COHERENCE TOMOGRAPHY TOPOGRAPHIC RNFL THICKNESS ANALYSIS IN GLAUCOMA

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Purpose
Retinal nerve fiber layer (RNFL) optical texture analysis (ROTA) is a novel algorithm that uncovers the trajectories and optical texture of individual axonal fiber bundles, providing an alternative method to detect RNFL defects with high sensitivity and specificity. This study aims to evaluate the agreement of the (1) area, (2) angular width (AW), and (3) locations of the temporal and-nasal borders of RNFL defects measured from the ROTA images and the corresponding optical coherence tomography (OCT) RNFL thickness deviation maps.

Methods
34 early glaucoma eyes (VF mean deviation [MD], ≥-6 dB) with only one localized RNFL defect from 34 patients were included. The area (mm^2), angular width (along the 3.45mm measurement circle) and meridian of the RNFL defects were measured from the 6x6 mm^2 optic disc region of the ROTA images and RNFL thickness deviation maps (*i.e.*, pixels encoded in red – below 1st percentile) using a custom developed software. The agreement of the RNFL defect measurements was evaluated with Bland-Altman (BA) Plots.

Results
The mean age was 60.2±12.3 years, the spherical error was -3.69±4.4D, and the VF MD was -3.07±1.47dB. The RNFL thickness deviation maps measured larger angular widths (mean ± standard deviation [SD]= 54.1±25.1°) compared with ROTA (mean ± SD = 25.6±12.0°) ($p< 0.001$). There was no significant difference in the areas between ROTA (mean ± SD = 2.7±1.2 mm^2) and the RNFL thickness deviation maps (mean ± SD = 2.5±1.3 mm^2) ($p = 0.589$). The span of 95% limits of agreement was 6.4mm^2 for the area and 103.3° for the angular width of RNFL defects. The disagreement increased as the defect angular width increased. 70% of eyes with superior defects (7 of 10 eyes) and 91.7% of eyes with inferior defects (22 of 24 eyes) were located on average 7.7° and 20.1° more nasally, respectively, on the RNFL thickness deviation maps when compared with those measured from ROTA.

Conclusions
There was substantial disagreement of RNFL defect measurements between ROTA and conventional RNFL thickness analysis. Taking ROTA as the reference standard, the angular width of RNFL defects measured by the RNFL thickness deviation maps was often overestimated, leading to false positive assessment of disease severity in glaucoma.

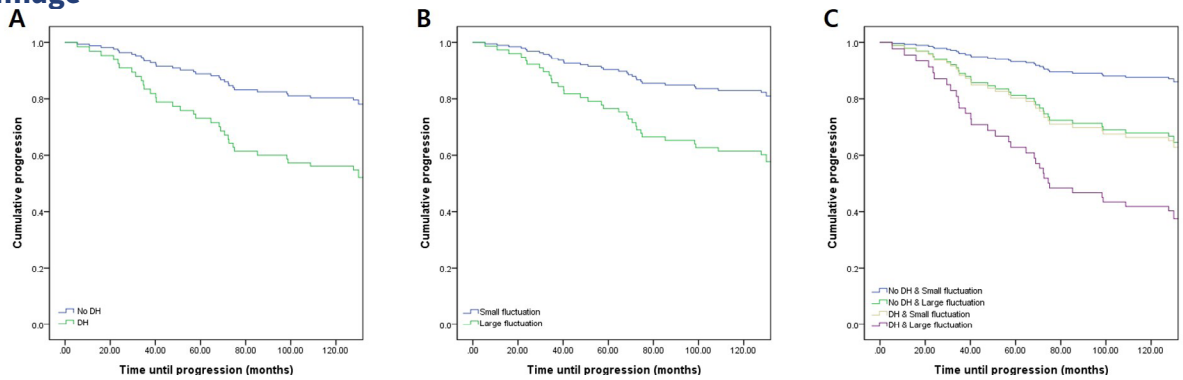
P-445
LONG-TERM INTRAOCULAR PRESSURE FLUCTUATION IS A RISK FACTOR FOR VISUAL FIELD PROGRESSION IN ADVANCED GLAUCOMA

J Lee

Purpose
To identify risk factors associated with progression of visual field defect in patients with advanced primary open-angle glaucoma (POAG).

Methods
A retrospective review of medical records was conducted to identify patients who met the Hodapp-Parrish-Anderson criteria for advanced POAG. 122 eyes of 122 patients had undergone intraocular pressure (IOP) measurement with Goldmann applanation tonometer (GAT), standard automated perimetry (SAP), cirrus optical coherence tomography (OCT) and fundus photography at 6-month intervals. Visual field progression was defined as deterioration of a minimum of 3 visual field locations more than baseline at 5% levels in 4 consecutive visual fields with 24-2 SITA testing.

Results
Thirty-six eyes of 122 eyes (29.5%, 51.9±13.9 years old) showed visual field progression during 100.7±44.2 months of follow-up. The progression group showed greater long-term IOP fluctuations (2.6±1.4 mmHg) than the no progression group (53.5±13.5 years; 2.0±1.0 mmHg, P=0.008). Disc hemorrhage was detected more frequently in the progression group (40.5% vs. 17.4%, P=0.005). Multivariate Cox regression analysis revealed long-term IOP fluctuations (HR 2.567 95% CI 1.327-5.370, P=0.012) and disc hemorrhage (HR 2.351 95% CI 1.120-4.931, P=0.024) to be independent risk factors of visual field progression. Patients who showed both disc hemorrhage and long-term IOP fluctuations were at greater risks of progression (HR 2.675 95% CI 1.072-6.457, P=0.035).

Image


Conclusions
Long-term IOP fluctuations and disc hemorrhage are independent and additive risk factors of visual field progression in advanced glaucoma even at low intraocular pressures. Patients in whom these risk factors are identified require close monitoring and vigorous treatment.

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P-446

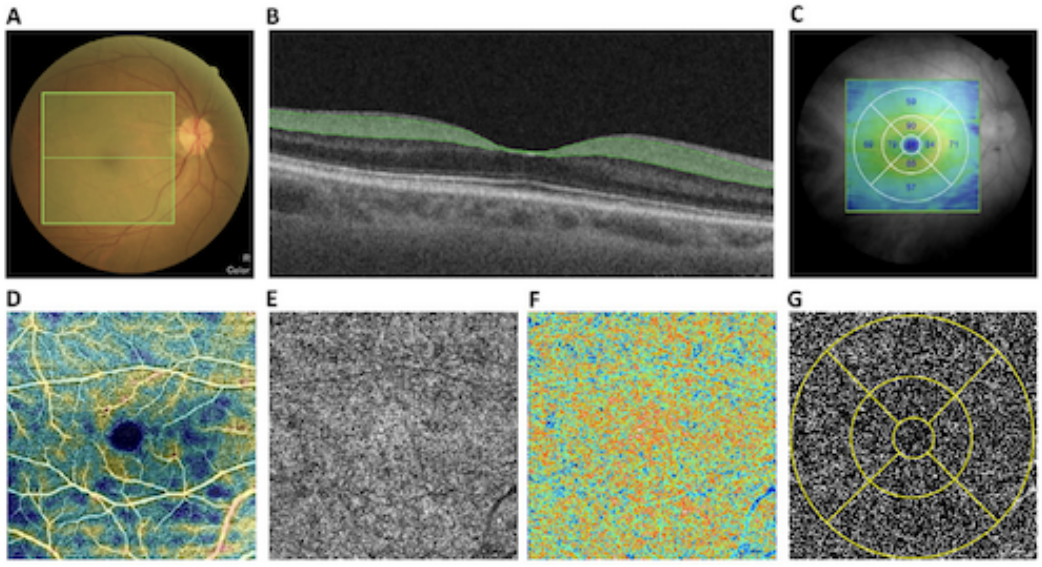
CHORIOCAPILLARIS AND PROGRESSIVE GANGLION CELL-INNER PLEXIFORM LAYER LOSS IN NON-GLAUCOMATOUS EYES

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Purpose
To explore the relationship between choriocapillaris (CC) flow deficit percentage (FD%) and ganglion cell-inner plexiform layer (GCIPL) thickness in a population-based sample of non-glaucomatous eyes.

Methods
This is a longitudinal cohort study and prospective cross-sectional study. Non-glaucoma Chinese subjects aged 18 years or older were enrolled. All participants underwent a detailed ophthalmic examination, including swept-source optical coherence tomography (SS-OCT) and SS-OCT angiography. Average, inner average, outer average and nine Early Treatment Diabetic Retinopathy Study sub-regions of GCIPL thickness and CC FD% were measured. The correlation between CC FD% and GCIPL was assessed using a linear regression model, and the relationship between the rate of change of GCIPL thickness and CC FD% was further validated in a 2year longitudinal study.

Results
In the cross-sectional study including 3514 participants (3514 non-glaucoma eyes), a higher CC FD% was significantly associated with a thinner GCIPL (β=−0.32; 95% CI −0.43 to −0.21; p<0.001). Further, in a longitudinal study (453 eyes of 453 participants), a faster increase in CC FD% was found to be significantly associated with a faster decrease in GCIPL thickness (β=−0.10; 95% CI −0.17 to −0.03; p=0.004) after adjusting for age, sex, axial length and image quality score.

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Conclusions

This is the first time to show that CC FD% and GCIPL thickness were correlated in both cross-sectional and longitudinal studies of non-glaucomatous individuals, which may potentially provide further insights on the role of CC perfusion in glaucoma development and progression.

P-447

WIDE-FIELD OPTICAL COHERENCE TOMOGRAPHY ANGIOGRAPHY MAP FOR HIGH MYOPIC GLAUCOMA DETECTION

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Purpose

The present study aimed to evaluate the diagnostic ability of wide-field optical coherence tomography angiography (WF-OCTA) map for detection of glaucomatous damage in high myopic (HM) eyes and to further compare the diagnostic ability of WF-OCTA with that of conventional imaging approaches including swept-source OCT (SS-OCT) wide-field maps.

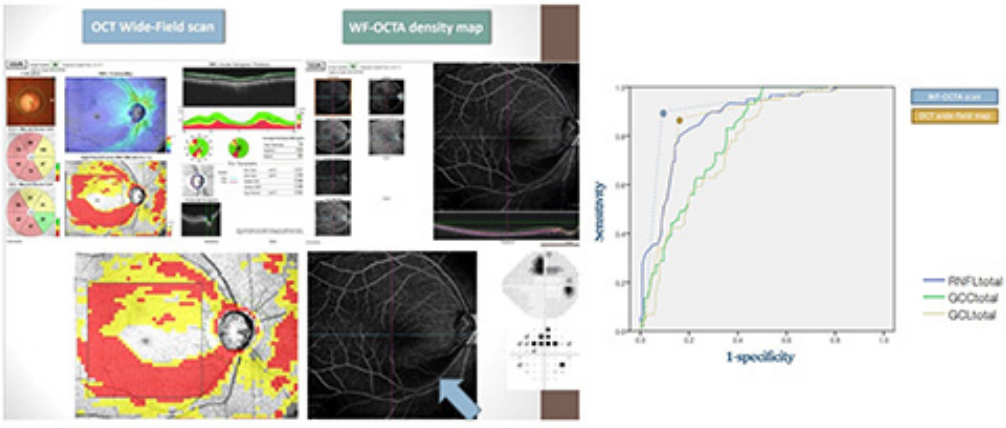
Methods

A total of 62 healthy HM eyes and 140 HM eyes with open angle glaucoma (OAG) and normal tension glaucoma (NTG) participated in this retrospective observational study. Patients underwent a comprehensive ocular examination, including SS-OCT wide-field scan and 12x12 WF-OCTA scans. The WF-OCTA map represents superficial vascular plexus of 12x12 mm including both peripapillary and macular area. Glaucoma specialists determined the presence of glaucomatous damage in HM eyes by reading the WF-OCTA map and compared its sensitivity and specificity with those of conventional images including SS-OCT.

Results

Sensitivity and specificity of 12x12 WF-OCTA scans for HM-glaucoma diagnosis were 87.28% and 86.94%. On the other hand, sensitivity and specificity of SS-OCT wide-field maps for HM-glaucoma diagnosis were 88.49% and 80.51%, respectively. The specificity of WF-OCTA map was significantly higher than that of SS-OCT wide-field maps. The sensitivity of WF-OCTA map was comparable to that of SS-OCT wide-field maps.

Image



Conclusions

The WF-OCTA map showed a good diagnostic ability for discrimination of HM-glaucoma eyes from healthy HM eyes. As a complementary method of an alternative imaging modality, WF-OCTA map can be a useful tool for detection of HM-Glaucoma.

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P-449

RACIAL DIFFERENCES IN GLAUCOMA DIAGNOSTIC ACCURACY OF MACULAR GANGLION CELL COMPLEX AND PERIPAPILLARY RETINAL NERVE FIBER LAYER THICKNESS

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Purpose

To evaluate the racial differences in performance of macular ganglion cell complex (GCC) and circumpapillary retinal nerve fiber layer (cpRNFL) thickness measured by Spectralis spectral-domain optical coherence tomography (SD-OCT) for detection of glaucoma in individuals of African descent (AD) and European descent (ED).

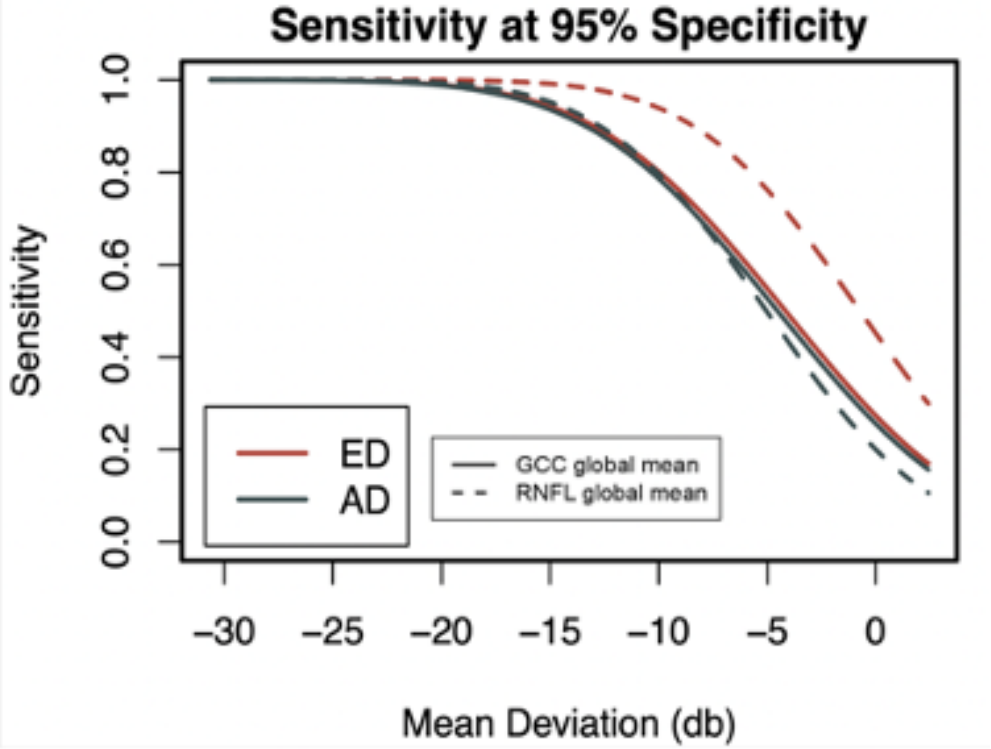
Methods

This cross-sectional study included 400 eyes of 285 glaucoma patients and 108 eyes of 78 healthy participants. Global and sectoral thickness measurements of Spectralis SD-OCT derived macular GCC and cpRNFL were obtained and compared between the AD and ED groups after adjusting for age, visual field mean deviation (VF MD) and axial length (AL). After controlling for these confounders, area under the receiver operating characteristic (AUROC) curves were used to evaluate the diagnostic accuracy of global and sectoral parameters of GCC and cpRNFL thickness in AD and ED participants.

Results

AD and ED glaucoma participants had similar severity of glaucoma (-8.1dB and -7.2 dB, respectively; P = 0.243). GCC thickness parameters in global, inner circle and outer circle showed good diagnostic abilities for glaucoma detection in both AD and ED groups and they performed equally for detection of glaucoma. Adjusted AUROCs for GCC thickness ranged between 0.67 (central foveal thickness) to 0.86 (inner GCC circle) in AD group, and 0.52 (central foveal thickness) to 0.87 (outer GCC circle) in ED group. Global and most sectoral parameters of cpRNFL thickness (except temporal and superonasal) performed significantly better in the ED group than the AD group for glaucoma detection. Adjusted AUROCs for cpRNFL thickness ranged between 0.72 (temporal) to 0.94 (global) in ED, and 0.69 (temporal) to 0.82 (global) in AD group. The diagnostic accuracies of all GCC and cpRNFL thickness parameters in differentiating glaucoma from healthy eyes increased with increasing glaucoma severity in both AD and ED participants.

Image



Conclusions

Macular GCC thickness parameters demonstrated good glaucoma diagnostic abilities in both AD and ED individuals. Although cpRNFL thickness parameters showed excellent diagnostic accuracy for detecting glaucoma in ED patients, their diagnostic accuracy was only modest in AD patients. cpRNFL thickness parameters may have limited value for diagnosing glaucoma in AD individuals.

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P-451

PERIPAPILLARY AND MACULAR VASCULAR PARAMETERS BY OPTICAL COHERENCE TOMOGRAPHY ANGIOGRAPHY IN PRIMARY CONGENITAL GLAUCOMA

L Morales Fernandez, P Perez Garcia, J Martinez de la Casa, J Garcia Feijoo

Purpose

To evaluate the differences in peripapillary and macular vascular parameters by optical coherence tomography angiography (OCTA) between patients with primary congenital glaucoma (PCG) and healthy controls; and to determine their diagnostic accuracy.

Methods

Observational, cross-sectional study including 39 eyes with PCG and 78 healthy eyes. Only one eye per patient was included. All included patients underwent a comprehensive ophthalmic examination and peripapillary and macular analysis were performed by Angioplex™ OCTA (Cirrus HD-OCT 5000) with a 4.5x4.5mm optic nerve head scan and 6x6mm macular scan. Global data and quadrant data from peripapillary vascular parameters and global data and circular sectors data from macular superficial plexus parameters were compared between groups. The glaucoma discrimination capability of these parameters was calculated as areas under the receiver operating characteristics curve (AUC ROC).

Results

Mean age was 14.1 ± 8.7 years for the PCG patients and 11.7 ± 6.2 years for controls (p = 0.093). All vascular peripapillary measurements (global and quadrants; all p<0.001) and all macular measurements (p<0.042) excepting perfusion density in the inner circle (p=0.087), were reduced in the PCG group compared to controls. According to AUC ROC, peripapillary (all ≥0.706) and macular parameters (all ≥0.699) showed good diagnostic capacity. AUC ROC for the most discriminatory measurements corresponding to blood flux index (0.887) and whole macula vascular density (0.855) were similar (p=0.085).

Conclusions

Peripapillary and macular vascular parameters by OCTA are decreased in patients with PCG, showing a good capacity to discriminate between normal and glaucomatous eyes.

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P-452

ANNOTATING AND PREDICTING ARTIFICIAL INTELLIGENCE TOOL BOX - DIAGNOSING STRUCTURAL GLAUCOMATOUS DAMAGE FROM CONFOCAL FUNDUS IMAGES

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Purpose

A novel convolutional neural network (CNN) approach in detecting glaucomatous damage was employed, with confocal fundus images, to overcome blackbox dilemma in artificial intelligence (AI), which was never reported in the literature before according to our knowledge.[1-5] In addition to identification of glaucoma, this tool intended to identify signs ranging from trivial splinter hemorrhages to catastrophic glaucomatous optic atrophy, due to customised human annotations.

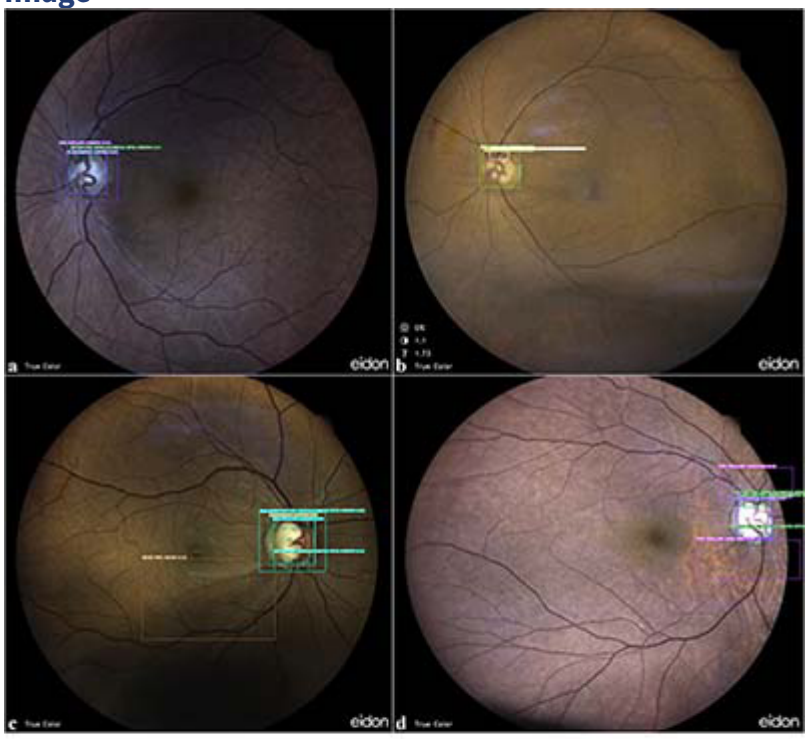
Methods

1900 high resolution fundus images were utilised; 1140 images (60%) for training, 380 images (20%) for validating and 380 images (20%) for held out testing. 26 signs pertaining to glaucoma were annotated. You Only Look Once 5 algorithm was used for detection. The tool was able to locate and draw customised anchor boxes over multiple areas within the fundus images. The testing images were split into four groups: 90, 100, 90 & 100 for three runs performed, once every 15 days.

Results

The AI tool was evaluated with mean average precision (mAP). mAP was calculated by taking the average precision (AP) over all classes and/or overall intersection over union (IoU) thresholds. IoU thresholds were calculated by dividing the area of overlap with area of union. Objectness loss, classification loss, precision and recall were also evaluated. Tests showed consistent increments in accuracy from 84.44% to 97.0% in predicting diagnosis and intricate signs. The sensitivity improved from 82.6% to 97.1% & the specificity improved from 97.0% to 100%.

Image



Glaucomatous Image Prediction Done By The Trained AI Module

Conclusions

With constant training via feedback mechanism, there was an upsurge in prediction accuracy, which helped overcome blackbox dilemma. An explainable AI tool box was created with 97.1% sensitivity and 100% specificity. However, quality of the fundus images obtained with lower resolution fundus cameras might find it challenging to achieve similar results obtained in this test. Furthermore multimodal clinical images such as optical coherence tomography & visual fields, along with fundus images should be integrated together to build a generalised and more reliable AI diagnostics system.

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P-453

Longitudinal Changes in Peripapillary and Macular Vessel Densities in Glaucomatous Eyes with a Single-Hemifield Retinal Nerve Fiber Layer Defect

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Purpose

Recent studies reported hemi-retinal asymmetry of the microvasculature in the peripapillary and macular areas of glaucomatous eyes and showed that hemiretinal differences in peripapillary vessel density may aid in early detection when glaucomatous damage is focal. Therefore, we evaluated the difference in the change rates of peripapillary vessel density (pVD) and macular vessel density (mVD) in glaucomatous eyes with a single-hemifield retinal nerve fiber layer (RNFL) defect.

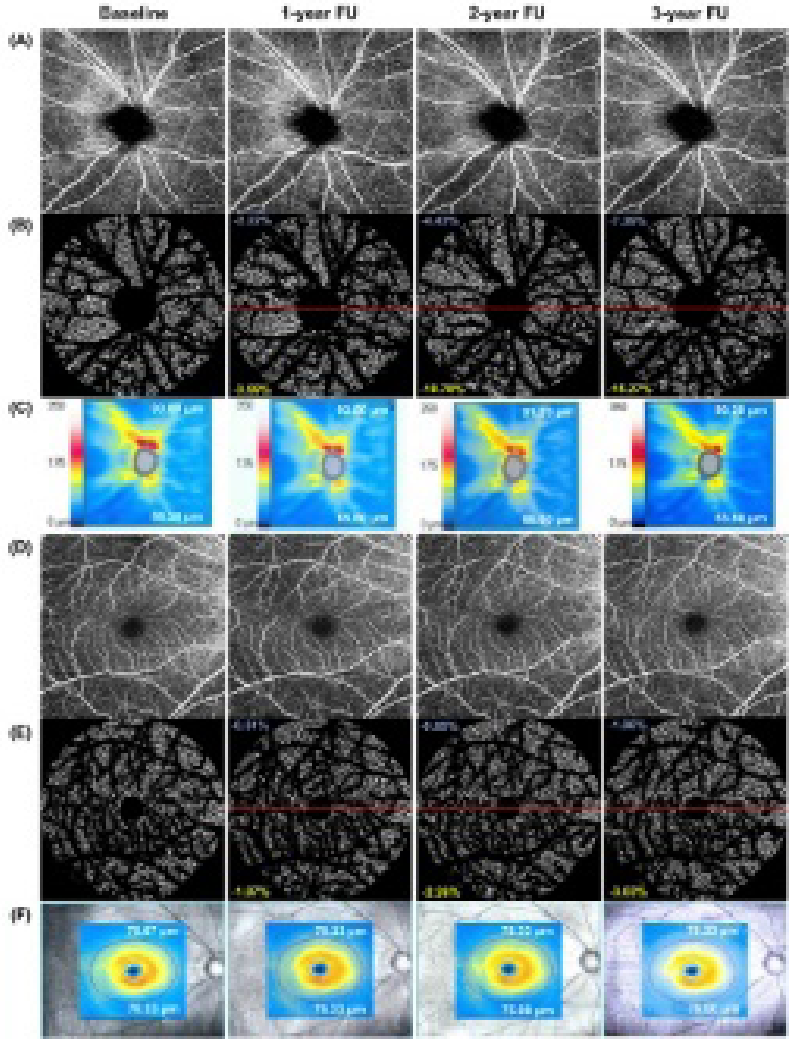
Methods

We performed a retrospective, longitudinal study of 25 patients with glaucoma who were followed up for at least 3 years, with a minimum of four visits after baseline optical coherence tomography angiography (OCTA) examination. At each visit, all participants underwent OCTA examination, and the pVD, mVD were measured by removing the large vessels. Changes in the pVD, mVD, peripapillary RNFL thickness (pRNFLT), and macular ganglion cell inner plexiform layer thickness (mGCIPLT) were investigated in the affected and intact hemispheres, and the differences between the two hemispheres were compared.

Results

In the affected hemiretina, the pVD, mVD, pRNFLT, and mCGIPLT were reduced than that in the intact hemiretina (all, $P < 0.001$). The changes in pVD and mVD were statistically significant at the 2-year and 3-year follow-ups in the affected hemifield (-3.37%, -5.59%, $P = 0.005$, $P < 0.001$). However, pVD and mVD did not show statistically significant changes in the intact hemiretina throughout the follow-up visits. While the pRNFLT decreased significantly at the 3-year follow-up, the mGCIPLT showed no statistical change at any follow-up visit. Compared to the intact hemisphere, pVD was the only parameter that showed significant changes throughout the follow-up period. The figure shows the representative case of our study showing single RNFL defect in the inferior hemifield. With time, pVD had reduced progressively in the inferior hemifield but the mVD, RNFL and mGCIPL thicknesses did not show a significant decrease.

Image



Conclusions

Although both pVD and mVD longitudinally decreased in the affected hemiretina significantly, the reduction in pVD was significantly faster than that in the intact hemiretina throughout the follow-up period.

P-454

CLINICAL FACTORS ASSOCIATED WITH LONG-TERM OPTICAL COHERENCE TOMOGRAPHY MEASUREMENT VARIABILITY IN GLAUCOMA

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Purpose

To examine the clinical factors associated with long-term optical coherence tomography (OCT)-measured retinal nerve fiber layer thickness (RNFLT) variability in glaucoma.

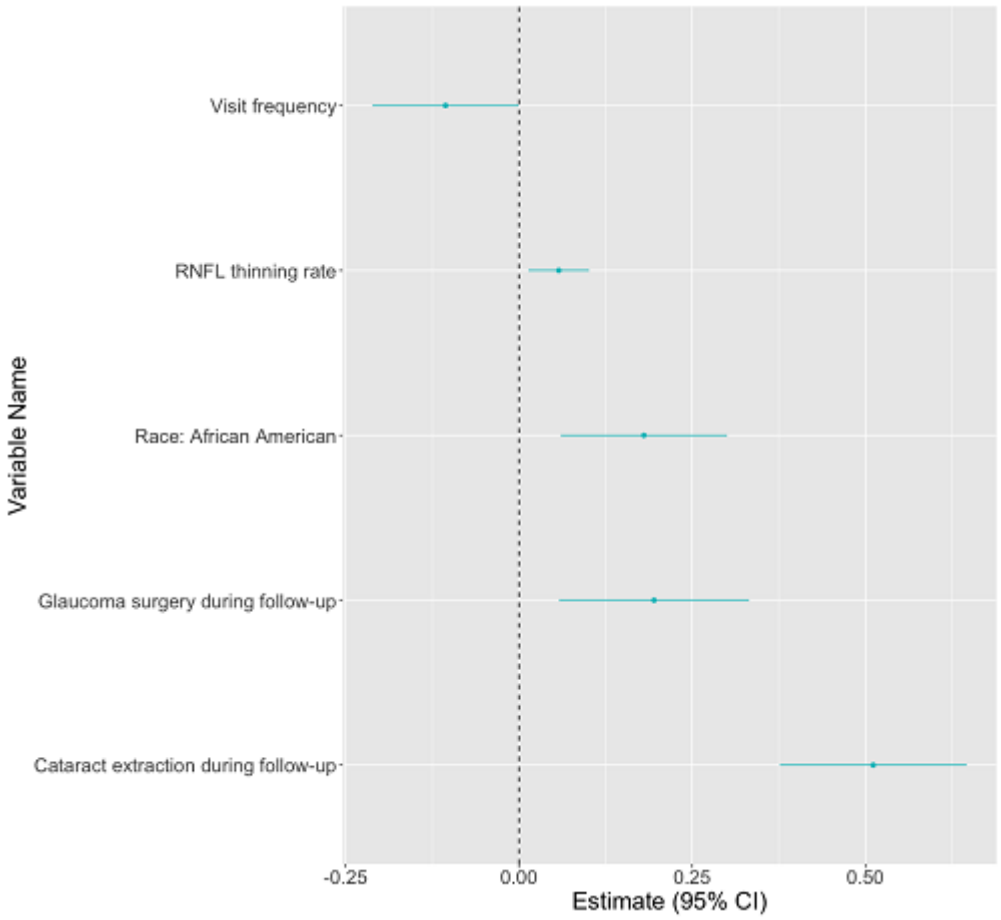
Methods

In this retrospective cohort study, primary open-angle glaucoma and glaucoma suspects from Diagnostic Innovations in Glaucoma Study/The African Descent and Glaucoma Evaluation Study with ≥2-years and 4-visits follow-up were included. For each eye, RNFLT variability was calculated as the longitudinal optic nerve head RNFLT residual error. Clinical factors examined included general demographics, baseline ocular measurements such as intraocular pressure and visual field (VF) mean deviation (MD), prior and intervening cataract extraction (CE) or glaucoma surgery, scan quality, baseline RNFLT and RNFLT thinning rate, follow-up duration and visits/testing frequency, etc. Three multivariable linear mixed models (full model, baseline model, and parsimonious model with least absolute shrinkage and selection operator regression) were fit to evaluate the effects of clinical factors on RNFLT variability. Ten-fold cross-validation was performed to estimate real-world model performance.

Results

A total of 1140 eyes (634 patients) were included. The overall mean (95% CI) RNFLT variability was small (1.51[1.45, 1.58] µm). In the parsimonious model (Figure 1), African-American race (β[standard error, SE] = 0.18[0.06]), intervening CE (β[SE] = 0.52[0.07]), intervening glaucoma surgeries (β[SE] = 0.15[0.03]), and more positive RNFLT thinning rate (β[SE] = 0.06[0.02] per 1um/year more positive) were associated with greater RNFLT variability, whereas more frequent visits/testing (β[SE] = -0.11[0.05] per 1 visit/year higher) was associated with smaller RNFLT variability (P<0.05 for all). These clinical factors showed consistent effects on RNFLT variability across different models. The R^2 of the three models ranged from 68-77%, demonstrating robust performances.

Image



Conclusions

Relevant clinical factors affecting long-term RNFLT variability were identified to enhance longitudinal structural evaluation. With small variability, OCT-measured RNFLT is a robust method for assessing glaucomatous change. Moreover, increasing the testing frequency may help to more reliably detect progression by OCT, especially in eyes at risk of higher measurement variability.

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P-455

VISUAL FIELD INDICES IN CHILDREN WITH GLAUCOMA COMPARED TO THAT IN ADULT GLAUCOMA PATIENTS WITH COMPARABLE RETINAL NERVE FIBER LAYER THICKNESS

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Purpose
To determine visual field defects detected by Humphrey's Visual field Analyzer (HFA) in children with glaucoma and compare it with visual fields in adults with comparable retinal nerve fiber layer thickness (RNFLT) on Optical Coherence Tomography (OCT).

Methods
Design: Cross-sectional Study.

Setting: Tertiary care Teaching Institute

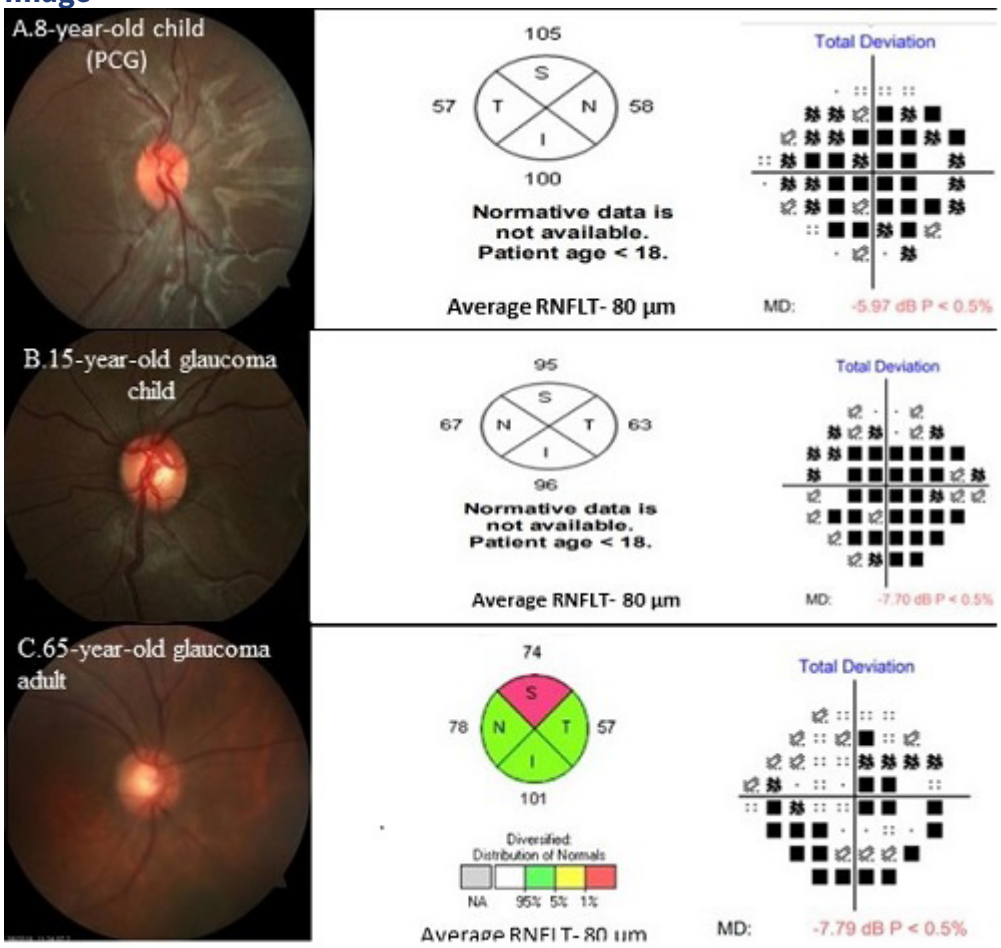
Study populations: 46 eyes of 35 children with glaucoma between 6-18 years of age and RNFLT-matched adult eyes having glaucoma.

Intervention/Testing: The children underwent Visual field (VF) testing on HFA and RNFLT measurement on OCT. Adults who had previously undergone OCT and VF testing were retrieved from the OCT database. The RNFLT of the adults was matched to the study group.

Main Outcome Measures: The Mean Deviation (MD), reliability indices, and time to do the test in each child were compared with RNFLT-matched glaucomatous eyes of adults. Children 6-11 years and 12-18 years were analyzed separately.

Results
The mean age of the children was 11.37±2.31 years. Twenty children were aged between 6-11 years, whereas 15 were aged between 12-18 years. Twenty-four children had Primary Congenital Glaucoma. The other diagnoses were Juvenile Open Angle Glaucoma in 11 eyes, steroid-induced glaucoma in 7 eyes, and glaucoma secondary to trauma in 4 eyes. The average MD of children was significantly less than that of the normal adults despite having the same RNFL thickness (-7.86± 3.96 dB Vs -4.56±2.76 Db, p=0.001). The difference between average MD in children aged 6-11 years and RNFLT-matched adults was significant (-6.91 ± 3.36 dB Vs -4.84 ±2.16 dB:p=0.005). Similarly, the difference between average MD in children aged 12-18 years and RNFLT-matched adults was also significant (-9.20 ± 2.73 dB Vs -4.64±2.36 dB; P=0.001). The average time taken for SAP in both subgroups of children was similar. The visual field indices were significantly worse in children aged 12-18 years.

Image



Conclusions

Children <12 years have a lesser retinal sensitivity than adults. Their VF appears worse than it is for the same disease severity in an adult. It is worthwhile to consider the development of a separate pediatric normative database for the VF assessment of children <12 years of age.

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P-458

CLINICAL CHARACTERISTICS OF OPEN-ANGLE GLAUCOMA PROGRESSION WITH PERIPAPILLARY MICROVASCULATURE DROPOUT IN DIFFERENT LOCATIONS

H Bae

Purpose

The study attempted to identify clinical characteristics associated with structural progression in open-angle glaucoma (OAG) in the presence of MvD in different locations.

Methods

A total of 181 consecutive OAG eyes (follow-up 7.3±4.0 years), which demonstrated peripapillary choroidal MvD (defined as a focal capillary loss with no visible microvascular network in choroidal layer) on optical coherence tomography (OCT) angiography (OCTA), were divided based on the location of MvD. Structural progression was determined using trend-based analysis of the Guided Progression Analysis software of Cirrus OCT.

Results

MvD was identified in the temporal quadrant in 110 eyes (temporal MvD; 60.5±12.6 years), and in the inferior quadrant in 71 eyes (inferior MvD; 60.3±11.1 years). After adjusting for age, average intraocular pressure (IOP) and baseline retinal nerve fiber layer (RNFL) thickness and visual field mean deviation, inferior MvD eyes showed faster rates of thinning in the inferior RNFL (mean (95% CI); -0.833 (-1.298- -0.367)) compared to temporal MvD eyes (-0.144 (-0.496-0.207)) when long-term IOP fluctuation was larger than the median value (1.7mmHg; P=0.022). Long-term IOP fluctuations were independently associated with inferior RNFL thinning in eyes with inferior MvD (P=0.002) but not in eyes with temporal MvD.

Conclusions

In OAG eyes, the rates of RNFL and GCIPL thinning were comparable regardless of MvD locations. However, inferior MvD is associated with faster RNFL and GCIPL thinning in the same quadrant when long-term IOP fluctuation is present. Structural progression in the presence of temporal MvD was less associated with IOP fluctuation.

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P-459

LONGITUDINAL VASCULAR CHANGES ASSESSED USING AS-OCTA IN DIFFERENT CONJUNCTIVAL INCISIONS IN FILTERING TRABECULECTOMY BLEBS: A PILOT STUDY

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Purpose
This study aimed to compare vascular changes in filtering blebs after trabeculectomy between different conjunctival incisions using anterior segment optical coherence tomography angiography (AS-OCTA).

Methods
In this prospective study, patients with primary open-angle glaucoma scheduled for trabeculectomy were recruited between April 2022 and October 2022. Trabeculectomy using fornix- or limbal-based conjunctival flap was performed based on the surgeon's preference. Bleb vasculature images were scheduled to be captured using AS-OCTA (PLEX Elite 9000; Carl Zeiss Meditec) and slit-lamp microscopy at one day, one and two weeks, and one, three, and six months postoperatively. Patients followed up for at least three months were included.

Results
Overall, 15 eyes of 15 patients were enrolled. Eight eyes had limbal-based conjunctival flaps and 7 eyes had fornix-based conjunctival flaps. Intraocular pressure (IOP) was 15.6±2.3 mmHg preoperatively and 9.3±4.7 mmHg at postoperative three months. The number of glaucoma medications was 3.4±0.9 preoperatively, and no glaucoma medication was used in all cases at postoperative three months. The IOP reduction was not significantly different between the different operations. In the early postoperative period (postoperative one day to two weeks), complete avascular areas were detected in all blebs with fornix-based flaps, while vasculature decreased but large vessels remained in all blebs with limbal-based flaps. Complete avascular areas were gradually filled with vasculature in six eyes with fornix-based flaps within three months, and the vasculature re-decreased in three eyes after 3-6 months. The vasculature in bleb decreased gradually in five eyes with limbal-based flaps, and complete avascular areas in bleb were formed in three eyes by three months.

Conclusions
AS-OCTA was useful to assess longitudinal vasculature changes in filtering bleb. Postoperatively, the difference in conjunctival incision affected the vasculature formation process in bleb.

P-462

CLINICAL VALIDATION OF DEVICE-INDEPENDENT WEB-BROWSER PERIMETER (MELBOURNE RAPID FIELDS) COMPARED TO HUMPHREY FIELD ANALYZER FOR GLAUCOMA

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Purpose
To validate a device-independent web-browser version of the Melbourne Rapid Fields (MRF-web) perimetry software compared to Humphrey Field Analyzer SITA-faster (HFA).

Methods
A total of 178 eyes of 90 consecutive stable glaucoma or glaucoma suspect patients were included in this study. For all patients we performed a 24-2 perimetry test using MRF-web running on a LG 27-inch desk top computer with Google Chrome browser. The MRF-web software implements a calibration step that identifies pixel density and screen size, identifies viewing distance with web cam, the eye being tested, and requests users to set the brightness of the screen to maximum. MRF-web implements a luminance calibration trial by checking that the user can detect spots in accordance with an expected frequency of seeing for fixed digital levels above background. Results of the 24-2 web perimeter were compared to those found during the previous visit to our clinic by the same patient tested on a Humphrey Field Analyser (HFA) 24-2 SITA-faster algorithm (within ~6 months). Outcomes were analysed by regression, Intraclass correlation coefficient (ICC), pointwise mean differences (MRF-HFA), and Bland-Altman methods.

Results
Patient age for the participants ranged from 21-92 (avg 61, SD 16). Based on the most recent HFA MD, 72 had normal outcomes (MD>-2 dB); 66 had mild loss (-2>MD>-6 dB); 13 had moderate loss (-6>MD>-12 dB); 13 advanced (-12>MD>-20 dB) and 14 severe (MD<-20 dB) loss. MRF-web took on average 1 min longer than the 24-2 SITA-Faster test. The Mean Deviations of both tests were highly correlated (r=0.93) and the linear regression had a slope of 1.00. Bland-Altman methods found a bias of -0.4 dB for MD with 95% Limits of Agreement of -2.2 dB to 1.4 dB in normal outcomes. Pointwise mean differences at each location in the 24-2 test grid returned an average displacement (MRF–HFA) across all points of +0.66 dB, with greater disparity found at peripheral locations consistent with the larger spots used by the MRF algorithm in the periphery.

Conclusions
MRF-web allows patients to have visual field tests performed using a web-browser independent of device (applicable for tablets, laptop and desktop computers), returning accurate and reliable outcomes similar to HFA 24-2 SITA faster. The low cost means this software has significant applications as an alternative to standard perimetry in clinic as well as allowing glaucoma telehealth with in-home testing.

P-463
RAPID OBJECTIVE PERIMETRY IN GLAUCOMA

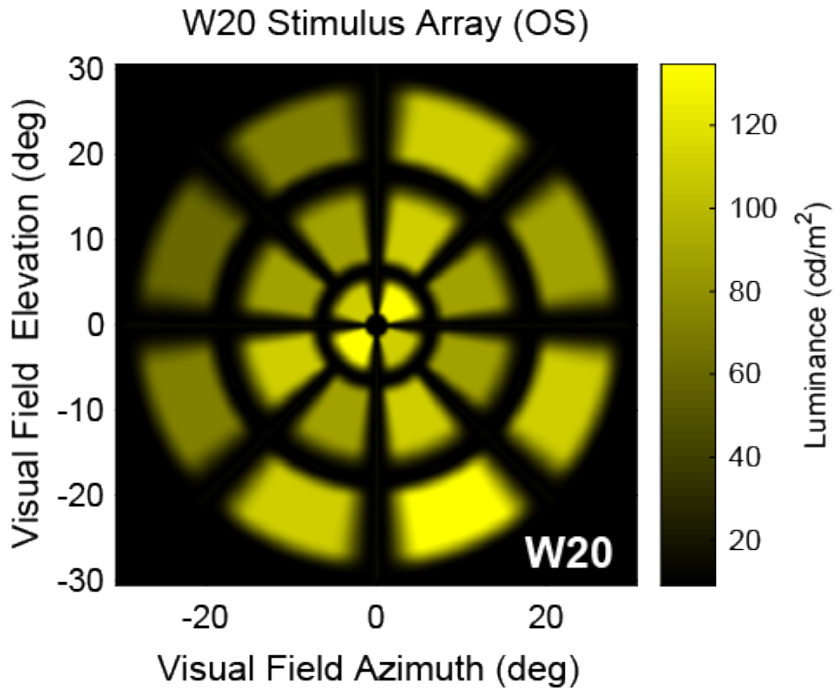
J Van Kleef[1], C Carle[1], E Rohan[1], B Rai[1], R Essex[2,3], T Maddess[1]
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Purpose
To compare the diagnostic power of a rapid 5th-generation stimulus of the ObjectiveFIELD Analyser (OFA) with two 4th-generation stimuli.

Methods
The 4th-generation (4G) stimuli comprised both a wide-field (P60) and a macular (P30) OFA test. Their stimulus arrays were scaled versions of each other, spanning the central 60 and 30 deg of the field. Each tested the two eyes concurrently in 7 minutes. The 5th-generation (5G) stimulus, W20, tested 20 arcuate regions of the central 60 deg of both eyes in < 90 seconds (Figure). Sensitivity and delay reports are made for each eye. For W20 we tested 37 glaucoma patients (11 females), and 73 normal control subjects (43 females), mean ages (±SD) were 70.5 ± 9.22, and 64.4 ± 13.1 years respectively. We used Matrix (Carl Zeiss) MDs to score glaucoma eyes as mild, moderate or severe using -6 and -12 dB cut-offs. For the older P60 and P30 stimuli we had normative data from 82 subjects (48 females): 61.1 ± 12.3 years. We combined sensitivity and delay scores for each field region [1] and computed % area under receiver operator characteristic (%AUROC) plots for the mean of the 3 or 9 most deviating points in each field. For this comparative study the normative data were conservatively computed as the median values for each region.

Results
Using the 3 worst regions/field the %AUCs for P60, P30 and W20 were: 72.1 ± 3.64, 71.4 ± 3.74, 77.9 ± 3.18 (mean ± SE%) for mild fields, 78.6 ± 3.15, 77.9 ± 3.18, 81.3 ± 2.75% for moderate fields, and 86.1 ± 4.58, 87.7 ± 3.74, 89.3 ± 3.54 for severe fields. There were no significant differences between %AUROC values within these groups. %AUROCs for the worst 9 regions/field were around 1% less. P60 and P30 performed better using per-region sensitivities producing 92.4 ± 2.55% and 91.4 ± 2.77%. For severe fields the standardised effect sizes (Hedge's g) were all > 2.5.

Image



Conclusions

The higher spatial resolution of P60 and P30 provided benefits, but the arcuate stimuli and short duration of W20 make it promising as a screening tool, and for use in infirm subjects and children. W20 and a related macular 5G 90-second test have been demonstrated as useful biomarkers in multiple sclerosis[2] and macular degeneration[3] respectively.

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P-464

RELATIONSHIP BETWEEN MRI OF THE BRAIN PRIMARY VISUAL CORTEX AND WEIGHTED SCALE COMBINING THE ESTIMATED RETINAL GANGLION CELL COUNT

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Purpose

Glaucoma causes widespread damage to central visual pathway. Attempts are currently being made to detect glaucomatous degeneration in the brain with magnetic resonance imaging (MRI) of the visual pathway. The weighted scale combining the estimated retinal ganglion cell count (wRGC) was reported by Mederios et al. As the number of RGCs estimated from the MD value and cpRNLT, and it is said to be excellent for grasping the progression of glaucoma widely from early to late stages. In this study, we examined the relationship between gray matter volume in primary visual cortex, MD value, cpRNFLT, and wRGC.

Methods

The participants were 12 healthy volunteers (56.1 ± 9.3 years old, male: female = 6:6), and 23 open-angle glaucoma (OAG) patients (57.8 ± 8.0 years old, male: female = 8:15, MD value: -10.2 ± 6.4 dB). MRI (Achieva 3.0T, Philips) was used to create 3DT1-weighted images. Anatomical standardization of the images was performed with SPM12. Gray matter volume maps were created, reflecting the local volume of gray matter in each voxel.MD value and cpRNFLT were calculated from Humphrey field analyzer and optical coherence tomography performed 3 months before and after the MRI imaging date,and wRGC was calculated from these.The averaged left and right results were analyzed using the spearman rank correlation coefficient.

Results

The primary visual cortex was positively correlated with MD values ($r = 0.40$, $p = 0.02$) and wRGC ($r = 0.42$, $p = 0.02$).When we looked at which sites in the primary visual cortex were particularly correlated with wRGC, we found a significant difference in the ventral side, which corresponds to the peripheral visual field.

Conclusions

From this study, the wRGC, which is useful in a wide range of disease stages, may be more useful in looking at the relationship between the eye and the brain.It also suggests that quantification of certain parts of the visual cortex may be able to predict the severity of glaucoma.

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P-466

ENHANCING STRUCTURE-FUNCTION RELATIONSHIP IN EARLY GLAUCOMA WITH COMPENSATION OF DEMOGRAPHIC AND ANATOMICAL DATA

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Purpose

To investigate whether compensating the circumpapillary retinal nerve fiber layer (RNFL) thickness for multiple demographic and anatomical factors can strengthen the structure-function relationship in early primary open-angle glaucoma (POAG).

Methods

In this cross-sectional study, 353 eyes from 272 Chinese participants with early POAG (visual field [VF] mean deviation, ≥−6 dB) underwent Cirrus spectral-domain optical coherence tomography (OCT) imaging and Humphrey 24-2 VF tests. Compensated RNFL thickness was generated based on age, refractive error, optic disc (ratio, orientation, and area), fovea (distance and angle), and retinal vessel density. Focal associations between VF losses at the individual VF test locations, original RNFL, and compensated RNFL thickness measurements were determined using nerve fiber trajectory tracings. Linear mixed models were used to model focal VF losses at each VF test location.

Results

The highest baseline correlation with VF losses was 0.30 (95% confidence interval [CI], 0.21-0.39) in the superior arcuate sector. Applying the compensated RNFL data increased the correlation substantially to 0.43 (95% CI, 0.34-0.51; P<0.001). Twenty-two (43.1%) VF locations had a Spearman's correlation value of 0.25 or greater with focal VF loss using the compensated RNFL approach compared with 7 VF locations (13.7%) using the original RNFL model (Figure).

Image

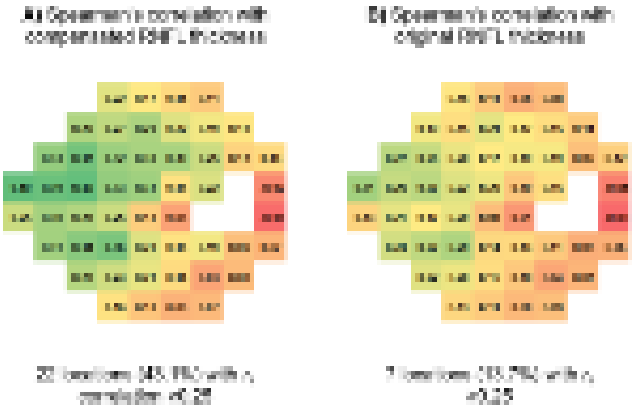


Figure. Spatial distributions of the results obtained from the local structure–function models. Twenty-two (43.1%) VF locations had a Spearman's correlation value of 0.25 or greater with focal VF loss using the compensated RNFL approach (A) compared with 7 VF locations (13.7%) using the original RNFL model (B).

Conclusions

Compensating for demographic and anatomical characteristics in RNFL thickness measurements substantially improved the modelling of focal early VF losses, suggesting that structure-to-function maps accounted for demographic and anatomic variances may help unmask localized structural and functional loss in early glaucoma.

P-467
ANALYSIS OF GLOBAL AND FOCAL LOSS IN GLAUCOMA PROGRESSION

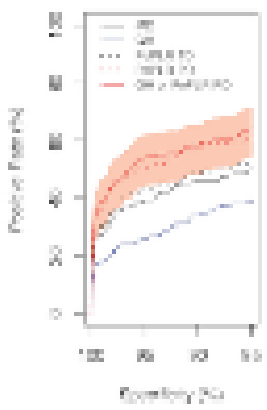
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Purpose
Visual fields are affected by opacities in the lenses of the eye and psychological factors (*e.g.*, learning, fatigue). These issues impair the ability to detect progression, affecting the visual field globally and masking focal progression. More precisely, they affect the general height (GH) of the patient's hill of vision, typically estimated by taking the seventh most sensitive total deviation (TD) value. To improve ability to detect progression, we propose an alternative estimation of the GH and repurpose the pattern deviation (PD) map to analyze focal changes after correcting for the GH.

Methods
Visual field series that were inside the useable range (mean deviation, MD ≥ −15 dB) were selected from the Rotterdam longitudinal glaucomatous visual field dataset. A total of 205 eyes of 122 patients were selected with a median number of 18 fields per eye and an average inter-visit separation of 6.7 months. The minimum number of visits was 10 and maximum was 21. To estimate the GH, the average of the 7th to 16th most sensitive TD values were subtracted to the average from the normative dataset in the visualFields R package. The pattern deviation (PD) values were defined as the difference between TD values and the estimated GH. Simple linear regression was used to detect deterioration of MD and GH over time, whereas permutation of pointwise linear regression (PoPLR) was used to detect deterioration for TD and PD values.

Results
Figure 1 shows the positive rates of MD, PoPLR with TD, GH, and PoPLR with PD at sensitivity from 100% to 85%. At a specificity of 95%, the positive rates for MD and PoPLR with TD were 39% and 43%. For the GH, the positive rate was 26%. For PoPLR with PD it was 50%. A simple criterion for detecting either global progression (GH) or focal progression (PoPLR with PD) yielded the greatest positive rate at 54%, statistically significantly greater than for MD and PoPLR with TD, with a 95% confidence interval from 44% to 62%.

Image



Conclusions

For a specificity of 95%, the sensitivity to visual field deterioration increased significantly when global and focal changes were separate. These changes should improve clinicians' ability to detect and monitor progression of glaucomatous visual field loss.

P-469

CORNEAL BIOMECHANICS IN VISUAL FIELD PROGRESSION OF PRIMARY OPEN-ANGLE GLAUCOMA WITH OCULAR NORMOTENSION OR HYPERTENSION

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Purpose

The risk factors of visual field (VF) progression in primary open-angle glaucoma (POAG) are controversial. Corneal biomechanical characteristics (CBC) have been found to be associated with VF progression. There have not been reports on the role of dynamic corneal response parameters (DCRs) in NTG and HTG VF progression seperately. This study was to analyze the effects of DCRs on VF progression in NTG and HTG with IOP well controlled.

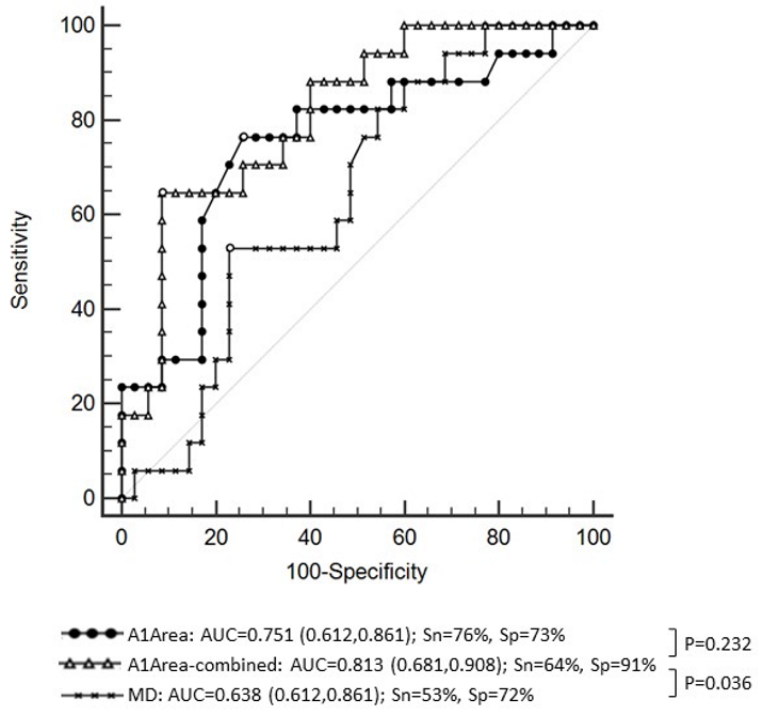
Methods

This was a prospective cohort study. Patients were divided into HTG or NTG group based on 24-hour IOP measured and followed up for 4 years. DCRs wertained by corneal visualization Scheimpflug technology.The subjects were divided into progressive and non-progressive group according to the Advanced Glaucoma Intervention Study (AGIS) score. General linear models (GLM) were used to compare the DCRs between the two groups with affecting factors (*e.g.*, age, AL, MD, prostaglandins durations) adjusted. The risk factors of VF progression were evaluated by logistic regression and the receiver operating characteristic (ROC).

Results

A total of 139 subjects with POAG were recruited. Excluding those who were lost to follow-up or did not reach the target IOP, 57 subjects in NTG and 54 in HTG were included for analysis. In NTG (n=57), the first applanation deviation area (A1Area) was larger in the progression group. A1Area was an independent risk factor for NTG VF progression. The ROC curve of A1Area combined with the affecting factors (age, AL, MD, GAT) to diagnose NTG progression was obtained with area under the curve (AUC) of 0.813. When the ROC curve was plotted with A1Area and MD alone, the AUC was 0.751and 0.638respectively. There was no significant difference between A1Area and A1Area-combined ROC curves (P=0.232), while the difference between MD and A1Area-combined ROC curves was significant(P=0.036).There was no significant difference in corneal biomechanical properties between the progressive and non-progressive groups in HTG.

Image



Conclusions

The corneal of progressive NTG group is more deformable than that of non-progressive group, and A1Area may be an independent risk factor for NTG progression. It is speculated that in the eyeball where the cornea is more deformable, the cribriform plate tissue may also be less tolerant to pressure and accelerate VF progression. We should pay more attention to A1Area in glaucoma progression follow-up. The VF progression in HTG group was not related to DCRs. Its specific mechanism needs to be further studied.

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P-470
GANGLION CELL COMPLEX ANALYSIS TO ASSESS THE PROGRESSION OF GLAUCOMA

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Purpose
Focal, especially inferior loss of GCC was demonstrated as the strongest single predictor of visual field progression. However, interindividual differences in parametric changes make a definitive diagnosis of change difficult. The ganglion cell thickness parameters in glaucoma patients with stable fields were analysed over a period of 5 years to provide a range of stability against which parameters in progression could be identified

Methods
Fifty consecutive glaucoma patients with stable reproducible visual fields (assessed by event analysis on GPA) and good quality OCT (SSI >40) were included in the study. Among these, 12 patients had preperimetric glaucoma in one eye and mild glaucoma (nasal step in other eye).Ganglion cell complex analysis reports on RTvue (SD-OCT system) were assessed for GCC change both qualitatively and quantitatively.

Results
On quantitative evaluation, average GCC thickness was found to be 85.99µ (range 74.39µ - 104.19µ). Average inferior GCC thickness was found to be 85.67µ (range 75.2µ - 109.63 µ). 92% of patients showed fall in average GCC thickness; mean decrease was 5% from the baseline after 5 years of follow up {range 0.5 % -- 14%}. 84% of patients showed fall in average inferior GCC thickness; mean decrease was 5.17% from the baseline {range 1.46% - 18%}. Mean change in average GCC thickness was -4.409 µ ± 3.94. Mean change in superior average was found to be -3.86 µ±3.67. Mean change in inferior average was found to be -4.66 µ±4.99. Mean FLV change was found to be 0.261 % (range -1.309 to 2.16).The percentage difference in inferior GCC thickness between eyes of the same patient from normal to mild glaucoma was 10% and average GCC thickness was 9%.

Conclusions
Stable visual fields were associated with a 5% decrease of average and inferior GCC thickness, and 0.261% of FLV from baseline after 5 year follow up. This could be age related. Progression from preperimetric to perimetric glaucoma required 10% change in inferior GCC thickness in the same patient. Thus, higher changes over time would suggest progression.

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P-471

DETECTION OF IRIDOCORNEAL ANGLE CHANGES AFTER UNCOMPLICATED PHACOEMULSIFICATION USING AUTOMATED GONIOSCOPY IMAGING

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Purpose
Cataract surgery is known to change anterior chamber morphology, widening the iridocorneal angle (ICA) of most patients, even in open-angle subjects. Imaging techniques aimed at studying ICA anatomy should thus be able to detect this change. We aimed to determine whether automated gonioscopy imaging (AGI) with GS-1® (NIDEK CO., Japan) can detect changes in ICA morphology and pigmentation after routine phacoemulsification cataract surgery (PCS).

Methods
A prospective, observational study. Patients who underwent routine PCS at Hospital Santa Maria, Lisbon, from March to October 2022 were included. AGI was done at the pre-operative visit and 6-weeks post-operative visit by two trained technicians. The images were then analyzed using NAVIS EX Software (NIDEK CO., Japan) by a masked observer. Each eye was divided into superior, inferior, temporal and nasal quadrants and their morphology and pigmentation was graded according to the Shaffer and modified Scheie (mScheie *i.e.*, 0/I=0, II=1, III/ IV=2) classifications, respectively. Clinical information was collected from electronic records.

Results
22 eyes from 21 patients (62% female) were included, with a mean age of 74.5±7.9 years. One patient had glaucoma in the studied eye. Mean intraocular pressure was 17.2±4.3 in pre-op and 15.1±2.9mmHg in post-op visits. Baseline AGI identified 7 (33%) patients with angle closure (>2 quadrants ≤ Shaffer 2). PCS led to angle opening, as all patients achieved open angle status. As expected, this increase was uneven, with lower pre-op Shaffer grades achieving great post-op improvement. Indeed, statistically significant increase was found in the superior (p=0.002), inferior (p=0.004) and temporal (p=0.01) quadrants, but no difference was found in the nasal quadrant (p=0.1). PCS allowed the gonio identification of at least one more ICA structure (1 Shaffer grade) in 2/3 of all quadrants. One quadrant in 1 patient showed ICA narrowing. Similarly, a statistically significant increase was found between pre- and post-op mScheie grade in the superior (p=0.005), inferior (p=0.001) and temporal (p=0.005) quadrants, but not in the nasal quadrant (p=0.06). 42% of all baseline quadrants <2 mScheie showed a post-op increase ≥1 point, with the most significant pigmentation gain in the inferior quadrant.

Conclusions
AGI with GS-1® can detect ICA angle widening after routine cataract surgery, mainly in the superior, inferior and temporal quadrants. Unlike other devices, it can detect changes in pigment density of the ICA.

P-472

DEVELOPMENT OF A NOVEL SCREENING PROGRAM FOR GLAUCOMA WITH A HEAD MOUNT PERIMETER IMO

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Purpose

This study aims to evaluate the accuracy and usefulness of a novel visual field screening program for glaucoma, using a head-mounted visual perimeter device 'imo'.

Methods

A screening program measuring 28 points known to be highly susceptible to the appearance of glaucomatous visual field defect was developed. The eyes of 168 patients, 76 nonglaucoma and 92 glaucoma, were examined. Participants underwent visual field testing using three Methods

the Humphrey Visual Field Analyzer (HFA) (24-2 SITA Standard or 30-2 SITA Standard), the imo visual field screening program (ISP), and frequency doubling technology (FDT). The ability of the imo screening program and FDT to distinguish between glaucoma patients and normal controls was evaluated using receiver operating characteristic (ROC) curves and areas under the ROC curve (AUC). Additionally, we compared the testing time of HFA, ISP, and FDT.

Results

The AUC of imo were 0.82, 0.98, and 1.00 in the mild, moderate, and advanced stages, respectively. The AUC of FDT were 0.75, 0.97, and 1.00 in the mild, moderate, and advanced stages, respectively. The testing time of HFA (24-2/30-2) was 280 ± 21/336 ± 82 s for normal controls and 328 ± 27/408 ± 59, 415 ± 34/506 ± 34, and 438 ± 41/444 ± 27 s, respectively, for mild, moderate, and advanced-stage patients. The testing time of ISP was 46 ± 13 s for normal controls and 61 ± 18, 82 ± 21, and 105 ± 16 s, respectively, for mild, moderate, and advanced-stage patients. The testing time of FDT was 57 ± 13 s for normal controls and 81 ± 24, 107 ± 32, and 140 ± 121 s, respectively, for mild, moderate, and advanced-stage patients. The testing time of ISP was significantly shorter than FDT and HFA in all stage.

Conclusions

We developed a program that could accurately and quickly screen for glaucoma using the imo.

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P-473

ASSOCIATION BETWEEN PROGRESSIVE CIRCUMPAPILLARY VESSEL DENSITY LOSS AND VISUAL FIELD PROGRESSION IN GLAUCOMATOUS EYES WITH HIGH MYOPIA

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Purpose

To investigate the longitudinal changes in the circumpapillary vessel density (cpVD) and retinal nerve fiber layer thickness (cpRNFLT) and their association with visual field (VF) progression in open-angle glaucoma (OAG) eyes with and without high myopia. Methods

A total of 166 eyes of 166 glaucoma patients consisting of 82 high myopic (HM) eyes and 84 eyes without high myopia (NHM) were enrolled in the study. HM was defined as having axial length >26.5 mm, while NHM as < 24.5 mm. VF progression was determined by both event- and trend-based analyses. The rates of longitudinal change in VF mean deviation (MD), cpVD and cpRNFLT were analyzed using linear mixed effects models and compared between VF progressors and nonprogressors. The factors associated with VF progression and VF MD reduction rate, including the rates of longitudinal changes in cpVD and cpRNFLT, were evaluated using logistic and linear regression analyses.

Results

The rates of longitudinal change in cpVD were significantly faster in VF progressors (-0.97 ± 0.19 % per year for HM and -0.67 ± 0.16 % per year for NHM) than in nonprogressors (-0.40 ± 0.08 % per year for HM and -0.31 ± 0.06 % per year for NHM) in both HM and NHM eyes. The rates of longitudinal change in cpRNFLT (-0.37 ± 0.16 µm per year vs -0.27 ± 0.08 µm per year) did not differ between progressors and nonprogressors in HM eyes. In multivariable logistic regression analyses, a faster rate of cpVD reduction (odds ratio [OR]: 0.235, P = 0.005) had a significant association with VF progression in HM eyes, whereas higher rates of both cpVD (OR: 0.359, P = 0.037) and cpRNFLT (OR: 0.174, P = 0.002) loss were significantly related to VF progression in NHM eyes. The rate of VF MD reduction was only related to the rate of change in cpVD (β = 0.229, P = 0.006) in HM eyes, while it was related to rates of reduction in both cpVD (β = 0.270, P = 0.001) and cpRNFLT (β = 0.258, P = 0.001) in NHM eyes.

Conclusions

Only the rates of longitudinal change in the cpVD, not in the cpRNFLT, were found to be an independent predictor of VF progression and faster rate of VF loss in OAG eyes with HM, suggesting clinical utility of cpVD in evaluating VF progression in OAG eyes high myopia.

P-474

ACCEPTANCE, TOLERABILITY AND PATIENT COMFORT DURING HOME-BASED VISUAL FIELD TESTING USING A VIRTUAL REALITY HEADSET

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Purpose
Visual field testing is key to assessing functional loss in glaucoma. Despite its clinical value, traditional visual field testing has a number of limitations, including its dependency on medical equipment and posturing requirements. The present study examines the acceptance, tolerability and comfort of home-based visual field testing using a virtual reality (VR) headset.

Methods
Healthy subjects were prospectively enrolled to undergo visual field examination in a non-clinical setting using a commercially available stereoscopic VR headsets and a sequentially optimized reconstruction strategy (SORS). Subjects were supervised and wore their own spectacles within the headset. After the test, they were asked about their comfort, side effects, and readiness to repeat the examination at home.

Results
Of the 12 subjects enrolled, 7 were female (58.3%). Mean age was 45 years (range: 30-68). While none of the subject suffered from glaucoma, their medical histories included severe arthritis, refractive surgery, high myopia, amblyopia and esotropia. Mean self-reported comfort score was 8.75 out of 10 (range: 8-10), with some subjects taking the test in dorsal decubitus position. Eleven subjects (91.7%) considered the device was easy to use, and 100% responded they would accept to repeat the test at home, of which 41.7% stated they would prefer to be supervised by a clinician. Overall, 3 subjects reported mild side-effects: light asthenopia, epiphora and periocular flushing. All side effects were mild and self-limited. The mean perceived duration of the test (187 seconds) correlated strongly with the mean actual duration (166 seconds; r = 0.76). In all, 58.3% of perceived durations were shorter than actual test durations. Mean false negative and false positive responses were 3.75% and 4.7% respectively. Central fixation recorded by real-time eye tracking was maintained on average 73.23% of the time and showed a strong correlation with false negative responses (r = 0.75).

Conclusions
While the present study did not examine the test algorithm itself, it suggests that home-based visual field testing using a VR headset is well tolerated and accepted, with high levels of self-reported comfort and only mild side effects. While all subjects welcomed the opportunity to perform clinical tests from home, over a third expressed a preference for supervision. Real-time eye tracking correlated well with traditional reliability markers, suggesting potential clinical value.

P-476

DETECTION AND CHARACTERISATION OF VISUAL FIELD DEFECTS USING OCTOPUS PERIMETRY IN CONGENITAL GLAUCOMA

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Purpose

to detect and characterise visual field (VF) defects using static Octopus perimetry in patients with primary congenital glaucoma (PCG) and to determine VF quality and time duration.

Methods

88 eyes of 70 patients diagnosed with PCG were included. Assessments were performed using an Octopus 900 and each eye was assessed with the tendency-oriented perimetry (G-TOP) algorithm. Quantitative VF data were collected: quality data (false positive and negative response, and time duration) and results of mean deviation (MD) and square root of loss variance (SLV). Qualitative data were collected: the presence of diffuse and localized defects, the affected hemifield and grade of defects using the Aulhorn and Karmeyer classification. Correlations between perimetric results and clinical variables were analysed.

Results

Median age was 11 (8-17)years. 65.9% (58/88) of PCG eyes showed VF defects.Diffuse defects were observed in 10/58 eyes (16.94%) (mean MD=23.92 (SD 2.52) dB) and localized defects in 48/58 eyes (82.75%). The most frequent defect was spot-like/stroke-like/incipient paracentral scotoma (n=15) nasal step (n=8), adding arcuate defect (n=2), half ring-shaped (n=13) and concentric defect with a central island (n=9). And the most frequent affected visual hemifield was inferior hemifield. Mean test duration was 2´12” (SD 21.6”). MD and sLV values were correlated with BCVA, cup to disc ratio and number of antiglaucoma surgeries (all p<0.001).

Conclusions

A high number of diffuse and localized defects were identified using Octopus perimetry in PCG patients. The most frequent defect was paracentral scotoma and inferior hemifield was the most affected.

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P-477

CHANGES OF EMOTIONAL STATUS AND BRAIN FUNCTIONAL CONNECTIVITY IN GLAUCOMA PATIENTS

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Purpose
This study used resting-state functional magnetic resonance imaging (rs-fMRI) to evaluate spontaneous resting brain activities in glaucoma patients, and the functional correlation between the visual cortex and other neural networks, especially networks regulating emotion and stress through functional connectivity (FC) analysis.

Methods
Patients with primary open angle glaucoma with preserved central vision and healthy subjects were prospectively enrolled. Demographic and clinical data including socioeconomic status were recorded. All the participants completed Hospital Anxiety and Depression Scale (HADS) questionnaire and Montreal Cognitive Assessment. MRI protocol included high-resolution 3D inversion recovery prepared fast spoiled gradient recalled sequence T1-weighted image and rs-fMRI scans. The rs-fMRI dataset was obtained using a T2-weighted gradient echo planar imaging sequence. The region of interest (ROI) was set in the primary visual cortex (V1) bilaterally from each participant's four-dimensional residual time series data in standard MNI space. Pearson's correlation coefficients were calculated between the mean time course of each ROI in the visual cortex and each voxel in the whole brain. These data were further converted to Z-value maps using Fisher r-to-z transformations. These Z-value maps were subjected to group-level analyses.

Results
Eighteen healthy controls and 19 glaucoma patients were enrolled. However, 6 healthy controls and 2 glaucoma patients were excluded due to severe head motion or image distortion. The age, sex and educational background were similar between the two groups. But glaucoma patients had worse HADS scores. The voxel wised gray matter volume was significantly smaller in glaucoma patients in the left medial frontal gyrus and right inferior frontal gyrus than in healthy subjects, which was correlated with the HADS score. But the gray matter volume in left precentral gyrus was significantly larger in glaucoma patients than in controls. Using the left precentral gyrus, left middle frontal gyrus, and right inferior frontal gyrus as seed, there were significant FC changes from the left precentral gyrus and right inferior frontal gyrus in glaucoma patients.

Conclusions
Glaucoma patients had both structural and functional changes in brain areas related to emotional regulation. This finding suggested that psychological consultation should be incorporated into the treatment plan with the evaluation of the HADS questionnaire in glaucoma patients.

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P-479

OFFSET OF OPENINGS IN OPTIC NERVE HEAD CANAL AT LEVEL OF BRUCH'S MEMBRANE, ANTERIOR SCLERA, AND LAMINA CRIBROSA

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Purpose

To compare the central retinal vascular trunk (CRVT) position, as a surrogate of lamina cribrosa (LC) offset, with the anterior scleral opening (ASCO) offset from the Bruch's membrane opening (BMO) as a marker of outer-wall-shift.

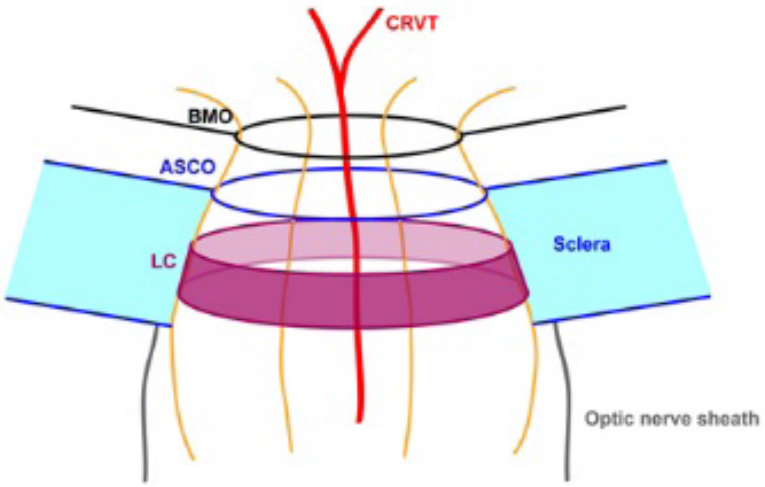
Methods

Based on the BMO-centered radial scans, the BMO and ASCO margins were demarcated, and each center was determined as the center of the best-fitted ellipse for each margin. The ASCO/BMO offset was defined as the offset between each center. If the ASCO margin could not be demarcated for more than 30° continuously, the eye was classified as "incomplete demarcation for ASCO." Angular deviations and the extent of ASCO and CRVT offsets from the BMO center were compared directly.

Results

Twenty-one of 106 eyes (20%) showed incomplete demarcation of ASCO, which was associated with a larger BMO area (P = 0.036) and a larger ASCO offset from the BMO (P < 0.001). The angular deviation of ASCO offset was associated with axial length (P = 0.003), that of CRVT offset (P = 0.002), and that of the longest EOB (P < 0.001). The ASCO offset was smaller than the CRVT offset (P < 0.001), and, unlike the CRVT offset, it was rarely deviated to the inferior side.

Image



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Conclusions

The complete ASCO margin might not be demarcateable when determined on BMO-centered radial scans in the presence of an offset. Also, the ASCO, which reflects only the superficial scleral layer, might not reflect the LC position, because the LC might be shifted further from the ASCO.

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P-480

COMPARISON OF *IN VIVO* TRABECULAR MESHWORK MORPHOLOGY BETWEEN NORMAL AND GLAUCOMATOUS EYES USING HIGH-RESOLUTION ADAPTIVE OPTICS GONIOSCOPY

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Purpose
To characterize and compare the *in vivo* trabecular meshwork (TM) morphology between normal and glaucoma eyes using high-resolution adaptive optics gonioscopy (AOG).

Methods
A retrospective case series of normal and glaucoma patients who had undergone AOG and photographing at Mori Ophthalmic and Medical Clinic between January 2020 and August 2022 were included in this study. Photographing of TM was performed using AOG with approximately 2-µm lateral resolution. The photographs were divided into micro pixels and created the histogram based on the intensity of each pixel using the ImageJ program. The coefficient of variation (CV) was calculated using intensity and frequency. A greater CV indicates greater variation in the image's intensity. The main outcome measure was the evaluation of CV in two groups.

Results
We analyzed the data from 177 normal eyes of 177 participants and 153 eyes of 153 glaucoma patients. There were differences between the groups in lens status (P<0.001), intraocular pressure (P<0.001), the number of glaucoma medications (P<0.001), pseudoexfoliation syndrome (P=0.001), visual field (P<0.001), and CV of the TM images analyzed with ImageJ(P<0.001). With multiple linear regression analysis, higher CV of the TM images was significantly associated with younger age (beta coefficient = -0.458, P<0.001) and the absence of glaucoma (beta coefficient = -0.522, P<0.001).

Conclusions
AOG enables near-cellular-level resolution of the human TM *in vivo*. The image of TM utilizing AOG in the glaucomatous eye is more likely to be uniform, and parameters such as age and glaucoma presence are associated with TM uniformity.

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P-481

EVALUATION OF MICROVASCULAR CHANGES AND OPTIC NERVE HEAD PERFUSION FOLLOWING TRABECULECTOMY – AN OPTICAL COHERENCE TOMOGRAPHY ANGIOGRAPHY(OCT-A) STUDY

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Purpose

To determine the effect of Trabeculectomy on peripapillary vessel density and optic nerve head perfusion in primary glaucoma patients using Optical Coherence Tomography Angiography(OCT-A)

Methods

Prospective, hospital-based, observational study.67 patients with primary glaucoma, both open-angle (POAG,n=25) and angle closure (PACG,n=42) , who underwent trabeculectomy were included in the study.OCT-A scans were performed using AngioPlex™ CIRRUS™ HD-OCT device (model 5000, Carl Zeiss Meditec, Inc., Dublin, USA), one week prior to surgery and at 1 month,3 months and 6 months postoperatively. Changes in Peripapillary vessel density(pVD) , Perfusion index, Flux index, Retinal Nerve fiber layer thickness(RNFL), Macular Ganglion Cell Layer – Inner plexiform complex(GCL-IPL) were analyzed. Correlation with changes in Intraocular pressure was evaluated using Pearson correlation coefficient. Linear regression analysis was used to assess the factors associated with changes in pVD. For all analyses, statistical significance was defined as a p-value less than 0.05.

Results

The Mean IOP decreased in both POAG($p<0.001$) and PACG($p<0.001$), when compared to preoperative IOP. The peripapillary vessel density measurements in all the quadrants showed significant improvement, superior($p= 0.016$,$p=<0.001$) inferior($p< 0.001$,$p<0.001$), nasal($p < 0.001$,($p < 0.001$), temporal ($p=0.009$, $p<0.009$) in follow-up visits at 1month, 3months and 6 months in both POAG and PACG respectively after trabeculectomy. There was a significant increase in the perfusion index of peripapillary vessels ($p=0.022$, $p= 0.004$) in POAG and PACG and flux index in POAG(p-value <0.001). Structural parameters like mean GCL-IPL thickness(POAG $p<0.001$;PACG $p=0.004$) and RNFL thickness(POAG $p<0.001$; PACG $p=0.676$) showed postoperative improvement. There was no significant correlation between IOP and change in peripapillary vessel density. Linear regression analysis showed a significant influence of Mean RNFL thickness in superior($p < 0.002$) and inferior ($p< 0.009$) pVD in PACG patients.

Image

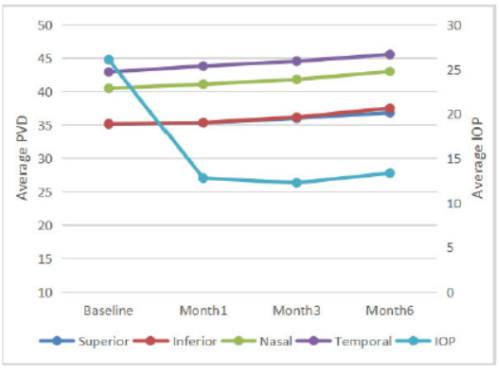


Figure24 : Change in PVD and IOP over the visits in PACG group

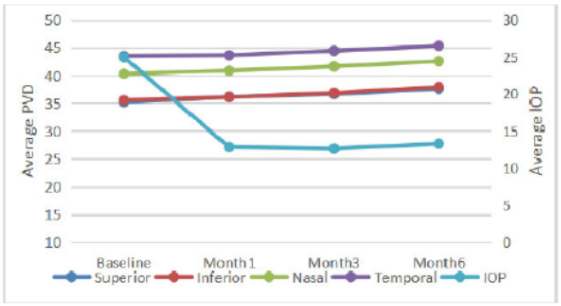


Figure 23 :Change in PVD and IOP over the visits in POAG group

Conclusions

OCT-A demonstrated a significant improvement in peripapillary vessel density and optic nerve head perfusion after trabeculectomy in both POAG and PACG patients. The reversal of microvascular and structural parameters after surgery is a shred of supportive evidence for the role of trabeculectomy in controlling glaucoma progression.

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P-482

CLASSIFICATION OF VISUAL FIELD ABNORMALITIES IN HIGHLY MYOPIC EYES WITHOUT PATHOLOGIC CHANGE

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Purpose

To develop a classification system of visual field (VF) abnormalities in highly myopic eyes with and without glaucoma.

Methods

Secondary analysis of VF data from a longitudinal cohort study. One thousand eight hundred ninety-three VF tests from 1302 eyes (825 individuals) were included. All participants underwent VF testing (Humphrey 24-2 Swedish interactive threshold algorithm standard program; Carl Zeiss Meditec) and detailed ophthalmic examination. A comprehensive set of VF defect patterns was defined via observation of the 1893 VF reports, literature review, and consensus meetings. The classification system comprised 4 major types of VF patterns, including normal type, glaucoma-like defects (paracentral defect, nasal step, partial arcuate defect, arcuate defect), high myopia-related defects (enlarged blind spot, vertical step, partial peripheral rim, nonspecific defect), and combined defects (nasal step with enlarged blind spot). A subset (n = 1000) of the VFs was used to evaluate the interobserver and intraobserver agreement and weighted k values of the classification system by 2 trained readers. The prevalence of various VF patterns and their associated factors were determined.

Results

We found that normal type, glaucoma-like defects, high myopia-related defects, and combined defects accounted for 74.1%, 10.8%, 15.0%, and 0.1% of all unique VF tests, respectively. The interobserver and intraobserver agreements were > 89%, and the corresponding k values were 0.86 or more between readers. Both glaucoma-like and high myopia-related VF defects were associated with older age (odds ratios [ORs], 1.07 [95% confidence interval (CI), 1.04-1.10; P < 0.001] and 1.06 [95% CI, 1.04-1.10; P < 0.001]) and longer axial length (ORs, 1.65 [95% CI, 1.32-2.07; P < 0.001] and 1.37 [95% CI, 1.11-1.68; P = 0.003]). Longer axial length showed a stronger effect on the prevalence of glaucoma-like VF defects than on the prevalence of high myopia-related VF defects (P = 0.036).

Conclusions

We propose a new and reproducible classification system of VF abnormalities for nonpathologic high myopia. Applying a comprehensive classification system will facilitate communication and comparison of findings among studies.

P-483

INTER-EYE ASSOCIATION AND DIFFERENCE OF THE RATES OF VISUAL FIELD PROGRESSION IN PATIENTS WITH BILATERAL OPEN-ANGLE GLAUCOMA

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Purpose
To investigate the inter-eye correlation and the difference of the rates of change of visual field sensitivity in eyes with bilateral open-angle glaucoma.

Methods
Patients with bilateral open-angle glaucoma with 8 or more reliable 30-2 standard automated perimetry over more than 2 years were enrolled. Inter-eye correlation and difference of the rate of change of MD (MD slope) were investigated. Factors associated with large inter-eye difference (> 0.42 dB/year) were explored.

Results
One hundred and eighty-eight eyes from 94 patients (56 females) were enrolled. There was a significant inter-eye correlation of the rates of visual field progression (P = 0.002). Mean ± standard deviation and median inter-eye difference of the MD slope value was 0.29 ± 0.31 and 0.18 dB/year (range: 0 – 1.41), respectively. Fifth, 10th, 25th, 75th, 90th and 95th percentile of inter-eye difference were 0.01, 0.02, 0.08, 0.42, 0.72, and 0.91 dB/year, respectively. Older age and slower progression were significantly associated with large inter-eye difference.

Conclusions
There was a significant inter-eye correlation in the rate of VF progression in eyes with bilateral open-angle glaucoma. However, there was a large variability in the inter-eye difference in the rate of VF progression. Age and the rate of progression were associated with the magnitude of inter-eye difference in VF progression. The inter-eye association may be used for improving the estimation of the rate of VF progression.

P-484

CONCORDANCE BETWEEN THE CLINICAL FINDINGS, OCT AND 30-2 VF IN PATIENTS WITH DIAGNOSIS OF GLAUCOMA SUSPECT AND PRIMARY OPEN-ANGLE GLAUCOMA

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Purpose
To demonstrate the correlation between clinical findings, optical coherence tomography of the optic nerve (OCT) and 30-2 visual field (VF) in patients with glaucoma suspect (GS) and primary open-angle glaucoma (POAG) between 2019 and 2022.

Methods
Analytical observational study of diagnostic concordance. The data were taken from the medical records of patients diagnosed with GS or POAG who had a maximum difference of 6 months in performing the diagnostic images. The second visual field was taken to eliminate the learning defect. Retinal nerve fiber layer (RNFL), cup/disc ratio (area and volume), disc area, and ganglion cell complex (GCC) data from optic nerve OCT were analyzed; mean defect (MD), loss of variance (sLV), foveal sensitivity and type of defect of 30-2 VF; finally, cup/disc ratio (C/D), neuroretinal rim and ISNT rule of the clinical examination. A positive correlation was established when the 3 variables (clinical, OCT, and VF) agreed on the result, partial correlation when only 2 variables agreed, and negative correlation when none agreed. the χ^2 test was used to calculate the proportion of agreement. Value of $p<0.05$ was considered statistically significant. Agreement was determined employing Kappa coefficient.

Results
846 eyes were included. 55.6% of the patients were women and 44.4% men with a mean age of 56 years. Clinically the ISNT rule was fulfilled in 54.6% of the patients. The predominant damage in OCT is observed in the inferior quadrant with 60.6%. The most frequent visual field defect was the superior arcuate with 29.3%. The proportion of agreement between the clinic and the OCT was 63.2% in overall, 56.2% in POAG and 64.7% in GS; between clinic and visual field was 66.3% in overall, 63.9% in POAG and 66.8% in GS; between OCT and visual field was 78.7% in overall, 63.9% in POAG and 81.7% in GS and between the three parameters were 56.6% in overall, 45.1% in POAG and 58.9% in GS. A positive correlation was found in 56.6% of the cases in overall, 45.1% in POAG and 59% in GS; partial correlation in 38.1% overall, 48% POAG and 36% GS and a negative correlation in 5.3% in overall, 6.9% in POAG and 5% in GS. The Kappa statistic showed acceptable agreement.

Image

Table 1. Correlation between clinical findings, OCT and VF

	TOTAL		POAG		GS		p-value
	n	%	n	%	n	%	
Negative	45	5.3	10	6.9	35	5.0	0.3400
Partial	322	38.1	69	48.0	253	36.0	0.0074
Positive	479	56.6	65	45.1	414	59.0	0.0022

Conclusions

The correlation in POAG between clinical findings and structural and functional studies is acceptable. This confirms the importance of clinical monitoring by qualified personnel, with OCT and VF being complementary diagnostic aids that should not delay clinical diagnosis.

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P-486

THE DEFINITION OF PREPERIMETRIC GLAUCOMA VARIES A LOT AS THERE ARE NO STANDARD GUIDELINES. A SYSTEMATIC REVIEW

T Chakravarti

Purpose

The purpose of this study is to systematically review the reported data on preperimetric glaucoma (PPG) to find out what prescribed perimetric guidelines have been followed for identifying a visual field defect (VFD) as PPG and differentiating it from a typical glaucomatous VFD. We also tried to find out modifications to the existing guidelines and proposed new guidelines for this purpose.

Methods

We conducted a literature search in the peer-reviewed literature on PubMed from 1999 to 2022 and included prospective studies that used the term PPG in the title of the paper. We excluded studies that did not have a clear statement on the definition of PPG in the method. Finally, 35 studies were included as per the study design. From the method, we recorded the prescribed guidelines that were applied to identify PPG and differentiate it from a glaucomatous VFD. All modifications to the existing guidelines and adopting different guidelines for this purpose were noted. Additionally, the number of follow-ups to confirm the reproducibility of abnormal VFD was also documented. Due to the high variability of parameters used, a meta-analysis was not feasible.

Results

Out of 35 included studies, clinicians applied Anderson's perimetric criteria in 8 (25.7%) research papers for identifying PPG and differentiating it from glaucomatous VFD, while 7 (22.8%) modified these criteria, and 22 (62.8%) adopted different guidelines. Only 28.5% of the research applied the cluster criteria of Anderson's criteria. One study used the ISGEO classification (2.8%). The majority preferred the Humphrey perimeter (91.4%) to the Octopus perimeter. Among the indices, the abnormal Glaucoma Hemifield Test was chosen mostly (63.6%) for formulating new guidelines, while the next opted indices were Mean Deviation and Pattern Standard Deviation (50% each). Surprisingly, the reproducibility of an abnormal glaucomatous VFD was the least concern as 74% did not mention it in the method.

Conclusions

Our results showed that only one-fourth of the research followed the prescribed guidelines and a smaller number modified it for identifying PPG and differentiating it from a glaucomatous VFD. The majority proposed new guidelines adopting different parameters. Moreover, the repeatability factor to confirm the glaucomatous VFD is neglected most. As per our study, there are no agreed standard guidelines followed to detect PPG and to separate it from glaucomatous VFD in clinical practice and in research.

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P-487

COMPARISON OF SUPERIOR AND INFERIOR VISUAL FIELD ASYMMETRY IN NORMAL TENSION GLAUCOMA IN AN ASIAN POPULATION

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Purpose
To compare the superior and inferior visual field asymmetry in normal-tension glaucoma

Methods
The retrospective cross-sectional study involved 420 eyes from 274 normal-tension glaucoma patients who visited the Department of Ophthalmology of the Kaohsiung Medical University Hospital between January 2010 and December 2020. The baseline features including age, sex, best-corrected visual acuity, spherical equivalent, intraocular pressure, and visual field index were recorded. These eyes were further stratified to early (mean deviation [MD] >-6 dB), moderate (-6 dB≤MD<-12 dB), or advanced glaucoma (MD≤-12dB) according to the Hodapp-Parrish-Anderson's criteria. The total deviation (TD) probability plot of the 30-2 Humphrey visual field test contained 74 points. The outermost 24 points were excluded to coincide with the 24-2 visual field test, and the remaining points in each hemifield were divided into 5 subfield regions (central, paracentral, nasal, peripheral arcuate 1, and peripheral arcuate 2) derived from the Glaucoma Hemifield Test for further region-wise analysis. Visual fields of the left eye were mirror-flipped to resemble those of the right eye. We compared the point-wise and region-wise total deviation differences between the superior and inferior visual fields across different glaucoma severities.

Results
In region-wise comparison, eyes with early normal-tension glaucoma had significantly worse mean TD in the central and paracentral regions of the superior hemifield. In moderate or advanced normal-tension glaucoma eyes, the mean TD is markedly lower in all regions of the superior hemifield. In point-wise comparison, early normal-tension glaucoma eyes have additional significantly worse TD in some points in the temporal portion of the inferior hemifield and the nasal portion of the superior hemifield apart from regions markedly worse in the region-wise analysis.

Conclusions
Comparing the superior and inferior visual field asymmetry in normal-tension glaucoma, more severe visual field defects are prone to appear in the superior central and paracentral region by region-wise analysis in the early stage. While on point-wise analysis, there are additional significantly worse points in the superior nasal and inferior temporal area in the early stage. Further research should be done on high-tension glaucoma to compare the difference.

P-488
PHOTOPIC NEGATIVE RESPONSE (PHNR) AMPLITUDE USING HANDHELD RETEVAL IN PRIMARY GLAUCOMA

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Purpose
Early diagnosis, management, and glaucoma progression follow-up remain challenging issue in the limited resources clinics in developing countries such as Indonesia. Therefore we evaluate the applicability of PhNR amplitude using handheld electroretinography (RETeval system, LKC Technologies, Inc., Gaithersburg, MD, USA) in primary open-angle glaucoma (POAG), primary angle closure glaucoma (PACG) compared to cataract and normal groups.

Methods
Patients were classified as primary glaucoma, cataract, and normal group. Primary glaucoma group consisted of open-angle and closed-angle glaucoma, was divided into early, moderate, severe, and advanced glaucoma. Cataract and normal groups were patients with normal IOP, no RNFL thinning with normal visual field. The normal group consisted of patients under 40 years old and the cataract group comprised of patients above 40 years old with lens opacity. The RETeval system claimed to be able to record flicker ERG without any mydriasis agent using skin electrodes. The PhNR protocol uses stimulus frequency 3.4Hz and 200 flashes for long protocol.

Results
The study group consists of 73 normal, 98 cataract, 205 glaucoma (47 early stage, 45 moderate stage, 41 advanced stage, 72 severe stage). Age in the normal group (32.57±5.49) were the youngest compared to cataract (64.20±6.67) and glaucoma group (65.30±5.75). There were no significant differences in the PhNR and PhNR 72ms amplitude in the normal and cataract group despite the significant age differences. The PhNR and PhNR 72 ms normal group (P=0.00) and cataract group (P=0.00) were both significantly higher compared to early glaucoma group. PhNR 72ms amplitude in all glaucoma groups were significantly lower compared to PhNR amplitude. PhNR 72ms were significantly lower in comparisons to all glaucoma severity.

Image
Table 1 PhNR Amplitude Comparisons Measured by RETeval PhNR Protocols in Normal, Cataract, Early Glaucoma, Moderate Glaucoma, Advanced Glaucoma, Severe Glaucoma, and Absolute Glaucoma

Parameter	Normal	Cataract	P (Normal vs Cataract)	Early Glaucoma	P (Normal vs Early Glaucoma)	P (Cataract vs Early Glaucoma)	Moderate Glaucoma	P (Early vs Moderate Glaucoma)	Advanced Glaucoma	P (Moderate vs Advanced Glaucoma)	Severe Glaucoma	P (Advanced vs Severe Glaucoma)
	Mean ± SD	Mean ± SD		Mean ± SD			Mean ± SD		Mean ± SD		Mean ± SD	
PhNR	-4.95±1.69	-4.57±1.74	0.157	-3.00±0.60	0.000	0.000	-2.55±0.52	0.001	-2.25±0.42	0.013	-2.15±0.44	0.263
PhNR 72 ms	-4.28±1.39	-3.91±1.56	0.106	-2.55±0.59	0.000	0.000	-1.93±0.58	0.000	-1.70±0.48	0.012	-1.46±0.48	0.025

Conclusions
The PhNR and PhNR 72ms using a handheld ERG system by RETeval were found to be beneficial in distinguishing patients with glaucoma compared to normal and cataract patients. The PhNR amplitude is a useful method to help analyzing disorders that affect the inner layer of the retina ganglion cells affected by glaucomatous damage (2). This data may complement the gap in structure-function agreement dilemmas in glaucoma examination.

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P-489

COMPARISON IN GLAUCOMATOUS VISUAL FIELD LOSS PROGRESSION ON 30-2 AND 10-2 VISUAL FIELDS

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Purpose
To compare glaucomatous visual field defect (VFD) progression measured by the Humphrey Central Programs 30-2 and 10-2.

Methods
We investigated glaucoma patients who were fulfilled the following criteria: (1) normal tension glaucoma, (2) a follow-up period ≥ 10 years, (3) reliable VF results of 30-2 and 10-2 ≥ 10 times, and (4) eyes in which at least 1 of the central 4 points showed pattern deviation with P < 5% in the 30-2 results. Mean deviation (MD) slope was calculated on 30-2 and 10-2. According to initial MD (30-2), they were assigned into the 4 groups (mild group: > 6 dB, moderate group: -6 dB to -12 dB, advanced group: -12 dB to -20 dB, severe group: < -20 dB).

Results
143 eyes satisfied the inclusion criteria. Mean age was 53.8 years, men included 67. MD slope was -0.32 dB/year on 30-2 and -0.40 dB/year on 10-2 (Wilcoxon signed-rank test; P < 0.001). The MD slopes on 30-2 and 10-2 in the mild group were -0.34 dB/year and -0.41 dB/year, respectively (P = 0.178). Similarly, they were -0.30 dB/year and -0.39 dB/year (P = 0.045) in the moderate group, -0.40 dB/year and -0.43 dB/year (P = 0.250) in the advanced group, and -0.13 and -0.31 dB/year in the severe group (P = 0.008).

Conclusions
In normal tension glaucoma patients with central VFD, the rate of VFD progression was faster on 10-2 than 30-2. This tendency was remarkably observed in the severe group.

P-490

COMPARISON OF OPTICAL COHERENCE TOMOGRAPHY STRUCTURAL PARAMETERS FOR DIAGNOSIS OF GLAUCOMA IN HIGH MYOPIA

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Purpose
To compare the diagnostic accuracy of single Optical Coherence Tomography parameters, the University of North Carolina OCT (UNC OCT) Index, and the temporal raphe sign for discrimination of glaucoma in highly myopic patients.

Methods
One hundred and thirty-two (132) highly myopic glaucoma patients (132 eyes) and 142 highly myopic non-glaucomatous individuals (142 eyes) were included. Macular ganglion cell-inner plexiform layer (GCIPL) thickness, peripapillary retinal nerve fiber layer (RNFL) thickness, and optic nerve head (ONH) parameters were measured in each subject. The UNC OCT scores and the temporal raphe sign were checked to compare the diagnostic utilities. Decision tree analysis with single OCT parameters, the UNC OCT Index, and the temporal raphe sign also was applied. Main outcome measures were area under the curve (AUC) of the receiver operating characteristic and sensitivity at 95% specificity.

Results
The AUC of the UNC OCT Index was 0.891 (95% Confidence Interval [CI]: 0.848-0.925). The AUC of temporal raphe sign positivity was 0.922 (95% CI: 0.883-0.950). The best single OCT parameter was inferotemporal GCIPL thickness (0.951, CI: 0.918-0.973), and its performance was significantly better than that of the UNC OCT Index (p = 0.0071). None of the optic nerve head (ONH) parameters was better than the UNC OCT Index, and the AUC values of cup-to-disc area ratio (CDR) and vertical CDR (VCDR) were statistically inferior to that of the UNC OCT Index (p = 0.0002, 0.0304, respectively). The decision tree analysis designated 3 significant nodes – temporal raphe sign, inferior RNFL thickness, and superotemporal GCIPL thickness – with a balanced accuracy of 0.9753.

Conclusions
In discriminating glaucomatous eyes in cases of high myopia, inferotemporal GCIPL thickness yielded the highest AUC value. The diagnostic performance of the UNC OCT Index was not as strong as in patients without high myopia from previous studies. Combining the temporal raphe sign with single OCT parameters may further enhance diagnostic performance. The RNFL thickness and GCIPL thickness parameters may play a greater role in glaucoma than the ONH parameters in high myopia.

P-491

PAPILLOMACULAR BUNDLE DEFECT (PMBD) IN GLAUCOMA PATIENTS WITH HIGH MYOPIA: FREQUENCY AND RISK FACTORS

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Purpose
To investigate the frequency of papillomacular bundle defect (PMBD) in glaucoma patients with high myopia, and its risk factors.

Methods
This is cross-sectional study. Retinal nerve fiber layer (RNFL) defect was analyzed in glaucoma patients with high myopia having an axial length of 26.0 mm or more or an average spherical value of –6.0 diopters or less. After dividing them into two groups with and without PMBD, respectively, the clinical characteristics of the groups were compared and analyzed.

Results
A total of 92 eyes in 92 glaucoma patients with high myopia were included in the study. The mean age of the patients was 52.1 ± 10.5 years, and there were 53 males and 39 females. PMBD were observed in 55 eyes (59.8%). There was no significant intergroup difference in baseline or follow-up IOP. Both lamina cribrosa defect (LCD; OR 2.60, CI :1.08 – 6.60, p = 0.036) and central visual field defect (CVFD; OR 3.07, CI : 1.29 – 7.56, p = 0.012) were significantly associated with the PMBD group.

Conclusions
PMBD was observed in 59.8% of highly myopic glaucoma patients, and was related to the presence of LCD and CVFD.

P-492

COMPARISON OF CORNEAL BIOMECHANICAL PARAMETERS DETECTED USING CORVIS-ST IN NORMAL TENSION GLAUCOMA AND HIGH TENSION GLAUCOMA

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Purpose
To assess and compare the corneal biomechanical differences between normal-tension glaucoma (NTG) and high-tension glaucoma (HTG) and determine the factors associated with these parameters.

Methods
In this prospective, cross-sectional study, 95 eyes with NTG and 84 eyes HTG were enrolled. Corneal biomechanical parameters were obtained using a Corvis Scheimpflug technology (ST) device and compared between eyes with NTG and HTG. We used univariate and multivariate regression analyses to analyse the correlations between corneal biomechanical parameters and known risk factors for glaucoma and glaucoma severity.

Results
Baseline characteristics, including gender, intraocular pressure (IOP), spherical equivalent, axial length (AL), central corneal thickness (CCT) and severity of glaucoma, as measured by mean deviation, (MD) was similar among the NTG and HTG groups. First applanation velocity was significantly smaller (p= 0.02) and radius of curvature at highest concavity was significantly larger (p= 0.02) in HTG (0.15 ± 0.01m/s and 6.78 ± 0.87mm respectively), compared to the NTG group (0.16 ± 0.01 m/s and 6.45 ± 0.96 mm, respectively). NTG eyes had significantly lower values (p= 0.04) of stiffness parameter at first applanation (SP-A1) and higher values of the deformation amplitude ratio of 2mm (DA ratio 2 mm) and integrated radius (IR), (p=0.02) compared to eyes with HTG, indicating a more deformable cornea. Multivariate regression analyses showed a significant positive correlation between MD and SP-A1 only in the NTG group (r=0.67, p=0.003), after adjusting for age, gender, CCT, axial length, IOP and use of prostaglandin analogues, indicating that NTG eyes with softer, deformable corneas were more likely to show visual field defects. Deformation amplitude (DA-HC) was negatively correlated with IOP in both NTG and HTG groups, but with CCT only in NTG. Additionally, SP-A1 was positively correlated with CCT and IOP in both NTG and HTG, suggesting that corneal deformability increased as the CCT thinned and IOP decreased. Interestingly, the time of whole eye movement (WEM) was strongly associated in women having NTG (p=0.01).

Conclusions
Eyes with NTG have more deformable corneas than eyes with HTG. NTG eyes with softer or more compliant corneas are more likely to show visual field defects. These results suggest the relevance of measuring biomechanical properties of NTG eyes.

P-493

MEASUREMENT PRECISION OF AN OPTICAL COHERENCE TOMOGRAPHY DEVICE IN NORMAL AND GLAUCOMATOUS EYES

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Purpose

To evaluate the repeatability and reproducibility of a 3D optical coherence tomography (OCT) device.

Methods

Three 3D OCT-1 Maestro were employed to image eligible participants with normal and glaucomatous eyes, *i.e.* normal group and glaucoma group. Study eye and operator/device testing order were randomly assigned to the subjects. Scan modes included 3D Wide (12x9mm^2), 3D Macula (6x6mm^2), and 3D Disc (6x6mm^2). At least 3 scans were performed for each scan mode and each device. Thickness of the circumpapillary retinal nerve fiber layer (cpRNFL), ganglion cell layer (GCL) with inner plexiform layer (IPL) and RNFL (GCL++), and GCL+IPL (GCL+) were assessed. All images were sent to the Topcon Reading Center for evaluation of image acceptability first. A two-way random-effect analysis of variance (ANOVA) model was used to estimate the repeatability and reproducibility limits, and coefficient of variation in percentage (CV%) for each scan parameter by subject group. The operator/device, eye, and interaction between the operator/device and eye were included as variance components in the ANOVA model.

Results

25 normal eyes and 25 eyes with glaucoma were tested. For eyes in the Glaucoma group, the mean standard automated perimetry (SAP) Swedish Interactive Threshold Algorithm (SITA) 24-2 mean deviation (MD) was -5.30±6.77 dB and the mean pattern standard deviation (PSD) was 4.70±2.87dB. The precision analysis was conducted utilizing all acceptable scans. Overall, the repeatability limit and reproducibility limit were relatively low (<10µm for most parameters). The variability between study eyes accounted for most of the variability for all the scan parameters. The operator/device variability and interaction between operator/device and eye were very small compared to inter-eye variability. Most of the CV%s were near 1%, while the CV%s of GCL+ and cpRNFL thickness were higher, especially for eyes with glaucoma (**Table**). The repeatability and reproducibility of the measurements of 6x6mm^2 Macular and Disc scans were slightly better than the corresponding measurements of 12x9mm^2 Wide scan.

Image

Table. Repeatability of Thickness Measurements of 3D OCT-1 Maestro

	GCL+ Thickness 6x6mm² Macula			GCL++ Thickness 6x6mm² Macula			RNFL Thickness 6x6mm² Disc		
	SD	Limit	CV%	SD	Limit	CV%	SD	Limit	CV%
Normal group (N=25 eyes)									
Average	0.3	0.7	0.3	0.4	1.2	0.4	0.8	2.2	0.8
Superior	0.5	1.5	0.7	0.6	1.8	0.6	2.5	7.1	1.9
Superior Nasal	0.5	1.3	0.6	0.6	1.7	0.5	*Nasal**		
Superior Temporal	0.6	1.6	0.8	0.6	1.8	0.7	*1.5*	*4.1*	*1.7*
Inferior	0.5	1.4	0.7	0.7	1.9	0.6	2.1	5.8	1.5
Inferior Nasal	0.4	1.2	0.6	0.6	1.7	0.5	*Temporal**		
Inferior Temporal	0.5	1.4	0.7	0.7	1.9	0.7	*1.1*	*3.0*	*1.5*
Glaucoma group (N=25 eyes)									
Average	0.4	1.0	0.6	0.4	1.1	0.5	1.2	3.4	1.6
Superior	0.6	1.7	1.1	0.7	1.9	0.8	2.4	6.8	2.8
Superior Nasal	0.4	1.2	0.7	0.8	2.3	0.9	*Nasal**		
Superior Temporal	0.7	2.1	1.2	0.6	1.6	0.7	*2.5*	*6.9*	*4.1*
Inferior	0.8	2.3	1.5	0.7	2.0	0.8	2.7	7.6	3.0
Inferior Nasal	0.7	2.0	1.2	0.8	2.1	0.8	*Temporal**		
Inferior Temporal	0.7	2.0	1.2	0.5	1.4	0.7	*1.4*	*3.9*	*2.4*

**The values in the shaded cells correspond to the sector above.*

Repeatability SD = Square root of the residual variance
Reproducibility SD = Square root of the sum of the operator/device variance, the interaction variance and the residual variance
Repeatability limit = 2.8 x Repeatability SD
Reproducibility limit = 2.8 x Reproducibility SD
Repeatability CV% = (Repeatability SD)/Intercept x 100%
Reproducibility CV% = (Reproducibility SD)/Intercept x 100%

Conclusions

The repeatability and reproducibility of the measurements showed that the Topcon 3D OCT-1 Maestro metrics, including cpRNFL, GCL+ and GCL++, generally utilized in the management of glaucoma, had a high precision.

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P-494

CORRELATION BETWEEN ENLARGEMENT OF RETINAL NERVE FIBER DEFECT ANGLE IN EN-FACE IMAGING AND VISUAL FIELD PROGRESSION

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Purpose

Retinal nerve fiber layer defect (RNFLD) is a common feature of glaucoma and becomes enlarged with visual field (VF) deterioration. We measured RNFLD angle and investigated whether it was correlated with deterioration of the VF in glaucoma patients.

Methods

This study included 84 eyes of 84 open-angle glaucoma patients (mean deviation [MD]: -6.51 ± 5.91 dB, follow-up period: 2.82 ± 0.74 years) with clear RNFLDs, who underwent en-face swept-source optical coherence tomography (SS-OCT) wide scans (12 × 9 mm) at least 6 times. RNFLD angle was measured as the intersection between the RNFLD and a circle centered on the disc with a radius half the distance between the disc and the fovea. Slopes for RNFLD angle, macular ganglion cell layer thickness (GCCT), and circumpapillary RNFL thickness (cpRNFLT) were compared with the MD slope. Visual field progression was determined with the glaucoma progression analysis (GPA).

Results

The correlation coefficients with MD slope were -0.67 for RNFLD angle slope ($P<0.001$), 0.15 for macular GCCT slope ($P=0.163$) and 0.04 for cpRNFLT slope ($P=0.719$). According to the GPA, RNFLD angle slope had a good ability to predict visual field progression (area under the receiver operating characteristic curve: 0.83).

Conclusions

We found that RNFLD angle slope was more closely associated with MD slope than other OCT parameters. This suggests that measurement of RNFLD angle with en-face OCT images could be useful in evaluating VF progression.

P-495

EVALUATION OF VISUAL CORTEX ACTIVITY USING FUNCTIONAL NEAR INFRARED SPECTROSCOPY [FNIRS] IN PRIMARY GLAUCOMA

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Purpose
To evaluate visual cortex activity using functional near infrared spectroscopy (fNIRS) in primary glaucoma and its association with severity of disease and RNFL thickness.

Methods
A total of 30 primary open angle glaucoma (POAG), 31 primary angle closure glaucoma (PACG) cases, and 30 healthy individuals were recruited in this cross-sectional observational study. A standard visual stimulus 'reversing flickering checkerboard' of frequency 1 Hz was utilized. The fNIRS data of 22 channels overlying the visual cortex were acquired through signals in 8x7 source-detector optode pairs using a computerized system software NIRStar 15-2. Statistical analysis was done using Statistical Package for the Social Sciences (SPSS) software version 21.0 (IBM, SPSS Inc., Chicago, USA) and nirsLAB v2019.4 (NIRx Medical Technologies, LLC). The visual cortex activity in fNIRS was evaluated in terms of the maximum amplitude of change in OxyHb over 10 seconds time period. Mean deviation and RNFL thickness in glaucoma patients were correlated with the visual cortex activity using Pearson correlation test.

Results
The mean age was 53.87 ± 5.66 years, 53.1 ± 8.6 years, and 53.2 ± 7.74 years for patients of POAG, PACG, and control respectively (p=0.909). Participants in all the groups showed the characteristic response of increased OxyHb and decreased DeoxyHb during stimulus presentation. The maximum amplitude of change in OxyHb over 10 seconds was significantly lower in the glaucoma group (PACG and POAG) compared to the control in the right and left middle occipital gyri at 1 Hz flicker stimuli (p-value < 0.05%). While there was no significant difference between PACG and POAG. Importantly, there was a negative association of the brain oxygenation level with the visual field defects (p-value < 0.002%) and a positive association with RNFL thickness in glaucoma patients (p-value < 0.05%).

Conclusions
In glaucomatous patients, neuronal degeneration in the occipital cortical region results in decreased brain oxygenation. Visual field defect and RNFL thickness in primary glaucoma are closely associated with the brain oxygenation level.

P-496

EVALUATING THE EFFECTIVENESS OF A MODIFIED RISK CALCULATOR BASED ON THE OCULAR HYPERTENSION TREATMENT STUDY

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Purpose

The Ocular Hypertension Treatment Study (OHTS) risk calculator was developed to estimate the 5-year risk that a patient with ocular hypertension will develop primary open angle glaucoma (POAG). The prediction model for POAG does not require the use of spectral domain optical coherence tomography (SD-OCT) data. The purpose of this study was to test the diagnostic efficacy of a glaucoma risk calculator modified to include SD-OCT data in place of vertical cup to disc ratio (vCDR).

Methods

The Point System method of the OHTS calculator was modified to include average circumpapillary retinal nerve fiber layer (cpRNFL) thickness measured by Topcon Maestro2 SD-OCT. The following points were assigned for cpRNFL: cpRNFL > 90 µm (0 point); 85 µm < cpRNFL ≤ 90 µm (1 point); 83 µm < cpRNFL ≤ 85 µm (2 points); 83 µm ≤ cpRNFL > 80 µm (3 points); and cpRNFL <= 80 µm (4 points). Age, intraocular pressure, central corneal thickness, and pattern standard deviation using Humphrey full threshold or SITA standard 30-2 or 24-2 were used same as in the OHTS calculator. In this study, we tested the ability to distinguish between glaucoma suspects and POAG patients during scheduled eye examinations at the Illinois College of Optometry.

Results

A total of 236 patients (128 suspect or normal, 108 glaucoma) were included in the study. 70% of patients were African American. The area under the curve (AUC) for the modified OHTS calculator was 0.85 compared to 0.81 for cpRNFL alone and 0.84 for cpRNFL from both eyes and when including the age of the patient.

Conclusions

The modified OHTS risk calculator including the average cpRNFL measured by Maestro2 improves performance over parameters from SD-OCT alone. The modified risk calculator is a sufficient diagnostic tool to distinguish between glaucoma suspects and glaucoma patients regardless of the diagnosis of Ocular Hypertension.

P-497

CHARACTERISTICS OF 10-2 VISUAL FIELD SENSITIVITY THAT DECREASES VISUAL ACUITY

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Purpose
To analyze the characteristics of 10-2 visual field sensitivity that decreases visual acuity in glaucoma patients.

Methods
Three hundred and twenty-eight intraocular lens eyes of 328 open-angle glaucoma patients who underwent the Humphrey 10-2 Swedish Interactive Threshold Algorithm Standard were analyzed in the current retrospective study. Firstly, the correlation coefficient of best corrected visual acuity and following each visual field parameter; the fovea threshold, mean total deviation (TD) value of the nearest four points from a fixation point (mTD_4), mean deviation (MD) value, and pointwise TD (TDpw) were calculated using Spearman's rank-correlation coefficient. Next, the cut-off value of each visual field parameter where visual acuity was worse than LogMAR 0 was calculated using the receiver operating characteristic curve.

Results
Visual acuity was moderately but significantly correlated with the fovea threshold (r = -0.65); mTD4 (r = -0.54); TDpw value corresponding to the papillary macular bundle area (r=-0.57 to -0.34); and MD (r=-0.41). The correlation coefficient of MD was slightly lower than that of other parameters. The cut-off value of each visual field parameter that visual acuity was worse than LogMAR 0 was 33dB in the fovea threshold (Area Under the Curve [AUC]=0.84); -7.4dB in mTD_4 (AUC=0.78); -5dB to -3dB in TDpw corresponding to the papillary macular bundle area (AUC= 0.73 to 0.79); and -21.0dB in MD (AUC=0.71).

Conclusions
Even a slight decrease in sensitivity in the papillary macular bundle area can cause early decreasing visual acuity. Therefore, attention should be paid to slightly reduced visual field sensitivity that corresponds to the papillary macular bundle area rather than MD.

P-498

THE EFFECT OF BIMATOPROST SUSTAINED-RELEASE ON DIURNAL INTRAOCULAR PRESSURE CURVE: INITIAL CASE SERIES

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Purpose

To investigate the diurnal intraocular pressure-related (IOP) effects of Bimatoprost sustain-release (SR) implant using iCare Home tonometry.

Methods

Six patients diagnosed with ocular hypertension (n=3) or primary open angle glaucoma (n=3), who were recruited into the TRITON Phase IIIb trial and underwent diurnal IOP assessments, were enrolled into this study. Both eyes of participants underwent a washout period prior to Bimatoprost sustained-release (SR) implant. The fellow eye was prescribed a topical prostaglandin analogue following the implant of the study eye. iCare Home tonometry was performed 2-hourly for 24 hours pre-implantation (baseline), 24 hours post-implantation (Day 1) of Bimatoprost SR, and 24 hours at 4 weeks post-implantation. Measurements were made for both eyes to assess mean IOP, and minimum and maximum peak IOPs.

Results

Six eyes (4 right and 2 left eyes) of 6 patients (mean age = 62 years) were treated as part of this study. Mean (±SD) IOP at baseline was 25.03±3.97mmHg. Following implantation, mean (±SD) IOP was reduced to 18.98±1.28mmHg at Day 1 ($p<0.05$) and to 20.55±0.77mmHg at week 4 ($p=0.072$). At baseline, mean maximum (±SD) IOP peak was 30.00±5.20mmHg. After implantation, mean maximum (±SD) IOP peak was significantly reduced to 21.00±2.65mmHg at Day 1 and to 22.33±1.49mmHg at week 4 ($p<0.05$ for both). Mean minimum (±SD) IOP peak was 19.67±4.99mmHg at baseline. Following implantation, mean minimum (±SD) IOP peak was reduced, yet not significantly, to 17.17±1.21mmHg at Day 1 and to 17.83±2.48mmHg at week 4 ($p>0.05$ for both). The mean IOP, at baseline and week 4 post-implantation, as well as the mean maximum peak IOP at baseline, were comparable between the study and fellow eyes ($p>0.05$ for all). At week 4 post-implantation, the mean maximum peak IOP was significantly less in the study eye compared with the fellow eye (IOP of 22.33±1.49mmHg and 27.80±4.66mmHg for the study and fellow eyes, respectively; $p=0.03$).

Conclusions

Bimatoprost SR implant appears to reduce IOP by reducing the maximum peak of the diurnal curve. Future studies with larger samples are warranted to confirm this finding.

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P-499

ASSESSMENT OF PERFUSED PERIPAPILLARY CAPILLARIES AND RADIAL PERIPAPILLARY CAPILLARY NETWORK IN PRIMARY OPEN ANGLE GLAUCOMA PATIENTS

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Purpose

To correlate density of radial peripapillary capillary network (RPC) and retinal nerve fiber layer (RNFL) thickness in eight peripapillary segments in patients with a primary open angle glaucoma (POAG) which have the disease under 10 years of duration, over 10 years of duration and in a group of healthy patients.

Methods

This is a cross-sectional review which included three groups of patients: POAG patients under 10 years of disease duration, over 10 years of disease duration and control group of patients. The study is performed on the commercial optical coherence tomography angiography system (AngioVue, Avanti RTVue-XR, Optovue, CA). Sectoral RPC density values, RPC maps and RNFL thickness were analysed in three groups of patients, data was compared and correlation between parameters was examined.

Results

Mean RPC Density values in both superior segments (S1, S2) were significantly lower in patients with glaucoma over 10 years of disease duration compared to patients with glaucoma under 10 years of disease duration ($p<0.05$). Statistically significant positive correlation was established between RNFL thickness and RPC density in all eight peripapillary segments.

Conclusions

Analysis of radial peripapillary capillary network density on optical coherence tomography angiography may provide an earliest functional sign of progressive optic nerve disease and new insights into the pathophysiology of glaucomatous damage.

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P-500

DIAGNOSING EARLY GLAUCOMATOUS DAMAGE IN A HOMONYMOUS HEMIANOPIC PATIENT WITH SPECTRALIS SD-OCT

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Purpose

In clinical practice, the differentiation of glaucomatous from non-glaucomatous neurological damage can be difficult for even experienced observers.[1,2] To add on, diagnosing coexisting glaucomatous cupping and non-glaucomatous neurological damage together is extremely difficult. In this case presentation; we have highlighted how to diagnose early glaucomatous structural damage in a disc, which has pre-existing non-glaucomatous neurological damage, with the novel bruch's membrane opening - minimum rim width (BMO-MRW) tool.[3-5]

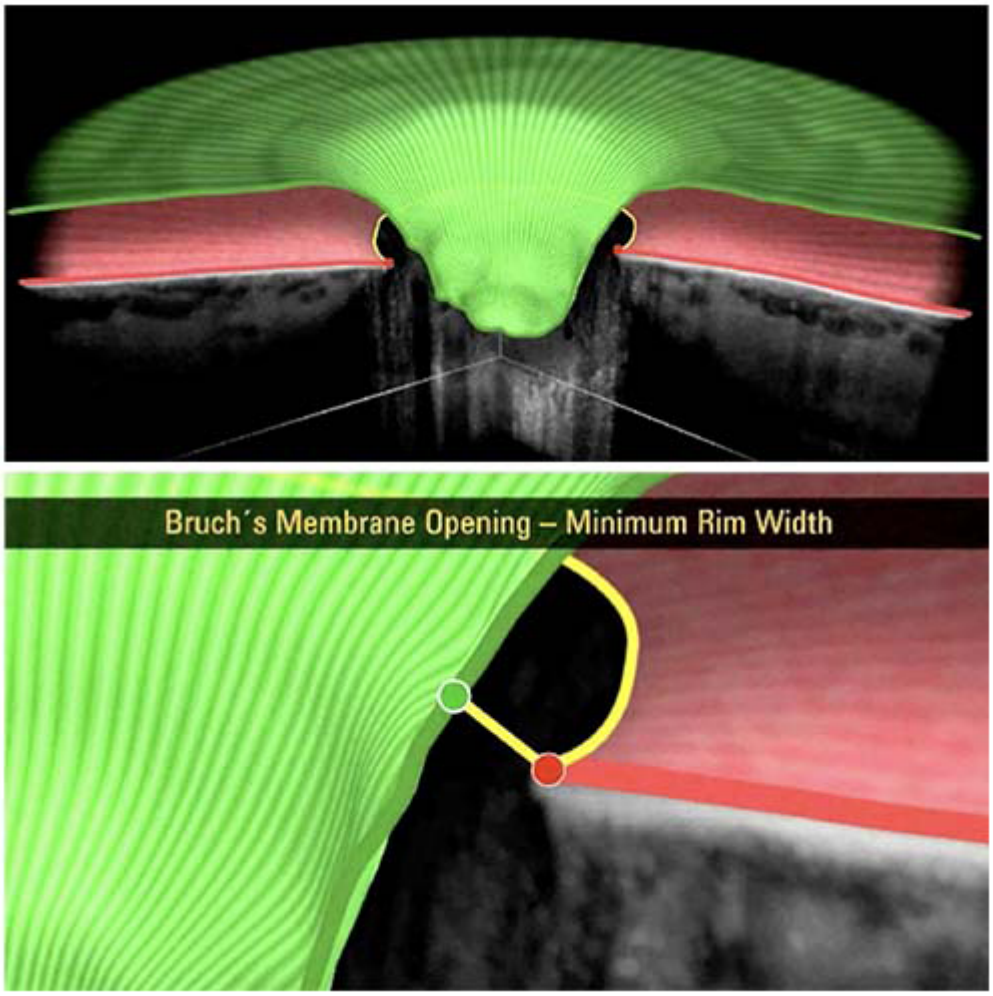
Methods

A 73-year-old male with right homonymous hemianopia with macula sparing for 30 years, due to left occipital lobe infarct presented with mild diminution of vision in the seeing field for past 1 year, during his annual follow-up. On examination, the anterior segment was normal with fundus revealing temporal pallor and cup/disc ratio of 0.8 in both eyes. The IOP was 21 mm Hg in both eyes (BE). Spectralis optical coherence tomography (OCT) interrogated the progression in the temporal superior and inferior nerve head sectors and confirmed a decrease in BMO-MRW and retinal nerve fibre layer (RNFL) thickness. The visual fields show the inception of superior arcuate scotoma with functional damage extending into the seeing field, which was previously normal.

Results

OCT damage also correlated with the paracentral scotoma detected in the visual field, which was previously unaffected by the neurological condition in the Hood report. Ganglion cell layer progression analysis also confirmed glaucomatous damage. The other rational for the diagnosis of normal tension glaucoma in this case were mild diminution of vision in the seeing field for past 1 year, occipital lobe infarcts does not cause non glaucomatous cupping, diurnal variation of IOP, breaching of ISNT rule, documentation of structural glaucomatous progression with the decrease in BMO-MRW & inception of superior arcuate scotoma.

Image



Conclusions

Spectralis OCT has the potential to complement clinical decision-making in coexisting glaucomatous and non-glaucomatous optic nerve damage. Specially in scenarios where visual field testing and clinical examination are not definitive; associated with progressive cupping despite adequate intraocular pressure control, it is very useful. To our knowledge, this is the first case to apply BMO-MRW anatomic positioning system technology, as a means to diagnose early glaucomatous optic nerve changes in a non-glaucomatous neurologically damaged disc.

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P-503

CHANGES IN OPTIC NERVE HEAD MEASUREMENTS USING OPTICAL COHERENCE TOMOGRAPHY(OCT) FOLLOWING COMBINED TRABECULOTOMY WITH TRABECULECTOMY IN JOAG

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Purpose
To evaluate the structural changes in optic nerve head parameters using OCT following Mitomycin-C augmented combined trabeculotomy with trabeculectomy in juvenile open angle glaucoma (JOAG) patients

Methods
Prospective, observational, monocentric study. 33 eyes of 27 patients with JOAG, who underwent Mitomycin C augmented combined trabeculotomy with trabeculectomy, were included in this study.The structural changes in Retinal nerve fiber layer, macula and optic nerve head parameters following CTT were analysed using Cirrus HD-OCT(Carl Zeiss Meditec Inc., Dublin,CA.)

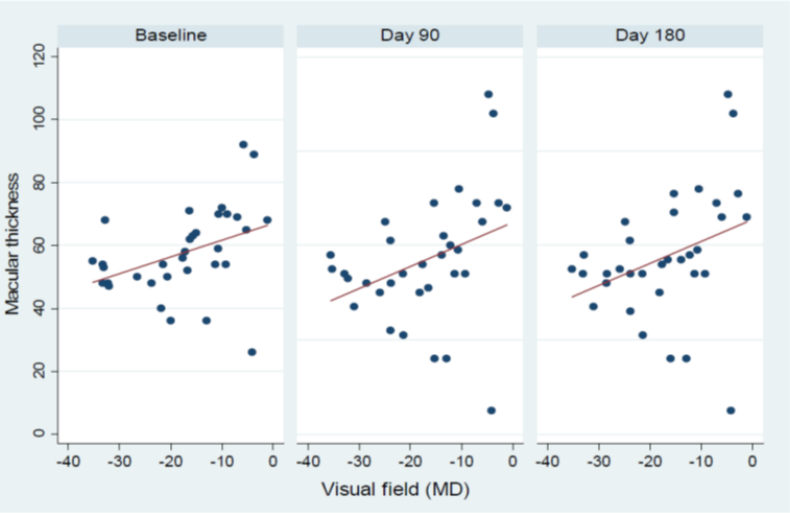
Additionally,Intraocular pressure changes(IOP) and functional changes in the visual field(-Carl Zeiss Meditech,Humphrey Field Analyze using SITA 24-2 strategy)were also evaluated.

The relationship between RNFL thickness, macular thickness, and mean deviation values were evaluated using Pearson correlation coefficient. For all analyses, statistical significance was defined as a p-value less than 0.05.

Results
Intraocular pressure showed a statistically significant decrease from 30.82+/10.71 mmHg preoperatively to 10.33 ± 4.42 mmHg postoperatively(p value<0.00001). There was a statistically significant reduction in the need for antiglaucoma medications from preoperative requirements of 2.07+/-0.84 to 0.89 ± 1.18 during the sixth postoperative month(p-value < 0.00001). Vertical Cup Disc ratio showed a statistically significant decrease from a preoperative value of 0.84(±0.09) to 0.79(±0.10)during the postoperative sixth month (p=0.001). The rim area showed a statistically significant increase from a preoperative value of 0.56(±0.27) µ to 0.71(±0.3) 40 µ during the postoperative sixth month follow up (p=0.00). No statistically significant change was noted in RNFL, macular thickness and visual field Mean Deviation(MD)postoperatively at 6 months.(p =0.898, p=0.955,p=0.054 respectively). Low to moderate positive correlation was found between postoperative measurements of average RNFL thickness and mean deviation(r=0.40) & macular thickness and mean deviation(r=0.34).

Image

Figure2: Correlation between Macular thickness and visual field (MD)



Conclusions

OCT demonstrated remarkable improvements in Optic nerve head parameters after Combined Trabeculotomy with trabeculectomy in Juvenile Open Glaucoma Patients.

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P-504

THE USE OF A NEW WIRELESS TYPE IV POLYSOMNOGRAPHY TO EVALUATE THE ASSOCIATION BETWEEN OBSTRUCTIVE SLEEP APNEA SYNDROME AND GLAUCOMA

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Purpose
Obstructive sleep apnea syndrome (OSAS) is associated with glaucoma. Polysomnography (PSG) is considered to be the gold standard for the diagnosis of OSA. However, PSG has limitations, because it is expensive, presents an inconvenience to patients, and may not be readily available in certain locations. This study aims to evaluate the association between apnea/hypopnea index with objective functional parameters, structural and vascular optic nerve parameters, and also with OSA risk questionnaires in patients with glaucoma by using a new wireless type IV PSG called Biologix.

Methods
This is a prospective, cross-sectional study, in which 11 glaucoma patients were enrolled until now. It included only primary open-angle glaucoma and normal tension glaucoma cases. All patients performed a complete ophthalmological exam. It was used a spectral domain optical coherence tomography (SD-OCT) and spectral domain optical coherence tomography angiography (SD-OCTA) for the measure of retinal nerve fiber layer (RNFL), ganglion cell layer (GCL), and optic nerve head (ONH) morphological and vascular parameters. All patients performed Biologix, which is a wireless type IV PSG that measures O2 saturation, heart rate, actigraphy and records the snoring. All patients also had the Berlin OSAS risk questionnaire and NEI-VFQ 25 life quality questionnaire filled.

Results
The mean age was 59.45 ± 7.96 years , and 54.55% was female. The mean body mass index (BMI) was 26.07 ± 3,44, the average mean deviation (MD) of the right eyes was -9.54 ± 5.50 dB, and the average mean deviation of the left eyes was -10,45 ± 10.37 dB, and. There was a significant association between right eye's MD and NEI-VFQ 25 questionnaire (p = 0.002), and between left eye's MD with NEI-VFQ 25 questionnaire (p = 0.023). It was also found a significant association between the left eye's average RNFL and NEI-VFQ 25 questionnaire (p = 0.045). In relation the optic nerve vascular parameters, it was found a significant association between right eye's and left eye's superior vascular density and NEI-VFQ 25 questionnaire (p = 0.034 and p = 0.38 respectively).

Conclusions
Our study found an association between average RNFL and vascular density and quality of life. Despite these results, it is necessary a greater number of patients to better evaluate the association between OSAS and structural, functional, and vascular optic disc nerve parameters.

P-505

COMPARISON OF SECTORAL STRUCTURE-FUNCTION RELATIONSHIPS IN MYOPIC GLAUCOMA: PERIPAPILLARY VESSEL DENSITY VERSUS PERIPAPILLARY RNFL THICKNESS

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Purpose

To compare the sectoral structure-function relationships in patients with myopic glaucoma between two structural parameters, peripapillary vessel density (VD) and peripapillary retinal nerve fiber layer (RNFL) thickness.

Methods

We performed a retrospective chart review of myopic subjects with primary open-angle glaucoma (POAG). The subjects younger than 60 years of age and having a best-corrected visual acuity of at least 20/40 were included. The optic nerve and peripapillary area were imaged using a commercially available swept-source OCTA device (DRI-OCT Triton; Topcon). All of the OCT B-scan images had to have an image quality score ≥ 40. Humphrey visual field (VF) tests were performed using a SITA fast 24-2 program. Patients unable to perform reliable VF testing or with poor quality OCTA, including segmentation errors, were excluded. Sectoral structure-function relationships based on the Garway-Heath map were compared between peripapillary VD and peripapillary RNFL thickness. The Pearson correlation coefficients were calculated to evaluate the relationship between peripapillary VD and VF parameters and between peripapillary RNFL thickness and VF parameters. A P value of less than 0.05 was considered statistically significant.

Results

We included 53 eyes of 53 myopic subjects with POAG (Mean age: 48.0 ± 6.4 years). The mean spherical equivalent was -6.70 ± 3.22 D. The mean VF mean deviation (MD) was -5.13 ± 4.23 dB and the mean VFI was 88 ± 11%. Both average RNFL thickness ($P < 0.001$) and rim area ($P = 0.025$) were correlated with VF MD. The sectoral RNFL thickness was significantly correlated with corresponding VF pattern deviation scores in superior, nasal, and inferior quadrants ($P = 0.002$, 0.039, and 0.002 respectively). However, peripapillary VD was not correlated with VF MD ($P = 0.108$) and only the superior peripapillary VD was significantly correlated with corresponding VF pattern deviation scores ($P = 0.021$).

Conclusions

In myopic patients with POAG, the peripapillary VD and RNFL thickness had different characteristic sectoral structure-function relationships. These findings theorize that the changes in peripapillary RNFL thickness may be better facilitated for the observation and monitoring of glaucoma progression in myopic eyes with POAG. Longitudinal studies are needed to determine the usefulness of VD in OCTA in the early detection of disease and progression in myopic patients with POAG.

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P-506
CHOROIDAL THICKNESS IN JUVENILE OPEN ANGLE GLAUCOMA

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Purpose
Juvenile open angle glaucoma (JOAG) is an uncommon subtype of primary open angle glaucoma diagnosed between the age of 3-40 years. It is believed to occur as a result of immaturity of outflow pathways. Choroidal thickness (ChT) and blood flow may play a role in glaucoma pathogenesis. In angle closure subjects, the choroid is thicker and in primary open angle glaucomas, it is not significantly thinner or thicker when compared with healthy controls. Choroidal thickness has not been studied in JOAG. It is questionable where it is a reliable additional diagnostic biomarker in glaucoma pathogenesis.

The purpose of this study is to compare choroidal thickness in JOAG and healthy controls using spectral domain optical coherence tomography (SD-OCT) and study its correlations

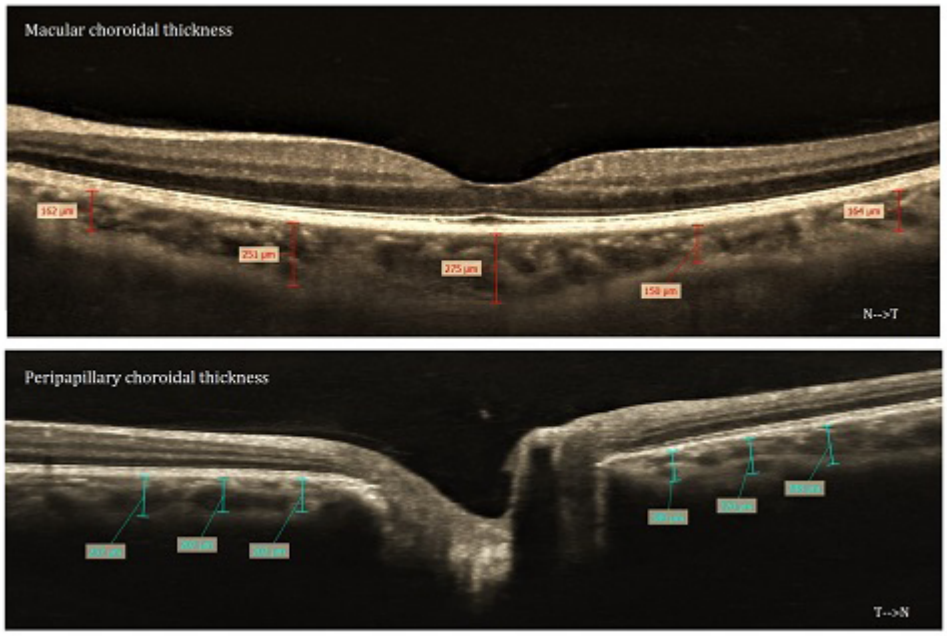
Methods

This case-control study recruited 56 eyes of 28 patients with JOAG and healthy age, gender, CCT & axial length matched controls ($p > 0.05$). A thorough eye examination was done with visual acuity, Goldmann tonometry, gonioscopy, pachymetry, fundus assessment, axial length, Humphrey perimetry 24-2, and OCT of the optic nerve head and ganglion cell complex assessment. SD-OCT was used to measure the macular choroidal thickness at 5 locations; subfoveal, 1500 µm and 3000 µm nasal and temporal to the foveal center, and the peripapillary choroidal thickness at 6 locations; 500 µm, 1000 µm, and 1500 µm, nasal and temporal to the disc, respectively.

Results

The average macular ChT in JOAG was 306.30 ± 56.49 µm vs 277.12 ± 64.68 µm in controls. The average peripapillary ChT in JOAG was 197.79 ± 44.05 µm vs 187.24 ± 38.89 µm in controls. The average total ChT ($p=0.042$), the average macular ChT ($p = 0.022$), the subfoveal ChT ($p = 0.022$), ChT 1500 µm ($p < 0.001$), and 3000 µm temporal to the fovea ($p = 0.002$), were significantly thicker in the JOAG group. However, the peripapillary ChT was not significantly thicker at any location or at an average. The ChT values were higher in JOAG at all locations when compared to controls. In the JOAG group, the average macular ChT had a significant negative correlation with age and mean deviation, and axial length was positively correlated with the average peripapillary ChT.

Image



Conclusions

In this South Asian cohort of JOAG, significant differences were observed in the average total ChT, average macular ChT, subfoveal ChT, and at 1500 µm, and 3000 µm temporal to the fovea when compared to healthy controls, with the choroid being thicker at an average in the macula and peripapillary regions.

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P-507

THE RELATIONSHIP BETWEEN THE RESULTS OF TRANSCRANIAL DOPPLER ULTRASONOGRAPHY AND VISUAL FIELD TEST

H Han, J Kim, M Lee

Purpose

To evaluate the relationship between parameters of transcranial ultrasonography and results of visual field tests in open angle glaucoma and glaucoma suspect patients.

Methods

This retrospective study was based on medical records and examinations of patients who visited the department of ophthalmology in Kangbuk Samsung hospital from 1st January 2016 to 17th October 2019 and went through transcranial Doppler ultrasonography in routine health check-up. Ophthalmic data included visual acuity, intraocular pressure, optical coherence tomography (OCT), and Humphrey visual field test. Retinal nerve fiber layer defect was confirmed by a glaucoma specialist. Patients' ophthalmic data, such as average ganglion cell layer thickness, visual field index (VFI), pattern standard deviation(PSD), mean deviation(MD), was divided into quartiles. Each parameter of the ophthalmic artery from transcranial doppler ultrasonography was compared between interquartile groups.

Results

A total of 162 patients were reviewed. There was no difference in doppler parameters of ophthalmic arteries between patients with or without retinal nerve fiber layer defect. Neither of interquartile groups of average ganglion cell layer thickness showed significant difference in any parameters of ophthalmic arteries. Patients in low VFI interquartile group showed significant low peak systolic velocities of ophthalmic arteries when adjusted with age, sex, diabetes mellitus, and hypertension.(p=0.016) The lower PSD showed the lower peak systolic velocity(p=0.046). There was no significant tendency between any other parameters of ophthalmic artery and MD values.

Conclusions

Our study suggests hemodynamic parameters of ophthalmic artery might be associated with visual field status of patients. Further large popultation studies are needed in order to better understand the relationship between visual function and blood flow.

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P-510

THE DEGREE OF LOSS IN THE TISSUE THICKNESS, MICRO VASCULAR DENSITY, SPECIFIC PERIMETRY, AND STANDARD PERIMETRY IN EARLY GLAUCOMA

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Purpose
To identify the degree of attenuation of the circumpapillary retinal nerve fiber layer (cpRNFL), layer from the macular RNFL to the inner plexiform layer (mGCL++), circumpapillary and macular vascular density (VD), Pulsar perimetry, and standard perimetry in early glaucoma.

Methods
One eye from each of the 96 healthy controls and 90 open-angle glaucoma was included in the prospective and cross-sectional study. The cpRNFL and mGCL++ were derived from swept-source optical coherence tomography (OCT) imaging; circumpapillary vascular density (cpVD) and macular VD (mVD) were derived from swept-source OCT-based angiography imaging. Mean sensitivity of specific and standard perimetries were measured with Octopus Pulsar 32 test (Pulsar) and Humphrey 24-2 test (HFA), respectively. For direct comparison, all parameters were converted to relative change values adjusted in both their dynamic range and age-corrected normal value. Receiver operating characteristic analysis was performed to evaluate the discrimination ability between the glaucomatous and healthy eyes using the area under the curve (AUC).

Results
The degree of loss in mGCL++ (-24.7%) and cpRNFL (-25.8%) was greater compared to mVD (-17.3%), cpVD (-14.9%), Pulsar (-10.1%), and HFA (-5.9%) (each $P<0.01$); the degree of loss in mVD and cpVD were greater compared to Pulsar and HFA (each $P<0.01$); and the degree of loss in Pulsar was greater compared to HFA ($P<0.01$). The discrimination ability between the glaucomatous and healthy eyes was higher for mGCL++ (AUC=0.90) and cpRNFL (AUC=0.93) than for mVD (AUC=0.78), cpVD (AUC=0.78), Pulsar (AUC=0.78), and HFA (AUC=0.79).

Conclusions
The degree of the tissue thickness loss was greater in approximately 7–10% and 15–20% compared to the micro-VD and visual fields in early glaucoma, respectively.

P-512

MACULAR VESSEL DENSITY VS MACULAR THICKNESS IN EARLY STAGE OF PRIMARY OPEN ANGLE GLAUCOMA

A Usman, L Marchenko, A Dalidovich, T Kachan

Purpose

To evaluate correlations between superficial macular vessel density and parafoveal inner macular thickness in early stage of primary open-angle glaucoma (POAG) using optical coherence tomography angiography (OCT-A)

Methods

Sixty-three (63) eyes were included in a prospective, cross-sectional study conducted at the 3rd Hospital, Minsk. All study subjects were subdivided into three groups: early glaucoma (EG) group (29 eyes of 29 patients with early POAG), glaucoma suspects group (21 eyes of 21 patients), and control group (13 eyes of 13 healthy individuals). The mean age of the groups was 65.58 ± 9.53, 56.54 ± 9.32, and 51.62 ± 4.13 respectively. All patients underwent OCT-A scanning using RTVue-100 "Optovue" (Optovue, Inc. Fremont, California, USA). The retina map vessel density 3 × 3 mm and retina thickness map 5 × 5 mm scans were respectively used to obtain parameters of the macular vessel density and the parafoveal inner macular (ILM-IPL) thickness. The total average, superior, inferior, nasal, and temporal parafoveal inner macular thicknesses (in micrometer) and their respective quadrants vessel density (in %) were the parameters analyzed. Spearman rank-order correlations were used to evaluate possible correlations between the macular vessel density and the structural changes aside calculating the Area Under the Receiver operating characteristic Curves (AUCs), sensitivity/specificity test for all available parameters.

Results

The early glaucoma group had significant reduction in both the superficial macular vessel densities and the parafoveal inner macular thicknesses compared to the control group ($P < 0.05$). The macular density and the macular Thickness parameters were positively correlated but none was statistically significant ($P > 0.05$). However, parafoveal inner macular Thickness parameters had higher AUCs. AUCs with average temporal parafoveal inner macular thickness having the highest AUCs (0.927).

Conclusions

In early POAG, there is no statistically significant correlation between the superficial macular vessel densities and the parafoveal inner macular thicknesses. Although there is thinning in the parafoveal inner macula thicknesses and a reduction in the superficial macula vessel density, the parafoveal inner macular thicknesses is diagnostically more significant than the superficial macular vessel densities in the early stage of POAG using OCT-A RTVue-100

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P-513

LARGE OPTIC DISC OR GLAUCOMA? – PRELIMINARY RESULTS FROM THE LONGITUDINAL GUTENBERG OPTIC DISC STUDY

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Purpose

Large optic discs are more frequently classified as glaucoma suspect. The aim of this study is to analyze the changes in large optic discs in children and influencing factors over time.

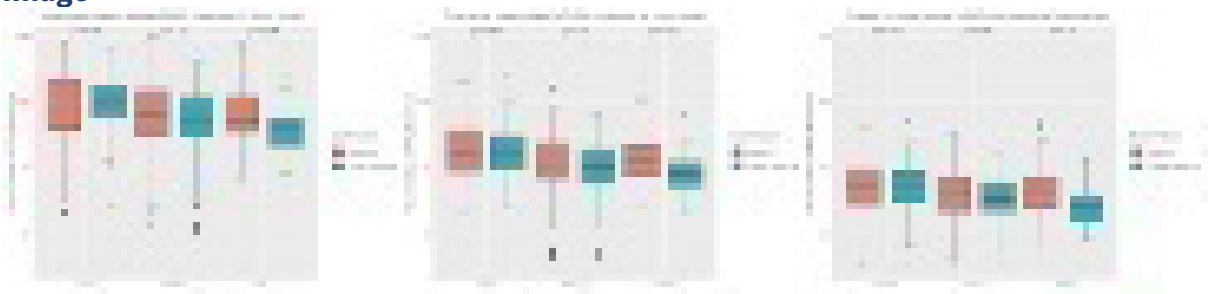
Methods

75 large optic discs in children (LOD-C), 59 normal optic discs in children (NOD-C) and 40 large optic discs in adults (LOD-A) were longitudinally monitored. The peripapillary retinal nerve fiber layer (pRNFL) thickness (circle diameters 3.5, 4.1 and 4.7mm), Bruch's membrane opening (BMO) area and minimum rim width (MRW) were measured using Spectralis Optical Coherence Tomography (OCT) glaucoma module (Heidelberg Engineering, Heidelberg, Germany). Large optic disc was defined as BMO area ≥ 2.5mm^2. The examinations were compared by paired t-tests. Bonferroni's correction was applied for multiple testing.

Results

Mean age at baseline examination was 12.0, 12.0 and 48.5 years and median BMO area was 2.84, 2.04 and 2.74 mm^2 for LOD-C, NOD-C and LOD-A. Median follow-up time was 1.0 years for all groups. The mean difference of mean global pRNFL thickness was -0.43/-0.32/-0.29 µm in the 3.5mm circle, -0.22/-0.03/-0.44 µm in the 4.1mm circle and -0.57/-0.03/-0.10µm in the 4.7mm circle; none of the mean differences was statistically significant after applying Bonferroni's correction (a=0.006; see figure 1). Neither BMO area, nor MRW showed significant changes except from a slight MRW decrease in the temporal inferior and nasal inferior sectors in the adult group.

Image



Conclusions

Neither children nor adults with large optic discs nor children with normal optic discs showed significant changes in pRNFL thickness or BMO area. Only adult patients had slight decreases of MRW in the temporal inferior and nasal inferior sectors. A long-term follow-up at 5 years will be performed to further monitor pRNFL thickness.

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P-514

INVESTIGATING PERIPAPILLARY VESSEL DENSITY ON OCT ANGIOGRAPHY AFTER INSTILLATION OF TOPICAL BRIMONIDINE VERSUS DORZOLAMIDE

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Purpose

To assess the changes in the superficial peripapillary retinal vessel density (SVD) and deep vessel density (DVD) after administration of topical Carbonic Anhydrase Inhibitor Dorzolamide and alpha-2 agonist Brimonidine using Optovue Solix Optical Coherence Tomography angiography (OCTA).

Methods

This is a prospective, randomized, trial. A total of 13 healthy individuals with no previous ophthalmological history were included. All the participants had their refractive parameters, Intraocular Pressure (IOP), Central Corneal Thickness (CCT) and OCTA measured. A computer-assisted randomization was used to determine which eye received one drop of Brimonidine, and which would receive one drop of Dorzolamide. The IOP and OCTA was measured after an onset of 2 hours after topical administration. All interpreted OCT scans had a minimal Quality Index (QI) of 7. The different OCTA parameters of retina and the disc were then analyzed.

Results

The IOP following the administration of Brimonidine decreased from 15.3±2.9 mmHg to 10.3±2.0 mmHg and after Dorzolamide the IOP decreased from 14.9±2.6 to 11.5±2.7 mmHg. The superficial vessel density did not show any significant changes after the administration of Brimonidine although there was a slight non-significant decrease in deep vessel density. However, the instillation of one drop of Dorzolamide decreased ($p<0.05$) the values of Superficial vessel density and Deep vessel density.

Conclusions

Both Brimonidine and Dorzolamide have shown neuroprotective benefits[1] in glaucoma patients, possibly by mediating ocular haemodynamics. This study demonstrated that Dorzolamide decreases the superficial and deep vessel density of the optic nerve head even though IOP significantly decreased, which is contrary to previous findings[2].

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P-515

EFFECT OF SEVERITY OF GLAUCOMA ON DARK/LIGHT ASYMMETRIES: EVIDENCE FOR THE PREFERENCE INFLUENCE OF GLAUCOMA ON THE ON-CELL PATHWAY

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Purpose

Although dark/light (L/D) asymmetries are most pronounced in visual cortex, they also are significant in the retina. Therefore, diseases that disrupt retinal function, such as glaucoma, could affect the L/D asymmetries in visual perception. Our goal was to study the effect of severity of glaucoma on L/D asymmetries.

Methods

Fourteen eyes of 14 subjects, 7 with glaucoma, (48-76 y/o; mean, 64 +/- 10.28; MD -0.48 to -18.25), followed for a mean of 9 years and 7 controls (48-78 y/o; mean, 65.14 +/- 9.63) were tested at 8 Michelson contrast levels (5-20%) out to 30 degrees of the visual field. Each test included 579 trials at 92 locations, repeated 3 times. Stimuli, dark and light squares scaled for eccentricity, were presented within a head-mounted display (HTC VIVE Pro Eye) with a maximum luminance of 110 cd/m2. Fixation was restricted to a central 3.5° radius. The percentage of incorrect responses (% errors) were measured across the entire visual field, organized into quadrants and ranked by quadrant dB Mean Sensitivity. Errors to light and dark stimuli were expressed as a ratio (L/D) and assessed as a function of Mean dB sensitivity of each quadrant. Mean sensitivity (MS) was measured using 30-2 SITA-standard Humphrey visual fields.

Results

There was a significant correlation between the L/D error ratio and quadrant MS across all contrasts (5-50%, r=0.98025, p=0.019753). When the quadrant MS less than 20 dB, the %errors are significantly larger for lights than darks (67.0 +/-22.7 vs. 59.9 +/-30.5, p=0.039, Wilcoxon test). However, when the quadrant MS is greater than 20 dB, there is no significant difference between % errors for lights and darks (36.2 +/-22.6 vs. 35.7 +/-22.7, p=0.652, Wilcoxon test) (figure 1).

Image

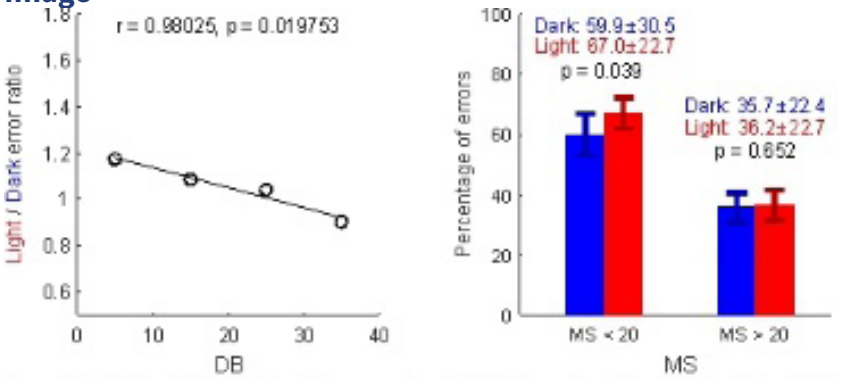


Figure 1. Ratio of % errors to light versus dark stimuli as a function of Mean Sensitivity across all sensitivities (left) and as a function of Sensitivities < 20 dB versus > 20 dB (right)

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Conclusions

In patients with glaucoma, the % errors to dark and light perimetric targets increases as a function of quadrant mean sensitivity. The influence of glaucoma severity on % errors to light targets vs dark targets suggests that, as glaucoma progresses, visual detection decreases significantly more for light versus dark stimuli. This suggests that glaucoma progression has a greater effect on the ON pathways vs the OFF pathways. Future work will further investigate the functional roles of the ON and OFF pathways in early glaucoma.

P-517
PROGRESSION ANALYSIS FOR OBJECTIVE PERIMETRY

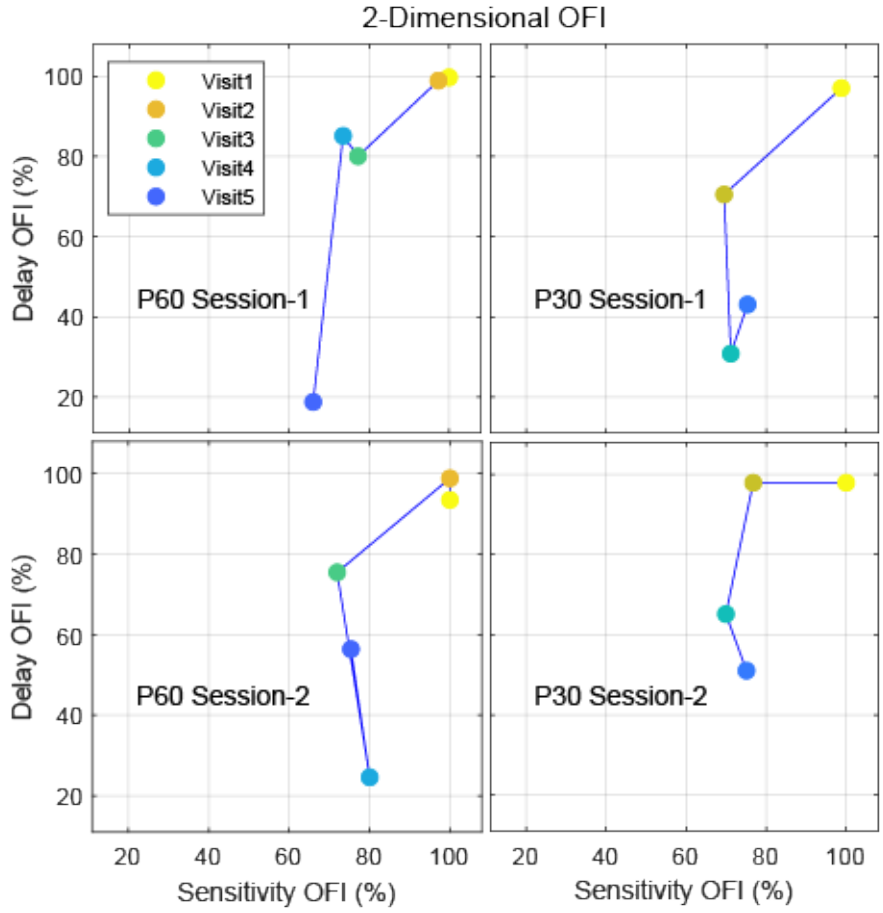
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Purpose
To assess visual field progression analysis of the ObjectiveFIELD Analyser (OFA), using the ObjectiveFIELD Index (OFI).

Methods
The OFI is a percentage score between normal (100%) and perimetrically blind (0%). We assessed the OFI for both a wide-field (P60) and macular (P30) OFA test whose stimulus arrays are scaled versions of each other, spanning the central 60 and 30 deg of the field. Each test concurrently presented independent stimuli to 44 regions per eye, retesting each test location 90 times in 7 minutes [1]. P60 data were mapped to a 30-2 layout, and P30 a scaled version. Sensitivity and delay reports are made for each eye. Data was collected from 19 glaucoma patients over 5 years using a prototype of the OFA (Konan Medical USA). Test-visits included pairs of P30 and P60 test sessions performed 2 weeks apart. Those visits were repeated 7, 6, and 5 times in 7, 9, and 3 subjects respectively for P60, with 8% fewer for P30. HFA SITA-fast fields were obtained randomly on the 1st or 2nd session of a test-visit. OFI slopes were estimated using least-squares (Lsq) and robust regression (RR). Randomly selecting OFA tests from the 1st or 2nd session allowed the formation of cross-validation data sets with the same number of tests over time as the HFA data.

Results
For HFA, 8/38 eyes showed significant VFI progression. For P60 sensitivities, and comparing Lsq:RR, 10:11/38 tests showed significant progression on some validation cycles, 7:9/38 for P30. OFA delays showed fewer progressing fields, for P60 3:2/38 and P30 3:5/38. About half of eyes identified by delay changes differed from those identified by sensitivity changes. For OFA fields not showing progression when HFA did, the mean HFA p-value was 5%. Of P60 fields matching HFA progression the mean HFA p-values were < 2.6%. For Lsq the inter-decile range of OFA sensitivity slopes was: P60 -0.65 to -8.36 %/y and P30 -0.33 to -2.84 %/y; for delays: P60 -0.14 to -1.18 %/y and P30 -0.17 to -12.1 %/y. Plots of delay on sensitivity OFI data indicated they could evolve at different rates over the 5 years (Figure).

Image



Conclusions

Sensitivity and delay OFI data progressed significantly, sometimes independently, suggesting independent disease processes. OFI slopes < -0.5 %/y occurred indicating modest progression can be tracked. When HFA p-values were small there was better agreement with OFA.

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P-518

REPEATABILITY OF 24-2 VISUAL FIELDS TAKEN WITH A BINOCULAR PERIMETER

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Purpose

Measuring the repeatability of perimetric measurements is important to distinguish change due to glaucoma from the inherent variability of the test. The purpose of this study is to compare the repeatability of two 24-2 test strategies in healthy eyes and glaucomatous eyes using a binocular perimeter.

Methods

Subjects performed four 24-2 tests with the imovifa perimeter in a single visit, two with the AIZE-Rapid 24-2 test strategy and two with the AIZE 24-2, in random order. Subjects were offered a rest between tests. To ensure sufficient binocular vision to perform the test using the default settings, if the subject saw more than the intended four spots surrounding the center during the foveal test, the study eye was tested monocularly. AIZE is a modified Zippy Estimated by Sequential Testing (ZEST) algorithm that determines threshold value by adding ZEST to the effect of the periphery of the measurement point.[1,2] AIZE-Rapid retains the AIZE test method, but increases the interaction with adjacent measurement points.[3] In addition, the number of presentations is reduced by estimating the reliability indices instead of performing catch trials. Repeatability standard deviation was calculated as the square root of the variance averaged across all pairs of measurements for mean deviation (MD) and pattern standard deviation (PSD).

Results

Nine subjects with glaucoma (age range: 46 to 88, mean 74, standard deviation: 16), and eleven without glaucoma (age range: 40 to 77, mean: 55, standard deviation: 13) were enrolled and tested. MD for the glaucoma subjects ranged from 0.55 to -21 dB, but most eyes had early glaucoma with an average MD of -3.4 dB and a standard deviation of 6.7 dB. The image shows a table with mean, repeatability standard deviation and repeatability limit for both strategies for both populations, normal and glaucoma, for MD. The repeatability limit for the AIZE Rapid strategy is similar to AIZE, but the average time for the AIZE strategy was 6.9 minutes for the glaucoma eyes and 5.0 minutes for the normal eyes, and the average time for AIZE Rapid was 3.9 minute and 3.0 minutes, respectively.

Image

24-2 MD	Mean	Repeatability SD	Repeatability Limit
AIZE Normal Eyes	0.69 dB	0.16 dB	0.45 dB
AIZE Glaucoma Eyes	-3.38 dB	1.11 dB	3.08 dB
AIZE-R Normal Eyes	0.45 dB	0.18 dB	0.51 dB
AIZE-R Glaucoma Eyes	-3.00 dB	1.20 dB	3.33 dB

Conclusions

The imovifa binocular perimeter has acceptable repeatability for clinical use, with binocular test times that allow for rapid testing in a clinical setting. Repeatability is worse in eyes with glaucoma, as expected for visual field testing. The repeatability for the rapid strategy, AIZE-Rapid, is comparable to that of the longer strategy, AIZE.

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P-519

CHOROIDAL THICKNESS INCREASE AFTER INTRAOCULAR PRESSURE LOWERING GLAUCOMA SURGERIES DETECTED WITH SWEPT-SOURCE OPTICAL COHERENCE TOMOGRAPHY

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Purpose

The aim of this study is to evaluate choroidal thickness (CT) changes using swept-source optical coherence tomography (SS-OCT) after intraocular pressure (IOP) lowering surgical procedures to treat glaucoma.

Methods

Subjects with progressing glaucoma presenting typical optic nerve head (ONH) and OCT findings that were referred to IOP-lowering glaucoma procedures were included. Patients underwent 24-2 perimetry (SITA standard; Humphrey Field Analyzer; Zeiss) and SS-OCT (DRI-Triton; Topcon) using the wide-field 9mmx12mm raster scan. IOP and SS-OCT scans were obtained at the preoperative period (pre-op) and between 1 to 30 days post-operatively (PO). The choroid was automatically segmented by the SS-OCT software. Choroidal measurements at the macular region were obtained from the averages provided by the ETDRS Grid of the software. Center refers to the inner 1 mm circle of the ETDRS grid. The other measures compose the 8 quadrants of the ETDRS grid: a parafoveal ring with 4 inner quadrants from 1-3 mm from the fovea and 4 outer quadrants from 3-6 mm from the fovea. Circumpapillary choroidal thickness (cpCT) was obtained by the circular B-scan (3.4 mm) used to measure retinal nerve fiber layer (RNFL). Statistical analysis was performed using Generalized estimating equations (GEE).

Results

Fifteen eyes (12 subjects) qualified for the study and underwent both visits. The average age was 70±11.04 years. At the baseline, the average circumpapillary RNFL was 60.13±23.21 µm and the visual field (VF) mean deviation (MD) was -13.29±8.5 DB. The mean IOP on each visit (pre-op and PO) were: 20.5±4.99 and 15.7±5.04, respectively ($p<0.01$).

The CT at the macular region significantly increased post-operatively in all sectors of the ETDRS Grid ($p < 0.05$) (table 1). cpCT significantly increased in the superior sector ($p = 0.002$), there was a borderline increase in the temporal sector (table 2) and in the inferior sector there was a significant decrease ($p<0.01$). Parameters are summarized by mean and standard deviation. P-value is for overall difference between groups.

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Image

Table 1. Choroidal Thickness Macular Measurements Pre and Post Operatively.

Sector (ETDRS Grid)	Preop N (15)	PO	p-value
Central Macula (µm)	192.64 (63.67)	222.14 (78.27)	< 0.001
Inner – Temporal (µm)	194.93 (53.78)	221.36 (69.38)	< 0.001
Inner - Superior (µm)	209.71 (59.04)	239.86 (62.75)	< 0.001
Inner – Nasal (µm)	195.79 (65.28)	224.71 (78.34)	< 0.001
Inner – Inferior (µm)	187.71 (66.76)	221.93 (86.08)	< 0.001
Outer – Temporal (µm)	188.14 (51.35)	214.50 (64.64)	< 0.001
Outer – Superior (µm)	204.36 (59.15)	239.21 (80.79)	< 0.001
Outer– Nasal (µm)	160.00 (64.20)	180.71 (71.25)	.006
Outer– Inferior (µm)	185.00 (65.41)	216.64 (72.56)	< 0.001

Table 2. Circumpapillary Choroidal Thickness Measurements Pre and Post Operatively.

Sector	Preop N (15)	PO	p-value
Superior (µm)	105.333 (48.01)	126.452 (56.98)	.002
Temporal (µm)	121.142 (40.95)	135.238 (52.64)	.057
Inferior (µm)	162.857 (76.07)	109.167 (46.89)	< 0.001
Nasal (µm)	114.404 (46.39)	125.571 (53.07)	.297

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Conclusions

CT at the macular region significantly increased in a short-term period after IOP-lowering surgeries to treat progressing glaucoma. A sectorial increase of cpCT was also observed superiorly and a decrease was observed in the inferior sector. The clinical and mechanistic implications of these findings should be further studied. Notwithstanding, a longer follow-up is needed to determine the persistence of these changes.

P-520

SHORT-TERM CHANGE OF RETINAL CAPILLARY NETWORK FOLLOWING ACUTE PRIMARY ANGLE CLOSURE

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Purpose

To evaluate changes in retinal capillary network as well as structural alterations after a successfully treated episode of acute primary angle closure(APAC)

Methods

Twenty patients successfully treated for a unilateral episode of APAC were included in this retrospective cross-sectional study. An average of nine weeks after APAC, the thickness of circumpapillary retinal nerve fiber layer(cpRNFL) and ganglion cell-inner plexiform layer(GCIPL) were measured with spectral domain optical coherence tomography(SD-OCT). Circumpapillary and macular vascular density (VD), perfusion density (PD) and area, perimeter of foveal avascular zone(FAZ) were measured with OCT angiography(OCTA). We compared the measured values between eyes affected by APAC and fellow eyes.

Results

There were no significant differences between two groups in the thickness of all sectors of RNFL and GCIPL measured with SD-OCT. In addition, circumpapillary VD and PD also showed no significant differences between two groups. However, in a sector within a radius of 0.5mm from fovea(center), VD was significantly lower in the affected eyes than fellow eyes. (P=0.009). Macular PD values were similar between two groups in all sectors of parafovea, while PD of center tended to be lower in the affected eye than fellow eyes. Spearsman's correlation showed a positve correlation of macular VD of center with macular PD of center, and a negative correlation with area and perimeter of FAZ

Conclusions

Early reduction of the macular VD was observed after an effective treatment of APAC. Therefore, glaucomatous progression should be suspected in eyes with lower macular VD and attentive follow-up is needed in the eyes.

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P-521

STUDY OF TECHNOLOGIES FOR THE DIAGNOSIS OF ANGLE CLOSURE (ACE): PROTOCOL FOR A PROSPECTIVE, CROSS-SECTIONAL, MULTI-CENTRE DIAGNOSTIC STUDY

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Purpose

Angle-closure is responsible for 1 in 6 glaucomas in the UK. Patients with suspected glaucoma require gonioscopy to rule out angle closure. Use of alternative tests will reduce the need for face-to-face examinations by glaucoma specialists.

The goal of the ACE study is to evaluate the diagnostic performance and cost -effectiveness of anterior segment optical coherence tomography (AS-OCT) interpreted by different health care professionals, and limbal anterior chamber depth (LACD) by optometrists.

In this abstract we will describe the study protocol.

Methods

Setting: 12 NHS sites across the UK.

Inclusion criteria: People referred to hospital eye services with suspected angle closure.

Participants will undergo all tests on the same visit by masked investigators. AS-OCT images will be anonymised and uploaded to our reading centre (https://www.networkuk.com/Home/About).

The reference standard will be gonioscopy by an ophthalmologist with glaucoma expertise.

Primary outcome: Sensitivity and specificity of tests to detect angle-closure. Secondary outcomes: Proportion of tests not done or of inadequate quality, cost-effectiveness

Results

Sample size: 600 individuals who have been referred with suspected angle closure from primary care (community optometry). We will have a 95% probability of detecting the true sensitivity of either test to within ±3.5% based upon a sensitivity of 90%. The study will have a 95% probability of detecting the true specificity of either test to within ±5%, assuming a specificity of 75%. Results of AS-OCT and LACD will be assessed separately. We will explore the accuracy of different thresholds and combination of tests. Sensitivity analysis will be done with multi-level logistic regression model.

Conclusions

Our hypothesis is that the new pathway using AS-OCT and/or LACD as triage tests will be highly sensitive and more efficient than standard care

References

1. The ACE study is funded by the NIHR HTA (NIHR134593). The views expressed are those of the authors and not necessarily those of the NIHR or the Department of Health and Social Care.

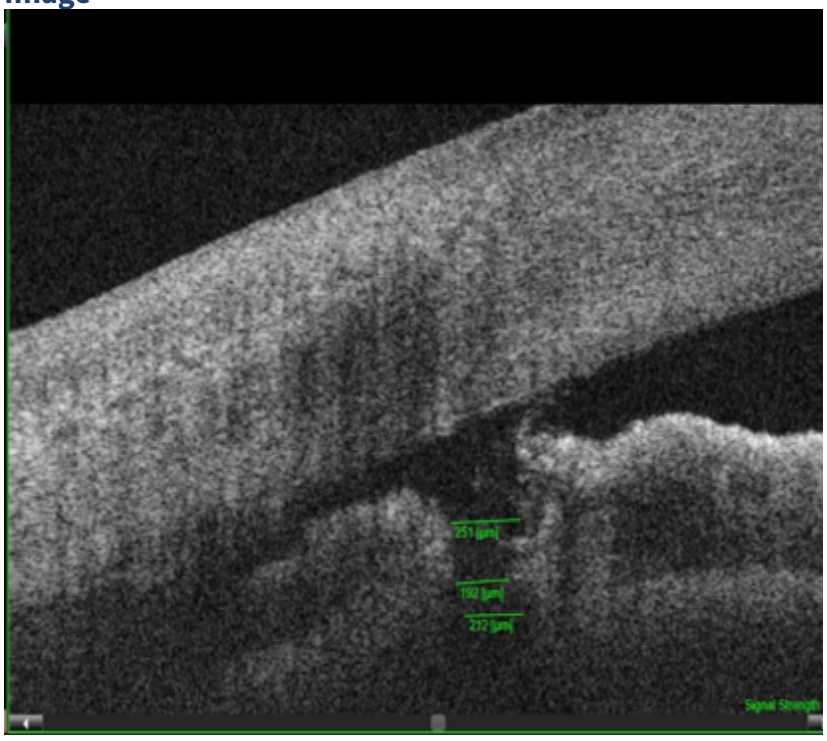
P-522
IRIDOTOMY THAT TRANSILLUMINATES..... SAFE IRIDOTOMY?

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Purpose
To assess the correct opening and size of laser peripheral iridotomies (LPI) in patients with primary angular closure (PAC), primary angle- closure suspects (PACS) and primary angle-closure glaucoma (PACG).

Methods
Descriptive study in patients with PACS, PAC and PACG who underwent Nd-YAG laser peripheral iridotomies from february 2022 to september 2022. At 8 weeks the size and morphology of each iridotomy is documented by Swept Source optical coherence tomography (SS-OCT) Triton (Topcon®, Japon) anterior segment images: radial and 3D scanning modes. We also took photos of the iridotomies and their positive transillumination and also performed gonioscopy in the dark before and 1, 2 and 8 weeks after LPI.

Results
A total of 15 patients (30 eyes) were performed laser peripheral iridotomies in this period of time, 6 patients with PACS; 7 with PAC and 2 with PACG. The lack of opening of the iridotomy was documented in five eyes by SS-OCT, all of them with positive transillumination documented photographically. In 2 eyes the iridotomy size was less than 150 microns. All of these eyes have been repeated Nd-YAG laser. None of them have suffered from an acute angular closure. Mean age 58.86 years old (57-72); 10 women and 5 men.

Image


Conclusions

Positive transillumination does not ensure the correct opening of an iridotomy. The origin of this study has been marked by a patient who has suffered from an acute angular closure despite having an iridotomy that transluminated. We have been able to verify through the use of OCT-SS anterior segment images, that all the iridotomias we make are not really open or do not have the minimum size recommended according to the guides. For this reason, we have adopted the practice of performing an anterior segment OCT-SS to all SCAP, CAP and GPAA patients that we performed a Nd-Yag laser peripheral iridotomy.

P-523

EVALUATION OF BLEB MORPHOLOGY AFTER FILTERING SURGERY IN OPEN ANGLE AND ANGLE CLOSURE GLAUCOMA

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Purpose
To analyze the outcome of glaucoma patients who underwent trabeculectomy with Mitomycin C

Methods
This study using retrospective cohort method was conducted in SMEC Manado and RSUD Prof Dr. R. D. Kandou Manado. We obtained patients who underwent trabeculectomy with mitomycin C in January 2020 to March 2022. Patients were divided into two groups: open angle group and angle closure group. Visual acuity, IOP, and number of antiglaucoma medications was obtained by medical record. Bleb morphology was examined using slit-lamp and anterior segment optical coherence tomography.

Results
There were 52 eyes of 48 patients (23 males and 25 females) included in this study. Mean age of the patients were 57.79 years. Mean follow up time was 15.38 months. There were 25 (48.08%) eyes had OAG and 27 (51.92%) eyes had ACG. In OAG group, there were 22 (88%) eyes had successful bleb function. In ACG group, there were 24 (88.89%) eyes had successful bleb function. In OAG group there is a statistically significant decrease in IOP ($p<0.01$), significant improvement in visual acuity ($p<0.05$), and significant decrease in number of glaucoma medication ($p<0.01$). In ACG group there is a statistically significant decrease in IOP ($p<0.01$), no significant improvement in visual acuity ($p>0.05$), and significant decrease in number of glaucoma medication ($p<0.01$). In OAG group there were 8 (32%) diffuse blebs, 4 (16%) microcystic blebs, and 13 (52%) flat blebs. In ACG group, there were 8 (29.63%) diffuse blebs, 3 (11.11%) microcystic blebs, and 16 (59.26%). In both OAG and ACG group respectively the IOP change was not significantly correlated with the wall thickness ($P = 0.734, 0.592$), total bleb height ($P = 0.824, 0.899$), bleb height ($P = 0.651, 0.236$), bleb length ($P = 0.465, 0.764$).

Conclusions
Trabeculectomy with MMC remains an effective treatment for both open-angle and angle closure glaucoma patients. There was a significant improvement in visual acuity, reduction in IOP, and decrease of anti glaucoma drugs after surgery. Bleb function evaluation is not limited to the use of a slit lamp biomicroscopy and AS-OCT. We found that there was no correlation among IOP changes, wall thickness, total bleb height, bleb height and bleb length.

P-524

TRUE COLOR CONFOCAL SCANNER OPHTHALMOSCOPY TO DETECT RETINAL NERVE FIBER LAYER DEFECTS IN PATIENTS WITH PRIMARY OPEN ANGLE GLAUCOMA

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Purpose

Describe and illustrate the utility of the true color confocal scanner ophthalmoscopy (TC-CSO) in the detection of retinal nerve fiber layer defects (NFLD) in Primary open angle glaucoma (POAG) patients as well as the congruence with the Spectral domain optical coherence tomography (SD-OCT) analysis.

Methods

Cross-sectional study of a case series of eleven patients with POAG that underwent evaluation of the retinal nerve fiber layer (RNFL) with Eidon® TC-CSO (CentreVue, Padova, Italy) and SD-OCT Spectralis® (Heidelberg Engineering, Heidelberg, Germany) Posterior pole protocol optic nerve head centered (PP-ONHC) and standard RNFL analysis.

Results

Eleven patients, 5 females, mean age of 61.2 years old and 6 male mean age of 62.83 years old with POAG, that were all followed with TC-CSO and SD-OCT with PP-ONHC and standard RNFL evaluation, both with manual segmentation; to obtain images with a topographic distribution of RNFL. Only the true color modality was assessed without considering blue reflectance images, by two independent observers. We found a good agreement between the observers in every patient and a good concordance comparing the topographic distribution between both of them.

Conclusions

Eidon® TC-CSO is a useful and reliable tool to detect NFLD, even without pupillary dilatation and without the presence of an expert technician to obtain the images, however we recommend both measures to improve the quality of the examination. Considering that the original true color image highlights other retinal diseases, we consider it far superior than conventional fundus photography and blue reflectance, and possibly, offers a more accurate interpretation by staff not used to this type of imaging findings.

Despite the topographic distribution of RNFL detected by SD-OCT can be altered for different reasons, manual segmentation gives a reliable pattern of RNFL distribution and provided us a useful reference to confirm true NFLD detected.

We found a good correlation of these two techniques, being reliable for documentation and follow-up of POAG patients. In our opinion the combination of both techniques (TC-SLO and SD-OCT with PP-ONHC) gave us a more confident understanding of the evolution of the patients and a better anatomic substrate to correlate with visual field defects, nevertheless further large-scale studies are required to confirm and validate these findings.

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P-525
STRUCTURAL CORRELATION OF VISION ASYMMETRY IN ADVANCED GLAUCOMA

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Purpose
Analyse correlation between retinal structures and microvasculature with best corrected visual acuity (BCVA) in patients with bilaterally symmetrical advanced glaucoma having vision asymmetry, in an attempt to find predictors of vision decline.

Methods
Cross-sectional study of 48 paired bilaterally symmetrical advanced primary glaucoma eyes with vision asymmetry.

Retinal structural imaging with spectral-domain optical coherence tomography of peripapillary retinal nerve fibre layer (RNFL) & macular ganglion cell complex (mGCC) coupled with optic nerve head (ONH) & macular vessel density (VD) with OCT-angiography was done.

Correlation between BCVA and structural parameters was evaluated. Area-under-receiver-operator-characteristics (AUROC) curve obtained a cut-off for OCT parameters to determine predictors of vision decline (BCVA<6/60).

Results
RNFL, mGCC thickness and VD in superficial layer of ONH and macular area, were significantly less in poor vision eye.

Sectoral analysis revealed that papillo-macular bundle sectors had a better correlation with logMAR BCVA.

Superior RNFL thickness (r = - 0.348, p=0.001) and inferior mGCC thickness (r = -0.553, p=0.000), showed highest correlation with BCVA.

mGCC was superior to RNFL in predicting vision loss in advanced glaucoma.

Macular VD was best correlated with BCVA (p<0.005).

Conclusions
Macular structural and micro-vasculature parameters of mGCC & vessel density had maximal predictive value with logMAR BCVA. Macular vessel density best predicted vision decline and emerged as a promising investigation relatively not affected by ‘floor-effect’ plaguing structural imaging in advanced glaucoma.

P-527

INFLUENCE OF GLAUCOMA FILTERING SURGERY ON PERIPAPILLARY AND MACULAR VASCULAR DENSITY

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Purpose

To measure the influence of the decrease in the intraocular pressure (IOP) after glaucoma filtering surgery on the peripapillary and macular vascular vessel density (VD) in patients with primary open-angle glaucoma (POAG).

Methods

A total of 26 patients (31 eyes) who underwent surgery between may 2021 and august 2022 were included. 12 patients had early POAG (40%), 7 patients had moderate POAG (23.33%) and 11 had severe POAG (36.67%). OCT-A scans DRI OCT Triton®: (Topcon) were performed before glaucoma surgery, and at 1-month and 6-month post-operatively.Vascular density (VD) was measured in the peripapillary and macular area. The changes in DV were calculated using angiocube scan 6x6 mm in the peripapillary area and 4.5x4.5 mm in the macular one. Circumpapillary retinal nerve fiber layer (RNFLp) and macular ganglion cell complex (GCG) were also measured before and after surgery. IOP was also measured in all these times.

Results

Mean patient age was 69.5 +/- 7.9 years old. In 9 cases (29.03%), nonperforating deep sclerectomy (EPNP) was performed; in one case a trabeculectomy (3.23%) was performed, in 18 cases combined cataract - EPNP surgery (58.06%) and in 3 cases combined cataract and trabeculectomy surgery (9.68%). One month after surgery, mean IOP has decreased significantly from 19.55 +/- 6.75 mmHg to 10.48 +/- 3.32 mmHg, (43% reduction, p<0.001). At 6 months, mean IOP was 11.84 +/- 3.32 mmHg. Mean glaucoma medication decreased from 2.42 (range 3-1) to 0.10 (range 0-2) one month after surgery and to 0.21 (range 0-1) at 6 months. There is a statistically significant (P<0.01) increase in the mean peripapillary DV one and six months after surgery (from 36.64% (9.11) to 37.31% (10.84) in the first month and to 49.63% (6.77) in the sixth month. Macular DV has also increased after surgery, although there are no statistically significant changes, from 14.32% (8.38) to 15.47% (7.86) at the first month, and to 18.68% (13.05) at 6 months (p<0.4). Mean RNFLp thickness increased after surgery from 68.93 microns (13.32) to 73.11 (18.46) the first month and to 70.11 (16.53) at 6 months without statistically significant difference (p 0.33 and p 0.9 respectively). GCL average thickness also increased from 54.65 microns (6.70) to 54.11 (10.83) one mont after surgery and 56.42 (8.42) at 6 months.

Conclusions

Decreased IOP after filtration surgery correlates with increased vascular density in the peripapillary and macular áreas. This increase is statistically significant in the peripapillary área.

P-528

OCTA OF THE RETINA AND THE CHOROID IN PSEUDOEXFOLIATIVE, PRIMARY OPEN ANGLE AND NORMAL TENSION GLAUCOMA

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Purpose
To compare vessel density (cVD) in the retina and the choroid among eyes with pseudoexfoliative glaucoma (PEXG), primary open angle glaucoma (POAG), normal tension glaucoma (NTG) and controls.

Methods
Patients with PEXG, POAG, NTG and controls were recruited. OCT scanning of the macula and the disc followed by 6*6mm HD macula and 4.5 mm optic disc OCTA imaging were performed with the RTVue XR Avanti with AngioVue software. Global and hemifield VD were recorded for the superficial (SCP) and deep (DVP) capillary plexus and also for the choriocapillaris (CVD). OCT thickness of the nerve fiber layer (NFL) and ganglion cell layer (GCC) was also measured.

Results
Data from 76 POAG, 44 PEXG, 27 NTG and 61 control eyes were analyzed. Mean SCP VD was lower in PEXG, POAG and NTG eyes compared to controls (40.65±6.70, 38.90±5.37, 38.30±5.56 vs 49.19±3.73%, p<0.001). Mean DCP VD was lower in PEXG, POAG and NTG eyes compared to controls (45.01±7.62, 42.58±5.98, 43.01±6.17 vs 49.87±6.26%, p<0.001). There was no difference in SCP VD or DCP VD between the three glaucoma groups (p>0.050). No difference was noted in CVD between the groups (68.02±3.51, 67.37±3.04, 67.82±2.67 and 68.00±2.31%, p=0.538).

Conclusions
Lower VD of the superficial and deep retinal layers is seen in eyes with PEXG, NTG or POAG compared to normal eyes. However, the type of open angle glaucoma does not seem to affect the amount of VD loss in the retina. Finally, eyes with open angle glaucoma manifest similar values of VD in the choroid compared to normal eyes.

P-529

OCULAR SURFACE DISEASE ASSOCIATION WITH VISUAL FIELD AND OPTICAL COHERENCE TOMOGRAPHY RELIABILITY IN GLAUCOMA PATIENTS

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Purpose

To identify the association of ocular surface disease severity with Visual Field and Optical Coherence Tomography Reliability in Glaucoma Patients.

Methods

Patients over 18 years of age with ocular hypertension or any type of glaucoma diagnosis with use of topical glaucoma medication for at least 6 months who attended a tertiary care ophthalmological center were subsequently recruited. On the day of enrollment, patients underwent a complete ophthalmological examination, Humphrey Visual Fields, Optic Nerve Head Optical Coherence Tomography, and ocular surface assessment that included: Ocular Surface Disease Index Test, Schirmer Test, Tear Break up time, conjunctival hyperemia grading, corneal and conjunctival staining (Oxford Scheme), Meibomian Gland Dysfunction grading, and meibography. Patients with active infectious conjunctivitis and previous incisional glaucoma surgery were excluded.The main outcomes were prevalence of OSD, reliability of HVF and OCT, and association between OSD severity and reliability of functional and structural tests.

Results

We included 150 eyes of 150 patients, with a mean age of 67.5 years, of which 69% were female. 53% of HVF and 63% of OCT results were reliable. 96% of patients presented MGD, 100% of patients presented some degree of conjunctival hyperemia, 48% had conjunctival papillae, 95% had some degree of corneal staining. TBUT had a mean of 10seconds and a median of 8 seconds, Schirmer test had a mean of 10mm and a median of 8mm. 38% of patients had some degree of gland alteration in meibography. Regarding OSDI, 25% of patients had mild to moderate scores, and 12% severe scores. There was a statistically significant association between a lower TBUT and unreliable HVF (p=0.050), and with higher OSDI scores and worse meibography grading with unreliable OCT (p=0.046, p=0.049). A higher number of drops was associated with statistical significance to a lower TBUT, higher false negatives on HVF, and more severe OSD (p=0.019, p=0.03, p=0.023).

Conclusions

In our study there is a high prevalence of OSD in patients with glaucoma who use topical hypotensive drops, which is more severe with a higher number of drops. Reliability of HVF and OCT was similar to previously reported in literature. TBUT was associated with HVF reliability and OSDI and meibography with OCT reliability with statistical significance. OSD diagnosis and management are important to address in the search of obtaining better reliability in functional and structural glaucoma testing.

P-530

DETECTION OF VISUAL FIELD DEFECTS IN EARLY GLAUCOMATOUS EYES: COMPARISON OF HUMPHREY 24-2C AND OCTOPUS PERIMETRY G1 PROGRAM WITH G-PERIPHERAL MODE

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Purpose

To compare the glaucoma diagnostic power of Humphrey Field analyzer(HFA) 24-2c SITA-Faster and the Octopus G1 program (Dynamic strategy) combined with G-peripheral test mode by comparing detection rate of visual field defect(VFD) between each perimeter in early glaucoma eyes.

Methods

Total 43 eyes of new patients who requested for glaucoma suspect underwent both HFA 24-2c SITA-Faster and Octopus G1 program with G-peripheral mode less than one month apart. The primary outcome was the comparison of VF parameter and VFD detection rates. Secondary outcome was comparing the test duration, sensitivity and specificity between each perimeter.

Results

The mean age of the population was 51.0±14.4 years. The mean deviation of HFA 24-2c SITA-Faster was -4.25±4.81 dB. The mean defect of Octopus G1 program was 5.92±5.17 dB and Octopus G-peripheral was 5.23±5.39 dB. The mean test duration was significantly different between the tests (HFA 24-2c; 3.73±1.27min, Octopus G1 with G peripheral; 6.35±2.23min, $p<0.05$ (Octopus G1; 4.54±1.01min, G-peripheral; 1.75±1.46min)). We defined cases with a corresponding OCT defect as glaucoma patients. 37 eyes(86%) had structural damage at corresponding area in OCT. HFA 24-2c test showed 69.7% sensitivity and 90% specificity to detect VFD and Octopus perimeter showed 100% sensitivity and 40% specificity.

Conclusions

The combination of Octopus G1 program and G-peripheral mode shows high sensitivity in the diagnosis of early glaucoma, which can be very useful tool in such a low incident rate disease like glaucoma. However, due to long test duration and low specificity of Octopus perimeter (G1 program with G-peripheral mode), it is necessary to pay attention to the test result by comparing it with corresponding structural damage such as OCT.

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P-531

OPTICAL COHERENCE TOMOGRAPHY PARAMETERS OF THE MACULA AND OPTIC NERVE IN PATIENTS BETWEEN 4 AND 17 YEARS OLD WITH AND WITHOUT GLAUCOMA

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Purpose
To analyze the macula and optic nerve parameters using Optical Coherence Tomography (OCT) in children and teenagers with and without glaucoma.

Methods
An analytical cross-sectional study was carried out at the Altino Ventura Foundation with patients between 4 and 17 years old with and without a glaucoma diagnosis. Patients were divided into a study group (glaucoma patients) and a control group (no glaucoma patients). The participants underwent OCT imaging of the macula and optic disc. For statistical analyses the macular ganglion cell complex (GCC) thickness and the peripapillary nerve fiber layer (NFL) thicknesses were considered.

Results
A total of 57 patients were included in the study, 29 in the study group and 28 in the control group. The sex distribution was similar for both groups (p=0.689). The mean age was 12.8 ± 3.3 years (range: 4–17 years) in the study group and 9.3 ± 3.1 years (range: 5–16 years) in the control group (p=0.001). The OCT analyses of macular parameters in the study group revealed a thinner GCC compared to the control group in all nine frames (p >0.05). The optic nerve was found to have a thinner NFL in the study group compared to the control group in three of the eight frames (p>0.05). Comparing no glaucoma and glaucoma subjects in the three age groups analyzed, the NFL thickness presented relevant variations in the superior temporal (p=0.042 and p=0.014) and inferior nasal (p=0.026 and p=0.034) quadrants.

Conclusions
The OCT of the macula and optic nerve of children and teenagers between 4 and 17 years old with glaucoma presented alterations including thinner GCC and thinner NFL compared to the control group. OCT of the macula may be a useful tool in the early detection of glaucoma in this population.

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P-532

COMPARISON OF PATHOGENETIC CLINICAL FEATURES IN UNILATERAL NORMAL TENSION GLAUCOMA DEPENDING ON THE OPTIC DISC HEMORRHAGE

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Purpose
To elucidate the pathogenetic clinical features in unilateral normal tension glaucoma(NTG) with and without optic disc hemorrhage(DH).

Methods
78 eyes of 39 patients with unilateral NTG were retrospectively studied between September 2006 and October 2022. After unilateral NTG patients were divided depending on the presence of DH(32 eyes of 16 patients) or absence of DH(46 eyes of 23 patients). The following clinical features were compared between both eyes of the two groups, NTG DH(+) vs NTG DH(-) : Spherical equivalent, axial length, central corneal thickness(CCT), intraocular pressure(initial IOP, IOP fluctuation), β-zone parapapillary atrophy(βPPA)-disc diameter(DD) ratio, βPPA area, disc tilt ratio, disc torsion. Comparison and analysis of clinical features associated with glaucoma between the two groups were conducted statistically.

Results
The mean age and gender ratio(male:female) was 61 ± 13.3 years and 1 : 1 in NTG DH(+) vs 57 ± 14.1 years and 7 : 16 in NTG DH(-) group. In NTG DH(+) group, the βPPA area was significantly higher(p=0.046) (mean βPPA area : 0.84 ± 0.44 mm^2), than that in fellow eyes (mean βPPA area : 0.59 ± 0.29 mm^2). In NTG DH(-) group, the optic disc torsion degree was higher(p = 0.001)(mean torsion degree : 15.57 ± 8.16°) than that in fellow eyes (mean torsion degree : 8.26 ± 5.20°). There was no statistically significant difference between the two groups in other clinical features except for βPPA area and optic disc torsion.

Conclusions
Clinical features associated with the development of NTG were different between the groups with and without DH. In NTH DH(-) group, mechanical damage such as disc torsion seems to have a greater effect on glaucomatous optic nerve damage, on the other hand, ischemic damage represented by βPPA in NTG DH(+) group.

P-534

INVESTIGATION OF THE OPTIC NERVE HEAD MORPHOLOGY INFLUENCE TO THE OPTIC NERVE HEAD BIOMECHANICS

M Ko

Purpose

The aim of the study is to study the Lamina Cribrosa (LC) morphology to the development and progression of glaucoma.

Methods

The impact of anterior LC surface morphology change to the LC deformation and influence of the shear stress on the ONH caused by IOP elevation and LC biomechanics stiffening were modeled with a full eye computational model using finite element modeling analysis.

Results

The shear stress on the anterior LC surface and the entire LC increased gradually from the middle part to the periphery under the elevation of intraocular pressure (from 15.5 to 50 mmHg) at different level of LC biomechanics (0.1 ~ 0.9 MPa) which is consistent with the clinical observation that glaucomatous progression start from periphery to the center. The corresponding change in LC shear stress are more sensitive in the inferior region and nasal region, and the shear stress magnitude in these two region are also relatively higher compared to the exterior region and temporal region. The optical nerve damage can be estimated by using the Tresca failure criterion. The LC showed more damage caused by the LC morphology change with the elevation in IOP. It is observed that the LC shear stress change and increase in optical nerve damage is more significant in three radial directions (shear stress 4.5 ~ 7.0% vs 0.2 ~ 1.5%; nerve damage 6.1 ~ 7.5% vs 1.6 ~ 2.4%), which deserves more attention in the clinical practice.

Conclusions

The LC morphology should deserves more attention in clinical practice in addition to the intraocular pressure and LC biomechanics. LC morphology and biomechanics could be a key to the estimation of glaucomatous damage under glaucoma development and progression.

P-536

STRUCTURAL AND FUNCTIONAL CHANGES IN MACULA OVERTIME IN OCULAR HYPERTENSION VS CONTROLS

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Purpose

To evaluate and compare the diagnostic ability of macular ganglion cell inner plexiform layer (mGCIPL) and peripapillary retinal nerve fiber layer (pRNFL) thickness changes on Spectral Domain-Optical coherence tomography (SD-OCT), macular and peripapillary perfusion changes using Optical coherence tomography angiography (OCTA), Microperimetry average threshold in ocular hypertensive patients (OHT) and compare these modalities with controls over 12 months.

Methods

80 eyes including 40 normal eyes and 40 eyes of OHT were analysed at Baseline timepoint and at 6 and 12 months. The average thickness of mGCIPL and pRNFL on OCT[1] and macular vessel density and peripapillary perfusion and flux index on OCTA using CIRRUS™ HD-OCT (Zeiss) and Microperimetry of central 10 degrees using MAIA[2] were evaluated.

Results

There was a significant reduction in avg RNFL (p=0.05) compared to normal(p=0.075); reduction in avg GCC in OHT (p=0.001) compared to normal (p=0.07). There was significant reduction in macula VD (p=0.008), ONH perfusion(p=<0.001), ONH flux index(P=<0.001) and avg threshold (microperimetry)(p=0.005) in OHT vs Normal (p= 0.4, p=0.6, p=0.02 and p=0.3 respectively).

Conclusions

Significant reduction in these parameters overtime in OHT patients evaluated with OCT, OCT-A, Microperimetry shows that any of these can be used to diagnose and monitor progression OHT ,so that its progression into glaucoma[3] can be prevented.

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P-537

PREDICTIVE VALUE OF DYNAMIC CORNEAL RESPONSE PARAMETERS EVALUATED WITH CORVIS ST ON THE VISUAL FIELD PROGRESSION IN PROSTAGLANDIN TREATED OAG PATIENTS

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Purpose

To compare the Dynamic Corneal response (DCR) parameters obtained with the Corvis ST at baseline (treatment naïve patients) and one month after initiating monotherapy with prostaglandin analogues (PGs) in eyes showing visual field (VF) progression or stability after six years follow-up.

Methods

This is a prospective observational study carried out in the Hospital Universitario Príncipe de Asturias, Alcalá de Henares, Madrid, Spain. Newly diagnosed and treatment naïve OAG patients were examined at baseline, and one month after beginning monotherapy with topical PGs. Goldmann applanation pressure (GAT IOP) and the corneal Hysteresis (CH), and the DCR parameters were measured using the ORA and the Corvis ST devices, respectively. Then the VF defect progression was evaluated 6 years after baseline visit.

Results

A total of 63 eyes were analyzed. 47 eyes were considered as “non progressed” (NP) and 16 eyes were considered “progressed” (P) according to the “event analysis” evaluation of the VF performed by the Humphrey VF analyzer after 6 years follow up. There were no significant differences in baseline parameters between NP and P groups. Nevertheless, in the 1 month follow up exam, the SSI was found to be 1.60±0.34 vs 1.90±0.34 (p=0.003) and the CH (mmHg) was 10.26±1.73 vs 9.34±1.59 (p=0.06),s in the NP vs P groups respectively. No significant difference was found in any other parameter analyzed.

Conclusions

High speed corneal imaging of the deformation induced by an air puff (Corvis ST) provides a corneal rigidity index (SSI) that shows a high correlation with VF progression when measured 1 month after initiating PGs therapy in newly diagnosed and treatment naïve open angle glaucoma.

P-538

COMPARATIVE ANALYSIS OF ELECTROPHYSIOLOGICAL AND PERIMETRIC PARAMETERS IN PATIENTS WITH SUSPECTED GLAUCOMA

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Purpose
To compare electrophysiological and perimetric parameters in patients with suspected glaucoma

Methods
42 patients (84 eyes) with a diagnosis of suspected glaucoma were examined in the RSNP-CMG. Visual acuity of patients with ametropia correction was 0.9–1.0. Refractive errors did not exceed 3.0 diopters, concomitant visual analyzer disorders were not detected. None of the examined patients received local drug hypotensive therapy at the time of diagnosis. The average age of the patients was 50.5 ± 2.5 years. The comparison group consisted of 20 people without changes in visual functions of the corresponding gender and age.

Electrophysiological and perimetric methods were used: blue-yellow threshold static perimetry, color-component blue-yellow electroretinography of the study of the visual organ to assess the functional state of the visual system with standard methods of examination of the visual organ.

Results
The results of the study. The results of standard and color-component methods of perimetry research, as well as electrophysiological indicators were processed using the applied package of research methods Statistica 6.0. When analyzing the main functional perimetric indices and the nature of the topography and depth of defects in the central field of vision (MD, PSD, CPSD), a significant change in the thresholds of light sensitivity of the blue-yellow perimetry relative to the standard method of investigation was noted. When conducting electrophysiological studies, the criteria that have the greatest similarity in damage to the S-cone system of the retina were selected: PERG, oscillatory potentials, synecolumbular electroretinography (S-CON ERG).

Conclusions
1. The developed complex of functional research methods makes it possible to identify the presence of changes in the visual system at the early preclinical stages of the development of glaucoma optic neuropathy.

2. The proposed method of separation of light and color component channels of the visual analyzer increases the sensitivity and specificity of the lesion of the retina of the optic nerve in the development of glaucoma changes.

3. Indicators of oscillatory potentials of ERG are a predictor of ischemic retinal changes in glaucoma.

4. Research results indicate the presence of specific S-cones the effectiveness of detecting damage to retinal ganglion cells using the coniocellular retinal response system.

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P-539

STRUCTURE-FUNCTION RELATIONSHIP AS MEASURED BY SD-OCT AND OCTOPUS PERIMETRY IN CHILDHOOD GLAUCOMA

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Purpose

To investigate sectoral structural and functional correlations in patients diagnosed with primary congenital glaucoma (PCG) using spectral-domain (SD) ocular coherence tomography (-OCT) and Octopus perimetry.

Methods

Participants were 38 children diagnosed with PCG. All participants underwent reliable Octopus perimetry with the tendency-oriented perimetry (G-TOP) algorithm and optic nerve head imaging with the Spectralis OCT. Principal component analysis was the mean deviation values (dB) for the visual field sectors provided by Octopus perimetry and circumpapillary retinal nerve fiber layer (cpRNFL) thicknesses (overall and sectors). Pearson correlations were calculated between visual field (VF) regions and cpRNFL thickness sectors.

Results

Median age was 11.5 (8-11.5)years for the study group. A moderate, negative and significant correlation was observed between visual field regions and cpRNFL thicknesses: one cpRNFL sector was correlated with more than one VF area. The strongest correlations were found between inferotemporal (all r>-0.600) and superotemporal cpRNFL thickness (all r>0.626) with nasal and peripheral VF areas. The weakest correlation was found involving temporal and nasal cpRNFL thickness and central and temporal VF areas (all r<0.470).

Conclusions

To conlcude, a significant no one-to-one correlation was found between different Octopus regions and SD-OCT sectors in primary congenital glaucoma. The strongest VF-RNFL correlations were found involving superotemporal and inferotemporal thicknesses.

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P-540

COLOUR VISION AND CONTRAST SENSITIVITY CHANGES IN PATIENT WITH PRIMARY ANGLE CLOSURE AND PRIMARY ANGLE CLOSURE GLAUCOMA

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Purpose
To assess colour vision (CV) and contrast sensitivity (CS) in patients with primary angle closure glaucoma (PACG) and primary angle closure (PAC) and to correlate these changes with age matched controls. In addition, to asses this correlation with optical coherence tomography (OCT) retinal nerve fiber layer (RNFL)

Methods
CV (using D-15 and Ishihara test) and CS(using SPARCS and Pelli Robson test) were analysed in patients with PACG (group 1) (33 eyes), PAC (group 2) (27 eyes) and controls (group 3) (60 eyes). OCT RNFL and HVF testing was also done for cases and controls.

Results
Out of a total of 33 eyes in Group 1, 2 (6%) eyes had no defect, 20 (60.6%) had protan defects, 2 (6%) had deutran defects and 9 (27.3%) eyes had tritan defects. Of the 27 eyes in Group 2, 1 (3.7%) eye had no CV defect, 19 (70.3%) eyes had protan defects and 7 (25.9%) eyes had tritan defects. None of the eyes in Group 2 had a deutran defect. Forty-seven (78.3%) eyes from Group 3 had no CV defect, 10 eyes (16.6%) had a protan defect and 3 (5%) of the eyes showed a tritan defect. All Group 1 and Group 2 eyes had a C-Index of > 1.4. 28 eyes had a total SPARCS score less than 70, 18 eyes belonged to Group 1 and 10 eyes belonged to Group 2. There was no statistically significant difference in central and peripheral CS (in all the quadrants) between Groups 1 and 2.

Conclusions
Qualitative and functional vision parameters are affected even in PAC patients before PACG sets in clinically. Hence early and regular screening of these parameters is required.

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P-541

THE CHARACTERISTIC OF RETINAL NERVE FIBER LAYER THICKNESS IN ADVANCE AND END-STAGE GLAUCOMA USING SPECTRAL DOMAIN OPTICAL COHERENCE TOMOGRAPHY

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Purpose

To study the characteristic of retinal nerve fiber layer (RNFL) thickness in advanced and end-stage glaucomatous eyes using spectral domain optical coherence tomography (SD-OCT)

Methods

This was a cross-sectional study of RNFL thickness in advanced and end-stage glaucomatous patients presented at the Faculty of Medicine Siriraj Hospital, Mahidol University, Bangkok, Thailand between January 2022 to January 2023. The RNFL thickness was measured using SD-OCT. The advanced glaucoma was defined as glaucomatous eye with visual field less 10 degrees on Humphrey visual field test. Advanced glaucomatous eye that loss the light perception was defined as end-stage glaucoma.

Results

Thirty-two eyes of 28 patients with the mean age (SD) of 67.8 (17.9) year-old were enrolled into the study. There were 17 eyes with POAG, 8 eyes with PACG, and 7 eyes with secondary glaucoma. The mean average RNFL thickness (SD) was 43.5 (16.0) and the mean IOP (SD) was 16.6 (10.4) mmHg. Among 32 eyes, 10 eyes were end-stage glaucoma. The mean RNFL thickness (SD) were 43.1 (14.6) and 44.5 (19.9) micron and the mean IOP (SD) were 12.8 (3.8) and 24.8 (15.1) mmHg in advanced and end-stage glaucomatous eyes, respectively. Even though the mean RNFL thickness in end-stage glaucomatous eyes was thicker than those of advanced glaucomatous eye, but the difference was not statistically significant in this small sample sized study. (p=0.99)

Conclusions

In advanced glaucomatous eye, the average RNFL thickness may reach the floor which probably about 43.5 (16.0) microns in this present study. The patients with advanced glaucoma may lose their light perception before reaching the floor of average RNFL thickness. This report may be the first study to report the average RNFL thickness in advanced glaucomatous eyes.

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P-542

VISUAL FIELD INDICES IN NORMAL CHILDREN COMPARED TO ADULTS WITH COMPARABLE RETINAL NERVE FIBER LAYER THICKNESS

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Purpose
To compare visual field indices in normal children and adults with similar retinal nerve fiber layer thickness(RNFLT) on Optical Coherence Tomography(OCT) and to analyze differences in reliability and time taken for the test.

Methods
Design: Cross-sectional Study.

Setting: Tertiary care Teaching Institute

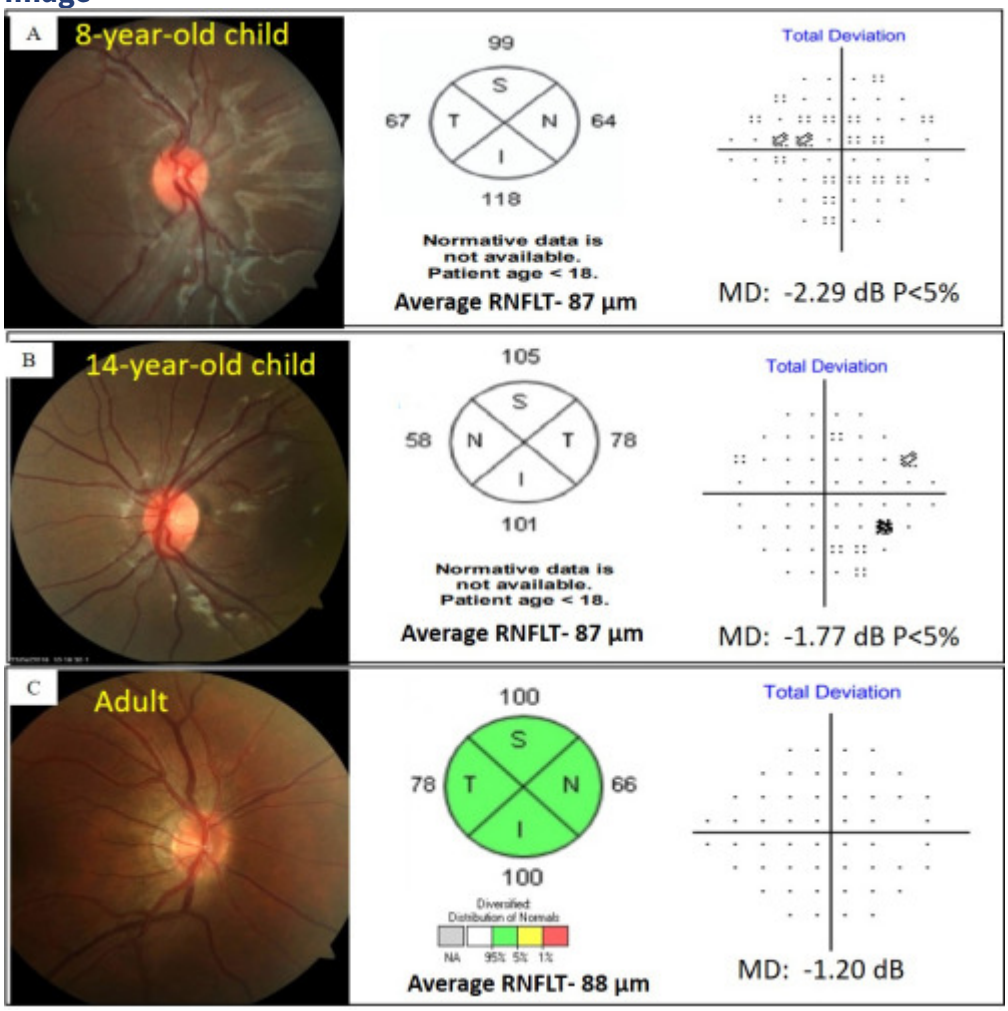
Study populations: 59 eyes of 59 normal children between 6-18 years of age and RNFLT-matched normal adults.

Intervention/Testing: The children underwent Visual field(VF) testing on Humphreys Field Analyzer(HFA) and Retinal Nerve Fiber Layer Thickness (RNFLT)measurement on OCT. Normal adults who had undergone OCT and VF testing previosuly were retrieved from the OCT database. The RNFLT of hte adults was matched to the study group.

Main Outcome Measures: The Mean Deviation(MD), reliability indices and time to do the test in each child were compared with RNFLT-matched eyes of normal adults. Children 6-11 years and 12-18 years were analyzed separately.

Results
The Mean Deviation (MD) of children was significantly less than that of the normal adults despite having the same RNFL thickness (-2.42±1.42 dB vs -1.61±1.47 dB; p=0.006). The difference in MD of children <12 years and normal adults was more significant that in children >12 years (-2.72±1.50 vs -2.15±0.93). Though the MD in children aged 12-18 years was also less than in adults, the difference did not reach statistical significance (p=0.12). The time taken and the reliability indices were significantly greater in children <12 years but similar to adults in older children

Image



Conclusions

Children under 12 years appear to have an inherently lesser retinal sensitivity than adults, and their visual fields may appear worse than they would be for the same disease severity in an adult. Normal children above 12 years appear to have a retinal sensitivity comparable to the adult normative database, and their visual field examination may be relied upon. It is worthwhile to consider the development of a separate paediatric normative database for the visual field assessment of children under 12 years of age.

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P-543

RELATIONSHIP OF VESSEL DENSITY BY OPTICAL COHERENCE TOMOGRAPHY ANGIOGRAPHY (OCT-A) IN HEALTHY, GLAUCOMA SUSPECT, AND GLAUCOMA EYES

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Purpose
The purpose of the study was to evaluate optic nerve vascular density using optical coherence tomography angiography (OCTA) in patients with primary open angle glaucoma (POAG), glaucoma suspect and normal eyes

Methods
This was a prospective, observational study including 250 eyes in total and divided into 3 groups; 100 eyes with POAG, 100 glaucoma suspect eyes, and 50 age-matched healthy eyes as controls. Vessel density was assessed as the ratio of the area occupied by the vessels in 3 distinct regions: 1) within the optic nerve head; 2) in the paripapillary region around the optic disc; and 3) in the whole image. The potential associations between vessel density and structural, functional measures were also analyzed.

Results
There was a statistically significant difference in vessel density among all the groups ($p<0.001$) and also showed a stepwise decrease from normal eyes to glaucoma suspect eyes to glaucoma eyes. Glaucomatous eyes showed a significant difference for all measured vessel densities compared to control eyes ($p< 0.001$). The superior and inferior paripapillary area vessel densities were highly correlated with RNFL thickness in OCT and functional changes (visual field) in Humphrey visual field assessment in POAG eyes.

Conclusions
There was a statistically significant difference in vessel density among all the groups ($p<0.001$) and also showed a stepwise decrease from normal eyes to glaucoma suspect eyes to glaucoma eyes. Glaucomatous eyes showed a significant difference for all measured vessel densities compared to control eyes ($p< 0.001$). The superior and inferior paripapillary area vessel densities were highly correlated with RNFL thickness in OCT and functional changes (visual field) in Humphrey visual field assessment in POAG eyes.

P-547

COMPARISON THE EFFECTS OF WATER DRINKING TEST ON VESSEL DENSITY OF OPTIC NERVE HEAD AND MACULA IN HEALTHY AND GLAUCOMA EYES BY OCTA

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Purpose

To compare the effect of water drinking test (WDT) on IOP and vascular density of optic nerve head and macula in healthy and primary open glaucoma patients using optical coherence tomography angiography (OCTA)

Methods

In this prospective interventional study, two groups of healthy (30) and POAG (44) subjects were enrolled. For all participants, intraocular pressure (IOP) and vascular density of optic nerve head and macula were measured at baseline and then 20, 40, and 60 minutes after WDT.

Results

Baseline IOP was similar between groups 15.94 ± 2.6 and 16.87 ± 4.21mmHg in healthy and glaucomatous eyes respectively. (P = 0.506) In both groups, IOP reached a peak at 40 measurements. In eyes with POAG, IOP elevation was significantly higher than in healthy eyes 4.34 ± 0.30 versus 2.24 ± 0.30 mmHg (P < 0.001). The changes in vessel density inside the disc, and radial peripapillary capillary (RPC) were not significant between the groups (P = 0.486, and 0.162, respectively). The changes in vessel density of the whole macula, superficial and deep capillary plexuses (SCP and DCP) after WDT were not significant between the groups (P = 0.664, and 0.703, respectively).

Conclusions

The WDT lead to a significant IOP elevation in both glaucomatous and healthy eyes, but the magnitude of changes was significantly higher in glaucomatous eyes. The changes in vessel density in the macula and optic nerve head were not significant between the groups.

P-548

AXIAL LENGTH AND CHORIOCAPILLARIS FLOW DEFICITS IN NON-PATHOLOGICAL HIGH MYOPIA

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Purpose

To examine the relationship between axial length (AL) and choriocapillaris (CC) flow deficits percentage (FD%) in non-pathological highly myopic eyes.

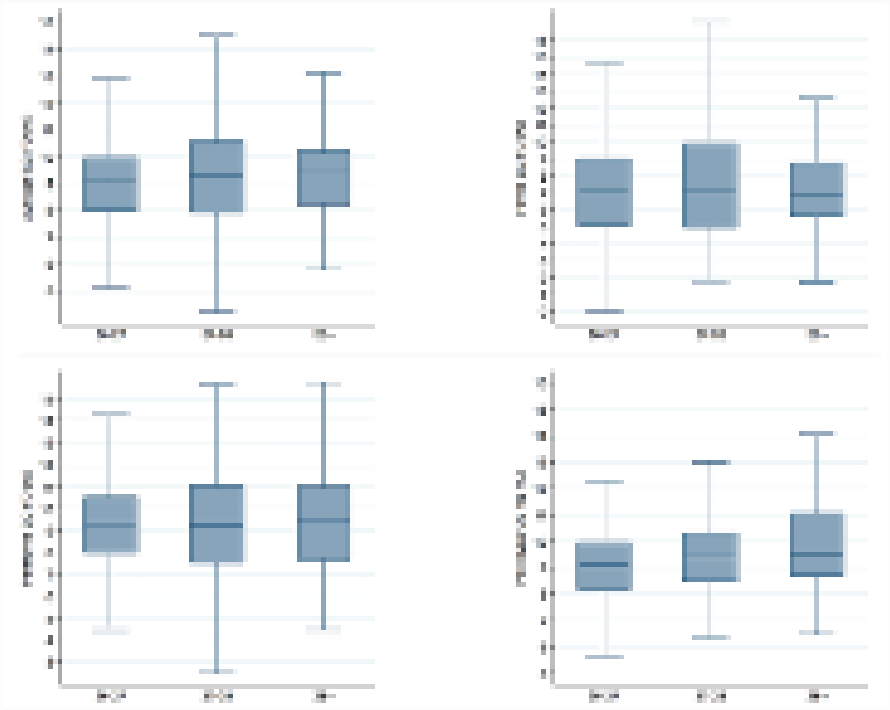
Methods

This prospective cross-sectional study included Chinese patients with non-pathological high myopia, which was defined by an AL of > 26 mm and a META-PM classification grade of <2. Swept-source optical coherence tomography angiography was used to obtain 6 × 6 mm images of the macular CC. The CC FD% was measured in the fovea, parafovea, and perifovea subfields.

Results

A total of 1017 individuals (1017 eyes) with a mean age of 35.95 ± 14.11 years were included. After adjusting for age, sex, intraocular pressure, body mass index, systolic blood pressure, and image quality score, the overall CC FD% increased by 0.27% (95% CI 0.02, 0.52; P = 0.034) for each mm increase in AL. Among subfields, longer AL was associated with a higher CC FD% in the perifovea (β = 0.53, 95% CI 0.30, 0.77; P < 0.001), and was not associated with a higher CC FD% in the parafovea (β = 0.08, 95% CI −0.26, 0.42; P = 0.652) and fovea (β = 0.001, 95% CI −0.50, 0.50; P = 0.999).

Image



Conclusions

The CC FD% increased with a longer AL in high myopia in the perifovea region but not in the fovea and parafovea fields. These findings may be of interest in elucidating the etiology of myopic axial elongation.

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P-550
CONSISTENCY OF BINOCULAR ESTERMAN VISUAL FIELD TEST

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Purpose
The binocular Esterman visual field test (EVFT) of 120 points is the first method to quantify binocular visual field losses. It is relatively easy to perform and available with most perimeters. EVFT is a standard test for driving issues in many parts of the world, and in Japan, it is required for the issuance and grading of visual disability certificates which are essential for access to public welfare services. Because there are few reports on the consistency of EVFT results, we investigated it.

Methods
There were 104 patients who underwent the binocular EVFT at Mie University Hospital, and 98 were diagnosed with glaucoma and 6 were diagnosed with other retinal or optic nerve diseases. The mean age was 68.0 years and there were 46 women and 58 men. The best-corrected visual acuity (BCVA) of the better eye was 0.18 ± 0.38 logMAR units (mean ± SD). The EVFT was performed twice on the same day, and the results of the first and second tests were compared. The 120 EVFT test points were numbered in order of descending y-axis values, or ascending x-axis value if y-axis values were the same.

Results
The mean Esterman scores for the first and second test were 89.3±30.5 and 89.1±30.2, respectively, and the test times were 338.9±86.8 and 336.7±76.4 seconds, respectively. These differences between the first and second tests were not significant (P=0.69 and P=0.33). In the Brand-Altman analysis (second - first test) of the Esterman scores, the mean difference was 0.38 without significant fixed error (P=0.20) or proportional error (P=0.27). The limits of agreement within 1.96 standard deviation was -8.96 to +9.45 points. The average agreement rate by individual test points was 89.8±4.6%, and the highest agreement rate was found in point number 55 (98.1%) and the lowest agreement rate was found in point number 44 (74.0%). The agreement rate of 84.3±3.4% for the most peripheral 24 test points was significantly lower than that of agreement rate of 91.1±3.8% for the other 96 test points (P<0.01). The agreement rate (88.0±3.8%) of the upper visual field (38 test points) was significantly lower than the agreement rate (90.6±4.8%) of the lower field (82 test points) (P<0.01).

Conclusions
The overall consistency rate of EVFT is acceptable, but the peripheral and upper test points have relatively low consistency rates. These findings are important for the proper interpretations of EVFT results.

P-551
FRONTAL LOBE DISORDERS AND VISUAL FIELD TESTING. CASE REPORT

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Purpose
Visual field testing is essential in diagnosing and managing glaucoma and many neurological diseases. The test results may vary from highly reliable to minimally informative. When the latter occurs, it can depend on the patient or the disease.

We have noticed that when frontal lobe disorders are present there is a higher risk for poor perimetric results and a discrepancy between clinically observed structure and functional testing. To illustrate this, we present three cases.

We hope that our case report raises the awareness for the possibility of a frontal lobe pathology as underlying cause for functional visual field defects.

Methods
We present two glaucoma cases and one with visual impairment of unknown origin referred to our clinic for surgery and/or further investigation.

All cases had visual field testing, mainly with the Humphrey Field Analyzer but also the Humphrey FDT visual field instrument. Optic nerve head was documented with digital fundus camera (Zeiss) and/or OCT (Topcon).

Results
In all three cases there was significant discrepancy between structure and function. These discrepancies led to further investigation with computer tomography. We discovered following diagnoses: parenchymal lesions of the frontal lobe, a frontal lobe cavernoma and a large frontal lobe meningioma.

We identified functional visual field loss, that is, field loss without objective causative pathology. We think that the functional field loss is strongly correlated to the frontal lobe pathology present in these three cases.

The glaucoma cases showed very high false negative (FN) error scores. High FN rates are often a characteristic of the glaucomatous eye. In our cases we had FN scores as high as 46% and 62% and this is at least partially caused by the frontal lobe comorbidity.

Conclusions
Frontal lobes are important for higher level of cognitive and executive functions. Pathology in the frontal lobe may affect the results of visual field testing. This association however is not well documented in the literature and therefore easy to overlook.

When assessing disease stage or rate of progression, omitting such a situation might lead to inappropriate management and sometimes incorrect diagnosis. We hope that our case report helps minimalize this risk.

P-552

INTRAOBSERVER AND INTEROBSERVER AGREEMENT IN THE DETERMINATION OF THE CUP-DISC RATIO OF THE OPTIC NERVE. PRELIMINARY RESULTS

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Purpose

To determine the variability of the observation of the cup-disc ratio of the optic nerve by the same physician. As a secondary objective, to analyze the agreement in the optic nerve description among ophthalmologists of different training levels.

Methods

This was an observational, analytical cross- sectional study. Groups of 3 ophthalmologists of different levels of training (resident, general ophthalmologist and a glaucoma specialist) examined the patient in 2 opportunities, leaving 2 months in between. 5 groups were defined and a total of 100 patients would be recruited.

The study included patients who were assisted at the Glaucoma Service of the Hospital Italiano de Buenos Aires, and who had been diagnosed with optic hypertension, chronic glaucoma or suspected glaucoma. Only patients older than 18 years old who are stable were included.

The exam consisted of an evaluation of both optic nerves under pupil dilation with a slit lamp using a 78D or 90D magnifying glass. The ophthalmologist was instructed to use the Armaly cup-disk ratio scale for the description and to report any abnormality seen. If there was some impediment to correctly evaluate both optic nerves under pupil dilation in the slit lamp, the patient was excluded.

Results

To the present, 56 eyes have been evaluated. Cohen's κappa was calculated to portray the degree of agreement between the 2 examinations carried out by each group of ophthalmologists in the same level of training. Residents' kappa was 0.27 (CI 95 % 0.13 to 0.41), general ophthalmologists' kappa was 0. 36 (CI 95% 0.21 to 0.51) and glaucoma specialists' kappa was 0.33 (CI 95% 0.18 to 0.47).

Moreover, the results were arranged according to level of severity. Cup-disk ratio of 0.1-0.4 was considered mild, 0.5-0.7 moderate and 0.8-1.0 advanced. The kappa calculated with these results was significantly higher. Residents' kappa was 0.59 (CI 95% 0.41 to 0.76), general ophthalmologists' kappa was 0.59 (CI 95% 0.41 to 0.77) and glaucoma specialists' kappa was 0.68 (CI 95% 0.52 to 0.84).

Conclusions

With current results there is evidence to claim that ophthalmologists, independently to their level of training, have a significant variability when evaluating cup-disk ratio with the slit lamp.

The study shows that this variability is reduced by classifying the cup-disk ratio according to the level of severity of the pathology.

New studies are required to find a way of training that can reduce the intraobserver variability.

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P-553

DIAGNOSTIC ACCURACY OF OPTIC NERVE HEAD AND MACULA OCT PARAMETERS FOR DETECTING GLAUCOMA IN EYES WITH AND WITHOUT AXIAL HIGH MYOPIA

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Purpose

To characterize structural differences in myopic and non-myopic eyes with and without glaucoma and to assess the diagnostic accuracy of optic nerve head (ONH) and macula parameters to detect glaucoma in high myopic eyes.

Methods

885 eyes of 514 glaucoma patients and 767 eyes of 401 healthy subjects (determined by fundus photographs and visual fields [VF]) were stratified into non (n=368 and 411 eyes, respectively), mild (24mm < axial length [AL] < 26mm, n=393 and 271 eyes, respectively), and axial high myopia (AL > 26 mm, n=124 and 85 eyes, respectively). Spectralis global and sectoral peripapillary retinal nerve fiber layer (pRNFL), Bruch's membrane opening minimum rim width (BMO-MRW), ganglion cell inner plexiform layer (GCIPL), and macular RNFL (mRNFL) were compared and the diagnostic accuracy for glaucoma detection was evaluated using the area under the receiver operating characteristic curve (AUC) adjusted for age and scan quality.

Results

In healthy eyes, global pRNFL and mRNFL were significantly thinner in high myopic eyes compared to non- and mild myopic eyes (mean; 95% CI pRNFL 98.0µm [95.7, 100.3], 100.1µm [98.9, 101.2] and 98.3µm [97.0, 99.6], respectively, p=0.038 and mRNFL 28.7µm [27.8, 29.5], 29.0µm [28.1, 29.9] and 30.3µm [29.3, 31.3], respectively, p=0.038). In contrast, mean BMO-MRW and GCIPL was similar in the 3 groups of healthy eyes (both p≥0.435). In glaucoma eyes, VF mean deviation was worse in the high myopes (-8.14 dB) compared to mild (-7.67 dB) and non myopes (-6.56 dB) (p=0.083). The AUC was largest for ONH parameters global pRNFL (0.96 for high myopes, and between 0.90 to 0.93 for non and mild myopes) and global BMO-MRW (0.96 for high myopes, and between 0.95 to 0.97 for non and mild myopes). Among macula parameters, the AUC was highest for GCIPL (Global 0.94), for high myopes and with AUC ranging between 0.88 and 0.9 for non- and mild myopes) and outer inferior mRNFL for high myopes (0.9) and ranging between 0.88 and 0.89 for non- and mild myopes.

Conclusions

The diagnostic accuracy for Spectralis-derived ONH and macula parameters was high for eyes with high myopia and did not vary much by myopia severity. Further analysis is needed to determine whether the high diagnostic accuracy in high myopes can be confirmed in other populations.

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P-554

LAMINA CRIBROSA THICKENING IN PROLIFERATIVE DIABETIC RETINOPATHY AS A PROTECTIVE MECHANISM IN THE DEVELOPMENT OF NEOVASCULAR GLAUCOMA

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Purpose

to assess the lamina cribrosa (LC) thickness in patients with proliferative diabetic retinopathy (DR) with absence and presence of neovascular glaucoma (NVG) secondary to proliferative DR.

Methods

A total of 45 patients (64 eyes with proliferative diabetic retinopathy) aged 55,8±7.7 years with type 2 diabetes mellitus (DM) were analyzed. The patients were divided into two groups based on the absence or presence of NVG (20 patients (28 eyes) formed the NVG group and the 25 patients (36 eyes) formed the non-NVG group, respectively). In addition to routine eye examination, optical coherent tomography (OCT) of the optic nerve was performed. Lamina cribrosa thickness was measured with the help of SD OCT using LC_Thickness_programm.m and main_low_noise_filters_programm.m, based on the adaptive compensation algorithm for eliminating a high-level noise in the deep layers of the optic nerve and improving the visualization of the posterior border of the lamina cribrosa, as well as for processing B-scan with a set of 3 digital filters: Butterworth Low-pass Filter inverion image, Wavelet Low-pass Filter Analysis Daubechies original and inversion image.

Results

In the non-NVG group the mean maximum IOP was 17.9 ± 1.7 mmHg; in the NVG group the mean maximum IOP was 32.8 ± 1.4 mmHg ($p<0.001$). It was possible to evaluate the LC thickness in 56 eyes of 43 diabetic patients. In patients with proliferative DR without NVG the average LC thickness was 706±35 µm (679 to 783 µm). The average LC thickness in patients of the NVG group with proliferative DR was 262±43 µm (168 to 351 µm), that was significantly thinner as compared with non-NVG group ($p<0.01$). Among the patients of NVG group, LC thickness was not different by the duration of uncontrolled high IOP.

Conclusions

The OCT imaging showed significantly thicker LC in patients with proliferative DR without NVG than in NVG group. Lamina cribrosa thickness was unchanged in the eyes with neovascular glaucoma. So, thickening of lamina cribrosa in proliferative diabetic retinopathy leads to less vulnerability to LC deformation, which can be considered as a protective mechanism against the development of neovascular glaucoma.

P-555

STRUCTURAL CHARACTERISTICS OF CHOROIDAL MICROVASCULAR DROPOUT IN PRIMARY OPEN-ANGLE GLAUCOMA: COMPARISON BETWEEN WIDTH AND AREA

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Purpose
To compare width and area of choroidal microvasculature dropout (CMvD) and investigate the correlation with clinical characteristics in eyes with primary open-angle glaucoma (POAG).

Methods
This cross-sectional study included 122 POAG eyes with a localized retinal nerve fiver layer (RNFL) defect, 85 eyes with and 37 eyes without CMvD. The CMvD was defined as hypoperfusion or nonperfusion in the choroidal layer determined by optical coherence tomography (OCT) angiography. Optic nerve heads were imaged using spectral-domain OCT, and the peripapillary atrophy (PPA) was divided into β-zone and γ-zone PPA according to the presence of Bruch's membrane. Circumferential width and area of CMvD were measured and correlations with clinical characteristics were analyzed.

Results
Eyes with CMvD had a higher proportion of females, worse visual field results, thinner global RNFL thickness, and a larger β-zone PPA than eyes without CMvD (all Ps≤0.028). The width and area of CMvD were highly correlated (P<0.001). Thinner global RNFL thickness, worse visual field mean deviation and larger area of β-zone PPA were associated with a larger width of CMvD (P=0.046, P=0.049, P=0.013, respectively), whereas larger area of β-zone and γ-zone PPA related to a larger area of the CMvD (P=0.001 and P<0.001, respectively).

Conclusion: The circumferential width of CMvD was significantly correlated with the area of CMvD, however related clinical factors showed different patterns. The width of CMvD rather than the area of CMvD could serve as an indicator showing the degree of glaucomatous damage.

Conclusions
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P-556

ORDER OF MAGNITUDE (OM): VIRTUAL REALITY-BASED VISUAL FIELD EXAMINATION TO DETECT GLAUCOMATOUS FIELD LOSS

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Purpose
This study presents Order of Magnitude (OM), a virtual reality-based visual field analyser, and its potential application in detection of glaucomatous visual field loss.

Methods
Study participants underwent a comprehensive eye examination, along with OM test and Humphrey's Visual Field (HVF) test. OM follows a two-step supra-thresholding algorithm with low and high threshold stimuli of 0.43° diameter (Goldmann size III) each. The diagnostic ability of OM and HVF tests was compared against the clinical diagnosis of glaucoma by the specialists. OM test was called abnormal when all the points in one or more Glaucoma Hemifield Cluster(s) were relatively depressed with a minimum of one absolute depressed point.

Results
We studied 157 eyes (74 glaucomatous and 83 control) of 152 participants. Ninety-seven (61.7%) OM and 108 (68.7%) HVF tests were reliable as per the defined criteria (P=0.19, Chi-square test). The sensitivity [95% confidence interval (CI)] of OM and HVF test was 93 (86, 100) % and 98 (93.9, 100) %, respectively. Similarly, the specificity (95% CI) of OM and HVF test was 83 (72.4, 93) % and 88 (73.9, 92.8) %, respectively. The test duration (Mean ± SD) in minutes of OM test (5.4 ± 1.6) was significantly less than that of HVF test (6.2 ± 1.2, P<0.001; t-test).

Conclusions
OM test is a quick and effective visual field test suitable for glaucoma screening.

P-557

A NEW GLAUCOMA MIMIC: SUBCLINICAL OPTIC TRACT DEFECTS DIAGNOSED BY WIDEFIELD MACULAR OCT SCANS

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Purpose

To describe a distinctive pattern of macular OCT imaging findings which are diagnostic in cases of tramuatic optic tract damage which are subclinical and do not produce visual symptoms or visual field defects, but can have optic disc and retinal nerve fibre layer OCT changes that mimic glaucoma.

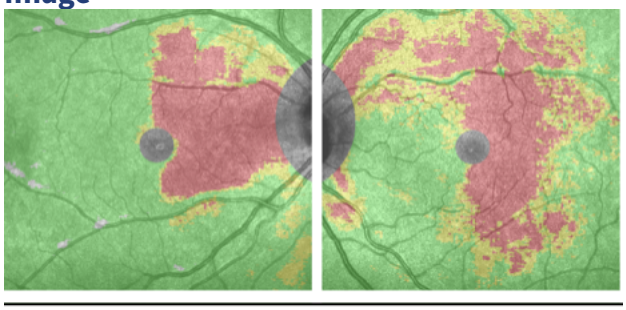
Methods

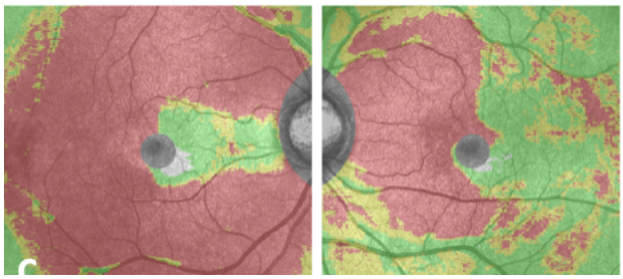
A series of 6 cases presenting to a glaucoma clinic with undiagnosed optic tract injuries are described.

Results

All cases had no visual field defect, no relative affferent pupil defect and normal colour vision. No optic disc pallor or gliosis was present in any case, with any abnormal optic disc examinaiton findings consistent with early glaucomatous neuroretinal rim loss, and OCT retinal nerve fibre layer defects were more subtle that the typical vertical loss in one eye and horizontal loss in the other found with clinical optic tract syndrome. However macular ganglion cell complex OCT scans showed marked changes from normal, with a distinctive pattern. This involves centrocoecal ganglion cell complex loss on one side and sparing on the other, with the vertical midline respected close to the fovea, but thinning affecting the arcuate pathways location on the side with temporal GCC loss. Widefield scans show both the homonymous vertical midline demarcation and the unilateral centrocoecal involvement of the papillomacualr bundle simultaneously, which distinguishes this from glaucoma.

Image





Conclusions

Subclinical traumatic optic tract injuries can mimic glaucoma, producing subtle optic atrophy in the clinical style of glaucomatous optic disc changes, no visual field defect and subtle retinal nerve fibre layer OCT changes which can also mimic early glaucomatous changes. However wide field macular ganglion cell OCT scans show a characteristic homonymous macular thinning which includes centrocoecal ganglion cell complex loss on one side and sparing on the other.

P-558

FACTORS AFFECTING VISUAL ACUITY AND CENTRAL VISUAL FUNCTION IN GLAUCOMA PATIENTS WITH MYOPIA

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Purpose

To investigate associated factors including structural parameters of myopia and vessel density (VD) using optical coherence tomography angiography (OCT-A) to visual acuity (VA) and central visual function in glaucoma patients with myopia.

Methods

Sixty-five eyes of 60 glaucoma patients with myopia and without media opacity and retinal lesions were included in this study. Both Swedish interactive thresholding algorithm (SITA) 24-2 and 10-2 visual field (VF) testing were performed. Superficial and deep VD in the peripapillary and macular region were evaluated using OCT-A; retinal nerve fiber layer and ganglion cell-inner plexiform layer (GCIPL) thickness were measured using optical coherence tomography (OCT). β-zone peripapillary atrophy (PPA) area, disc torsion, disc-fovea distance, and peripapillary choroidal thickness were measured from fundus photography and OCT images. Decreased VA was defined as best-corrected VA <20/25. Central VF damage was defined as glaucomatous VF defect in 1 hemifield within 12 points of a central 10 degrees of fixation.

Results

The worse mean deviation of SITA 24-2, thinner GCIPL thickness, and lower deep peripapillary VD were associated with the presence of central VF damage in glaucoma patients with myopia. Thinner GCIPL thickness, lower deep peripapillary VD, and longer disc-fovea distance were associated with decreased VA in logistic regression analysis. Thinner GCIPL thickness, lower deep peripapillary VD, and larger β-zone PPA area were associated with lower VA in linear regression analysis. Deep peripapillary VD showed a positive correlation with GCIPL thickness, whereas there was no relationship between deep peripapillary VD and RNFL thickness.

Conclusions

Decreased VA in glaucoma patients with myopia was associated with lower deep peripapillary VD and papillomacular bundle damage. Lower deep peripapillary VD was independently associated with decreased VA along with thinner GCIPL thickness. Therefore, this could be stated that decreased VA in glaucoma patients is related to the damage location and the status of blood flow in the optic nerve head.

P-559

CHARACTERISTICS OF PRIMARY ANGLE-CLOSURE GLAUCOMA EYES PRESENTING WITH VISUAL FIELD LOSS OF DIFFERENT SEVERITY LEVELS

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Purpose
To investigate and compare the clinical characteristics of patients across varying severity of primary angle closure glaucoma (PACG) at presentation.

Methods
In this retrospective chart review, we extracted the following clinical data from case records of 304 PACG patients: age at presentation, presenting intraocular pressure (IOP), gonioscopy data performed prior to laser or surgical intervention, visual field mean deviation (MD) at presentation, ocular biometry, and pre-surgery refractive data. One eye of each patient was analysed. For bilateral cases, the worse eye was selected based on visual field MD, while the affected eye was used in unilateral cases. Patients with previous acute primary angle closure (APAC) were excluded. Disease severity were based on the visual field MD and classified as early-to-moderate (≥-12dB), advanced (-12.01 to -20.00dB), and severe (<-20dB).

Results
At presentation, 304 patients were categorized as having early-to-moderate (n=129), advanced (n=57) and severe PACG (n=118). 52.6% of patients were male and mean visual field MD at presentation was -15.7±10.3dB. Patients with severe disease at presentation were more likely to be male (61.9%) than those in the early-to-moderate and advanced groups (49.6% and 40.4%, p=0.02). There was no significant difference in mean age at presentation across groups (ANOVA p-value =0.12). Severe PACG patients had the highest IOP at presentation (ANOVA p<0.01), narrowest anterior chamber angles on gonioscopy (ANOVA p<0.01), shallowest anterior chamber depth (ANOVA p= 0.02), shortest axial length (ANOVA p=0.04), and worst visual acuity (ANOVA p<0.01). There was no significant difference in lens thickness, central corneal thickness, and spherical equivalent between the groups. Of the 118 severe PACG patients, 17.9% presented with severe disease in bilateral eyes.

Conclusions
More than a third of PACG patients presented with severe disease in at least one eye, and their age at presentation was similar to those with less severe disease. This suggests that these subjects either developed severe disease at an earlier age or underwent rapid disease progression.

P-560

STAGE SPECIFIC GLAUCOMATOUS CHANGES OF THE MACULA RECORDED USING SPECTRAL DOMAIN OPTICAL COHERENCE TOMOGRAPHY

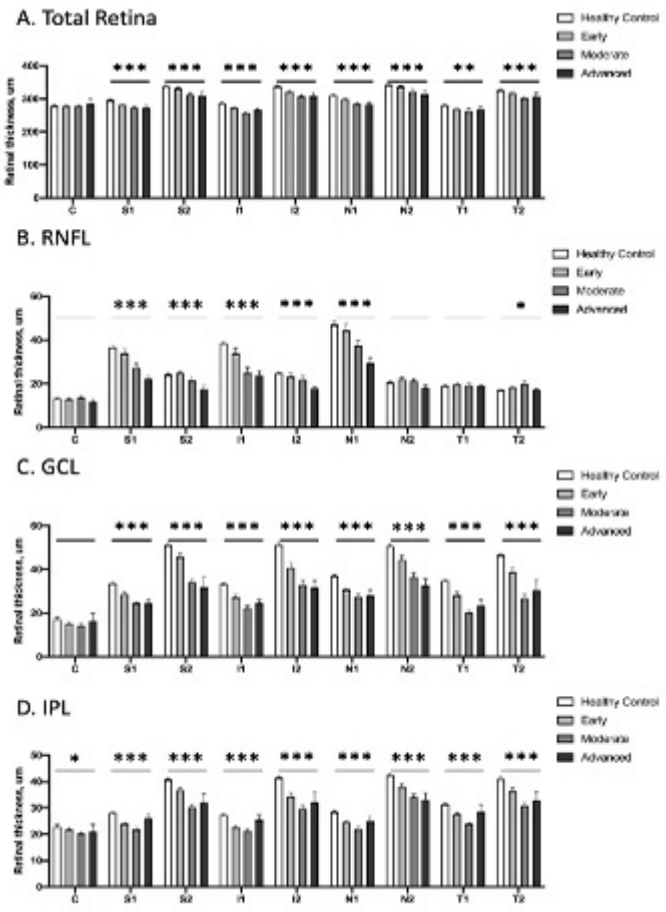
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Purpose
This study aims (1) to compare the thickness of macular retinal sublayers in eyes with different stages of glaucoma and healthy controls, and (2) to evaluate the diagnostic performance of inner macular layers for detection of glaucoma using Spectralis spectral-domain optical coherence tomography (OCT).

Methods
48 glaucomatous and 44 healthy eyes went through the OCT examination. The thickness of the total retina and all retinal sublayers were obtained in each sector of the Early Treatment Diagnostic Retinopathy Study (ETDRS) grid. The minimal and average values of the outer ring and inner ring of the ETDRS grid for each sublayer were also calculated. The diagnostic performance for glaucoma detection was evaluated using the area under the receiver operating characteristic curve (AUC).

Results
The thickness of the total retina, ganglion cell layer (GCL), and inner-plexiform layer (IPL) was significantly lower in glaucomatous eyes in all sectors except the center sector (all $P<0.05$). The thickness of retinal nerve fiber layer (RNFL) was significantly lower in the glaucoma group except in the center, nasal inner, and temporal outer sectors (all $p<0.05$). The thinning of total retina and inner retinal sublayers advanced with glaucoma severity. The best OCT parameter for discrimination between glaucomatous eyes and healthy controls was minimal outer GCL (AUC, 0.955). The minimal outer IPL (AUC, 0.938) was the best parameter for discriminating early-stage glaucomatous eyes from healthy controls.

Image



Conclusions

The thickness of the complete retina, RNFL, GCL, and IPL were reduced with advancing stages of glaucoma severity. Macular GCL and IPL showed high diagnostic ability in discriminating glaucomatous and early-stage glaucomatous eyes from healthy controls.

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P-561

COMPARISON OF GLAUCOMA DIAGNOSTIC ACCURACY OF MACULAR GANGLION CELL COMPLEX THICKNESS BASED ON NON-HIGHLY MYOPIC AND HIGHLY MYOPIC

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Purpose

To evaluate and compare the diagnostic discriminative ability for detecting glaucoma in highly myopic eyes from a normative database of macular ganglion cell complex (mGCC) thickness based on nonhighly myopic and highly myopic normal eyes.

Methods

Forty-nine eyes of 49 participants with high myopia (axial length> 26.0 mm) were enrolled. Spectral-domain optical coherence tomography scans were done using Nidek RS-3000, and the mGCC thickness/significance maps within a 9-mm diameter circle were generated using built-in software. We compared the difference of sensitivity, specificity, and diagnostic accuracy between the nonhighly myopic database and the highly myopic database for differentiating the early glaucomatous eyes from the non-glaucomatous eyes.

Results

This study enrolled 15 normal eyes and 34 eyes with glaucoma. The mean mGCC thickness of the glaucoma group was significantly less than that of the normal group ($p < 0.001$). Sensitivity was 96.3%, and the specificity was 50.0% when using the non-highly myopic normative database. When the highly myopic normative database was used, the sensitivity was 88.9%, and the specificity was 90.0%. The false positive rate was significantly lower when using the highly myopic normative database ($p < 0.05$).

Conclusions

The evaluations of glaucoma in eyes with high myopia using a nonhighly myopic normative database may lead to a frequent misdiagnosis. When evaluating glaucoma in high myopic eyes, the mGCC thickness determined by the long axial length high myopic normative database should be applied.

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P-562

OPTIC NERVE HEAD CHARACTERISTICS IN PATIENTS WITH UNILATERAL CORNEAL TRANSPLANTATION

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Purpose
To evaluate optic nerve head features in eyes that had corneal transplantation and compare with the fellow unoperated eye.

Methods
Medical records of the patients who underwent unilateral graft surgery at least 1 year ago in Dokuz Eylul University Hospital were reviewed retrospectively. Patients' age, gender, central corneal thickness (CCT), best corrected visual acuity (BCVA), intraocular pressure (IOP), optic disc optical coherence tomography (OCT), and peripapillary OCT-angiography (OCT-A) images were recorded at the last follow-up. Data of the eyes with graft surgery (Group 1) were compared with that of the fellow eyes with no corneal or glaucoma surgeries (Group 2).

Results
A total of 29 patients (17 males, 12 females) were enrolled. The mean age was 49.7±18.7 years (range: 19-77). There were 14 right and 15 left eyes with graft surgeries. Penetrating keratoplasty was performed in 27 eyes, whereas deep anterior lamellar keratoplasty was performed in 1 right and 1 left eyes. The BCVA was 0.38±0.23 in Group 1 and 0.71±0.23 in Group 2 ($p<0.05$) at the last follow-up. The mean CCT was 580.24±85.83µm in Group 1 and 530.21±104.30µm in Group 2 ($p=0.05$). The mean IOP was 15.38±3.20mmHg in Group 1 and 15.51±4.34mmHg in Group 2 ($p>0.05$). IOP was 20 mmHg or higher in 3 eyes in Group 1 and in 5 eyes in Group 2. The mean retinal nerve fiber layer (RNFL) thickness as measured by OCT in temporal (107.43±41.0 vs 101.36±39.67), nasal (81.46±19.29 vs 78.97±15.68), temporal-inferior (102.46±34.90 vs 107.96±45.78), temporal-superior (127.36±24.13 vs 132.36±19.97), nasal-inferior (115.32±24,48 vs 115.79±23.14) and nasal-superior sectors (112.14±28.25 vs 114.71±24.40); as well as the peripapillary vessel density as measured by OCT-A in nasal (49.72±4.10 vs 48.70±4.49), superior (57,28±3.88 vs 58.63±4.45), temporal (50.14±4.60 vs 51.16±4.81) and inferior (58.43 ± 4.17vs 59.19±3.40) quadrants were statistically similar in Group 1 and 2, respectively ($p>0.05$ for all).

Conclusions
Post-corneal transplantation glaucoma is known to be multifactorial, including among the causes the compression of the angle's anatomical elements with the trabecular meshwork's collapse, incorrect graft suturation, postoperative inflammation and prolonged use of corticosteroids in the postoperative treatment. However in the absence of glaucoma, corneal graft surgery does not seem to alter the optic nerve head RNFL thickness or the peripapillary vascularity density.

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P-563

QUANTITATIVE RETINAL NERVE FIBER LAYER ANALYSIS COMPARISON BETWEEN TWO MULTIMODAL IMAGING PLATFORMS: THE HEIDELBERG SPECTRALIS & NIDEK MIRANTE

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Purpose

Despite of it advancements on diagnostic capabilities and image acquisition, the Spectral Domain Optical Coherence Tomography (SD-OCT) still has limited evidence on the reproducibility of peripapillary RNFL measurements. This study aims to assess the comparability of the RNFL measurements of the two multimodal imaging platforms in our institution: The Heidelberg Spectralis and the Nidek Mirante.

Methods

This is a retrospective cross-sectional comparative instrument validation study. A total of 118 eyes of 69 subjects (69 healthy and 49 glaucomatous eyes) underwent peripapillary RNFL imaging using the Spectralis and the Mirante. The RNFL thickness measurements of the two OCT devices were compared and statistically evaluated and a Bland-Alman plot was utilized to check for agreement among RNFL measurements per quadrant.

Results

For the RNFL thickness measurements per quadrant, there is a significant difference with the mean values and standard deviations between the two machines, where the Spectralis was thicker on the superior ($p<0.0135$), inferior ($p<0.0007$), and nasal ($p<0.0147$) quadrants while there was no significant difference on the temporal quadrant ($p<0.30.36$). The mean RNFL thickness on all quadrants between the healthy and glaucomatous eyes had a significant difference on the Spectralis. The temporal quadrant for Mirante's RNFL was non-significant between the two groups but significant for the rest of the 3 quadrants. Despite of the differences on the mean values of RNFL, all Bland-Altman plots for the four quadrants shows majority of data points lies within the set limits of agreement between the two diagnostic machines.

Conclusions

Despite of the significant differences in acquiring RNFL thickness measurements, both the Heidelberg Spectralis and the Nidek Mirante can yield reliable results based on the presence of an established agreement agreement and will serve its purpose of identifying structural glaucomatous changes. A propsective and a larger population study is recommended to verify further the reproducibility of the two diagnostic machines.

P-564

OPTICAL COHERENCE TOMOGRAPHY ANGIOGRAPHY IN GLAUCOMA: A CASE-CONTROL STUDY

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Purpose

We intended to develop software to quantify vessel density (VD) from OCT-Angiography (OCTA) images. We aimed to test the software in glaucomatous patients compared to healthy controls to characterize its diagnostic capacity. We then intended to contrast the diagnostic capabilities of VD, OCT (Retinal Nerve Fiber Layer thickness, RNFL, and ganglion cell complex thickness, GCC), and visual fields (VF) for glaucoma.

Methods

We performed a cross-sectional study with the prospective recruitment of 67 open-angle glaucoma patients and 42 healthy controls. All participants had a complete ophthalmologic consultation (including Goldmann tonometry and gonioscopy), central corneal thickness, OCTA, and OCT. All cases and some of the controls performed VF. We built software to quantify VD using Visual Studio. The area under the curve (AUC) was calculated for all slabs and different cutoffs. In addition, capillary VD, color VD, and whole-image papillary VD were obtained.

Results

Mean VD was statistically significantly smaller in glaucoma than controls in most cutoffs tested. The highest AUC obtained was for cutoff 10 in radial peripapillary capillary (0.706, 95%CI 0.595-0.817). Models using several OCTA scans surpassed the AUC for VF (0.678, 95%CI 0.472-0.884) and OCT (0.765, 95%CI 0.669-0.860), with an AUC of 0.842 (95%CI 0.714-0.968).

Conclusions

The software built allowed us to quantify VD, enabling a systematic and quantitative approach that can be applied to other OCTA devices and populations. The AUC was superior with OCTA than with OCT or VF, showing OCTA's promise in glaucoma diagnosis. Future studies with other devices, longitudinal studies, and artificial intelligence applied to OCTA are warranted to better understand VD's role in glaucoma through time.

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P-565

TO CORRELATE THE MACULAR CIRCULATION ON SS-OCT-A WITH ANATOMICAL AND FUNCTIONAL ASPECTS IN OCULAR HYPERTENSIVE AND PRE-PERIMETRIC GLAUCOMA PATIENTS

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Purpose

To correlate the macular micro vascular circulation on SS-OCTA with anatomical and functional aspects in ocular hypertensive and pre-perimetric glaucoma patients and normal subjects.

Methods

A prospective, comparative, observational, cross-sectional study was done on 26 ocular hypertensive (OHT) eyes, 26 pre-perimetric (PPG) eyes, and 26 normal eyes. All subjects were in the 40-60 year age group, had a BCVA of 6/12 or better, spherical refraction within 0.5D,Cylinder within 3.0D, and normal C24-2 visual fields. SD-OCT RNFL and GCC were used to study anatomical characteristics(GCC parameters).Vascular density of 6x6 mm superficial vascular slab on SS OCTA plexus was calculated to analyse superficial microvasculature, VFA C10-2 was applied to study the functional characteristics of all eyes

Results

The median VFA (10-2) FT was comparable between the three groups. The median VFA (10-2) PSD was significantly higher in OHT compared to Normal, while it was comparable between PPG and OHT and PPG and Normal. The mean of GCC Parameters (average GCC, superior GCC and inferior GCC, GLV, FLV) was significantly higher in normal compared to PPG and OHT; and it was significantly higher in OHT compared to PPG. The mean of superior/inferior GCC ratio was significantly lower in PPG compared to OHT and Normal; while the mean of superior/inferior GCC ratio was comparable between OHT and Normal. The mean FLV was comparable between the three groups. The mean GLV was significantly higher in PPG compared to OHT and Normal; and it was significantly higher in OHT compared to Normal. The mean Whole Image Vascular Density (WiVD) was significantly higher in Normal compared to PPG and OHT; and it was comparable between PPG and OHT. Among all the parameters (average GCC, inferior GCC superior GCC, GLV), OCT GLV was the best predictor of PPG at cut off point of >6.98 with area under curve of 0.934 for correctly predicting PPG.OCT A WiVD was the best predictor of OHT at cut off point of ≤0.66 with area under curve of 0.746 for correctly predicting OHT

Conclusions

Macular vascular density can be a supplementary tool for identifying early glaucomatous damage and vascular changes cannot distinguish between PPG and OHT.Best predictor of OHT is whole image vessel density and best predictor of PPG is global loss of volume.

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P-566

ANTERIOR SEGMENT OPTICAL COHERENCE TOMOGRAPHY FOR ADEQUATE POSTOPERATIVE PLACEMENT OF PRESERFLO MICROSHUNT

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Purpose

To study the usefulness of Anterior Segment Optical Coherence Tomography (AS-OCT) in the postoperative after Preserflo Microshunt. AS-OCT allows us to investigate the device during the duration of its use and we want to understand if using these images in conjunction with standard postoperative clinical evaluation can help with the management of these patients.

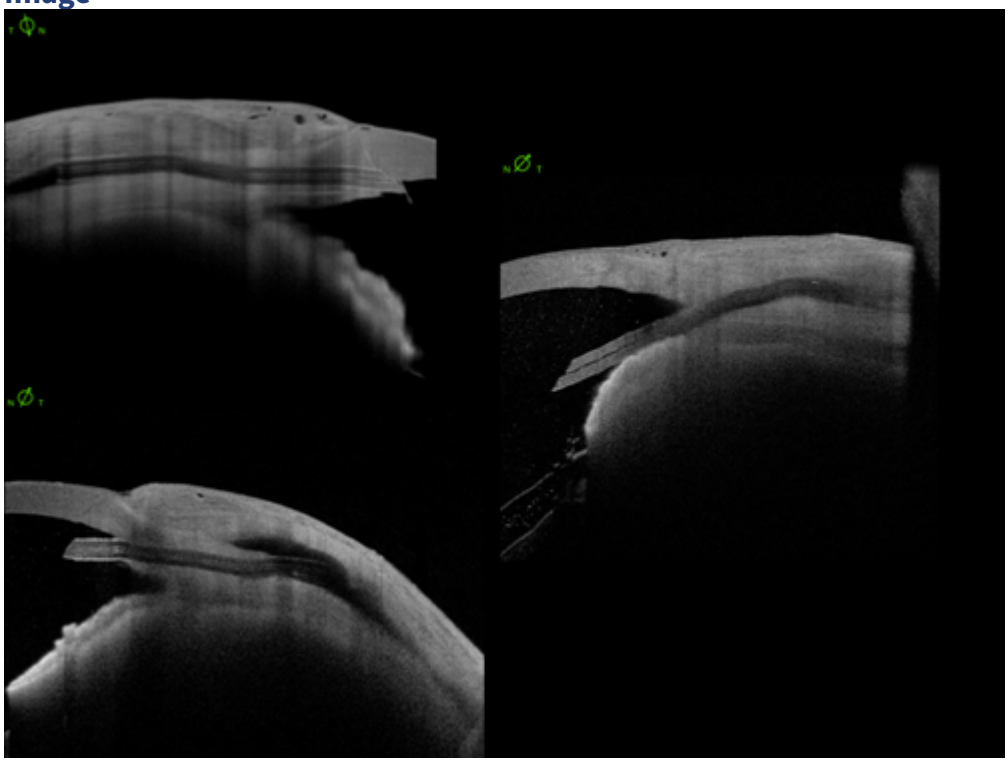
Methods

28 eyes received the same surgical procedure to implant Preserflo Microshunts. Patients were monitored using Anterior Segment Optical Coherence Tomography (AS-OCT) after the installation of the PreserFlo Microshunt, at various intervals. At each session, tone measurement, slit-lamp clinical evaluation, and AS-OCT acquisition were combined. AS-OCT images were captured using high-resolution swept-source ANTERION®, (Heidelberg Engineering GmbH, Heidelberg, Germany). The project consists of a collection of AS-OCT ANTERION images that have been analyzed and compared to clinical information.

Results

Despite the fact that surgical technique is constant, it is clear from this work that there is significant variability in device placement. We can confirm the device's true path and how it interacts with the ocular structures using AS-OCT.

Image



Conclusions

The use of swept-source high-resolution AS-OCT in postoperative PreserFlo MicroShunt implantation is useful in everyday clinical practice to be combined with slit-lamp evaluation. Anterior segment imaging allows for a more precise study of the placement of the device and its relationship to the various ocular structures with which it comes in contact can be a useful factor in predicting the progress and effectiveness of this type of surgery.

P-567

FUNCTIONAL PLASTICITY OF THE OPTIC NERVE AFTER EXOGENOUS NERVE GROWTH FACTOR ADMINISTRATION: REPORT OF TWO CASES

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Purpose
To describe a case series of patients with severe visual loss due to advanced glaucoma, showing optic nerve functional plasticity after exogenous nerve growth factor (NGF) eyedrop administration.

Methods
We examined two patients with advanced manifest glaucoma, severe visual field loss and abnormal flash visual evoked potentials (VEPs), who underwent over a short period (10 days) topical treatment with human recombinant NGF (180 microgr 3 times/day).

Results
Compared to pre-treament values, VEP amplitudes increased largely (150 – 200%) immediately after the end of treatment (then declined at 6 months post-treatment), visual fields improved by 3-8 dB, visual acuity improved in one patient from 20/400 to 20/200. Quality of vision improved greatly in both patients.

Conclusions
Exogenous NGF administration may induce a temporary increase in VEP light responsivenesss as well as in psychophysical visual functions. Comparable results by mouse NGF are reported in previous clinical trials in glaucoma patients (Lambiase et al, 2005) as well as in patients with optic pathway glioma (Falsini et al., 2016). The observed visual function improvements could be ascribed to a functional plasticity of retinal ganglion cells and optic nerve fibers. A direct bolstering effect of NGF on neuronal cyclic AMP, or an indirect NGF effect as a transcription factor may have a causative role in optic nerve functional plasticity.

P-568

TO DETERMINE MACULAR GANGLION CELL LOSS BY SD-OCT IN OHT, POAG SUSPECTS, POAG & TO ACCESS IF GCIPL IS SUPERIOR TO PRNFL

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Purpose

To determine macular ganglion cell loss by SD-OCT in OHT, POAG suspects, POAG & to access if GCIPL is superior to pRNFL.

Methods

Prospective study of 112 patients 28 in each group (OHTN , POAG suspects , POAG).The superior, inferior GCIPL and RNFL thickness were recorded by SD-OCT

Results

The superior and inferior GCIPL were OHT 85.67±3.6µ & 84.39±4.3 µ, POAS 83.95±3.7 µ & 81.68±3.5 µ, normal 85.39±3.6 µ & 85.75±3.5, POAG 69.06 µ & 65.7±9.2 µ. Average RNFL were 93 µ OHT, 90 µ POAS, 97 µ normal and 65.45 µ POAG. There was a significant difference in RNFL, superior and inferior GCIPL values between POAG and other 3 groups. RNFL had significantly better AROC value than GCIPL for discriminating POAG suspect (.004) and OHT (.005) from normal but in POAG with normal subjects both AROC were closer to 1.

Image

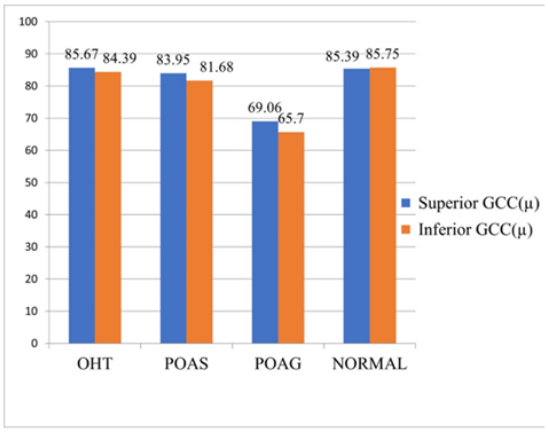


Figure 1 : Comparision of Superior and Inferior GCC values among 4 groups

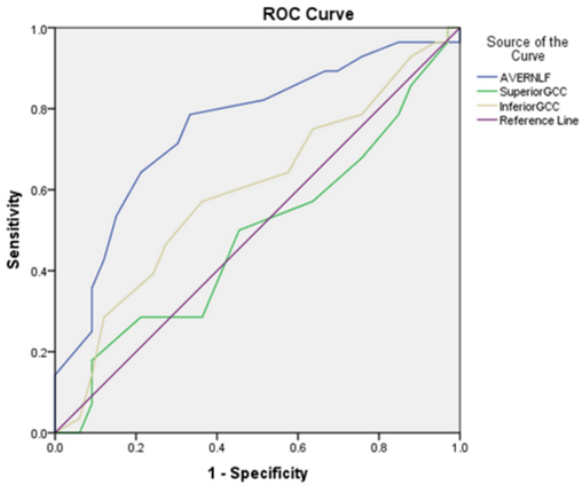


Figure 2: Comparision of OHT with normal subjects (ROC Curve)

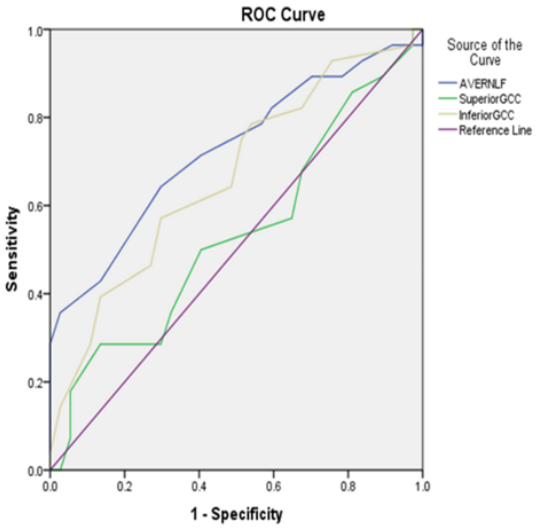


Figure 3: Comparision of POAS with normal subjects (ROC Curve)

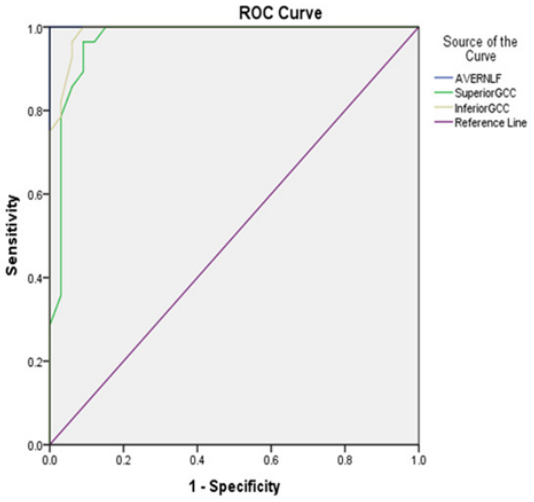


Figure 4: Comparision of POAG with normal subjects (ROC Curve)

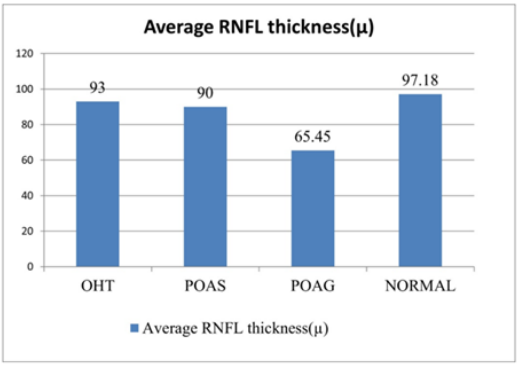


Figure 6: Average RNFL in all 4 groups

Conclusions

No significant GCIPL loss noted between the OHT, POAG suspect and normal. RNFL and GCIPL parameters have same diagnostic capability in POAG patients but in POAG suspect and OHT, RNFL changes earlier than GCIPL.

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P-570
ELECTROPHYSIOLOGY OF GLAUCOMA - THE PATH TO EARLY AND FINAL DIAGNOSIS

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Purpose
To present a case report of a patient with suspected primary open-angle glaucoma and to demonstrate the efficacy of PERG in the early detection of retinal ganglion cell dysfunction.

Methods
A 51-year-old patient was referred to the hospital due to subjective visual disturbances and elevated intraocular pressure values. Standardized glaucoma testing was performed with electrophysiological testing of the retinal ganglion cell's function.

Results
During the work-up, an ophthalmological examination was performed. The initial corticonuclear clouding of the lens was diagnosed as well as marginal elevated values of intraocular pressure with elevated values of the IOP recorded on the follow-ups. The standardized glaucoma diagnostical procedure performed did not describe the change in the structure of the optic nerve and the RNFL layer. Gonioscopically there is an open angle of the POS. The field of view finding Octopus G standard indicates a marginal narrowing of the field of view (oc. dex .: MS (dB): 22.0; MD (<2.0 dB): 3.8; sLV (<2.5 dB) 3.1; oc. syn.: MS (dB): 18.1; MD (<2.0 dB): 5.6; sLV (<2.5 dB): 4.0). Additionally, electrophysiological testing of ganglion cell function by PERG was included in the diagnostical procedure and the prolongation of latency P50 (65.4 ms) and N95 (102.7 ms) with a decrease in the amplitude of P50 (1.5 µV) and N95 (2.1 µV) was identified.

Conclusions
Examination of ganglion cell function by PERG allows the detection of ganglion cell dysfunction without the presence of morphological and structural changes commonly detected in advanced glaucoma disease by morphological methods of retinal and optic nerve visualization. PERG testing allows for early diagnosis and treatment of primary open-angle glaucoma, prior to the onset of irreversible changes characteristic of the glaucoma disease.

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P-571

REVERSE PUPILLARY BLOCK IN NON PIGMENT DISPERSION GLAUCOMA AND THE VALUE OF DYNAMIC AS-OCT

M Riquelme-Quintero, D Alvarez-Ascencio, G Lazcano-Gomez

Purpose

To present the hypothesis that reverse pupillary block (RPB), occurs inadvertently in some non-pigmentary dispersion (PD) glaucomas. This RBP is often unidentified and can complicate the achievement of IOP control and stability. We show a case series with imaging evidence of non-PD glaucomas where reversing RPB with a peripheral iridotomy improves the anatomy, aqueous humor dynamics, and intraocular pressure (IOP).

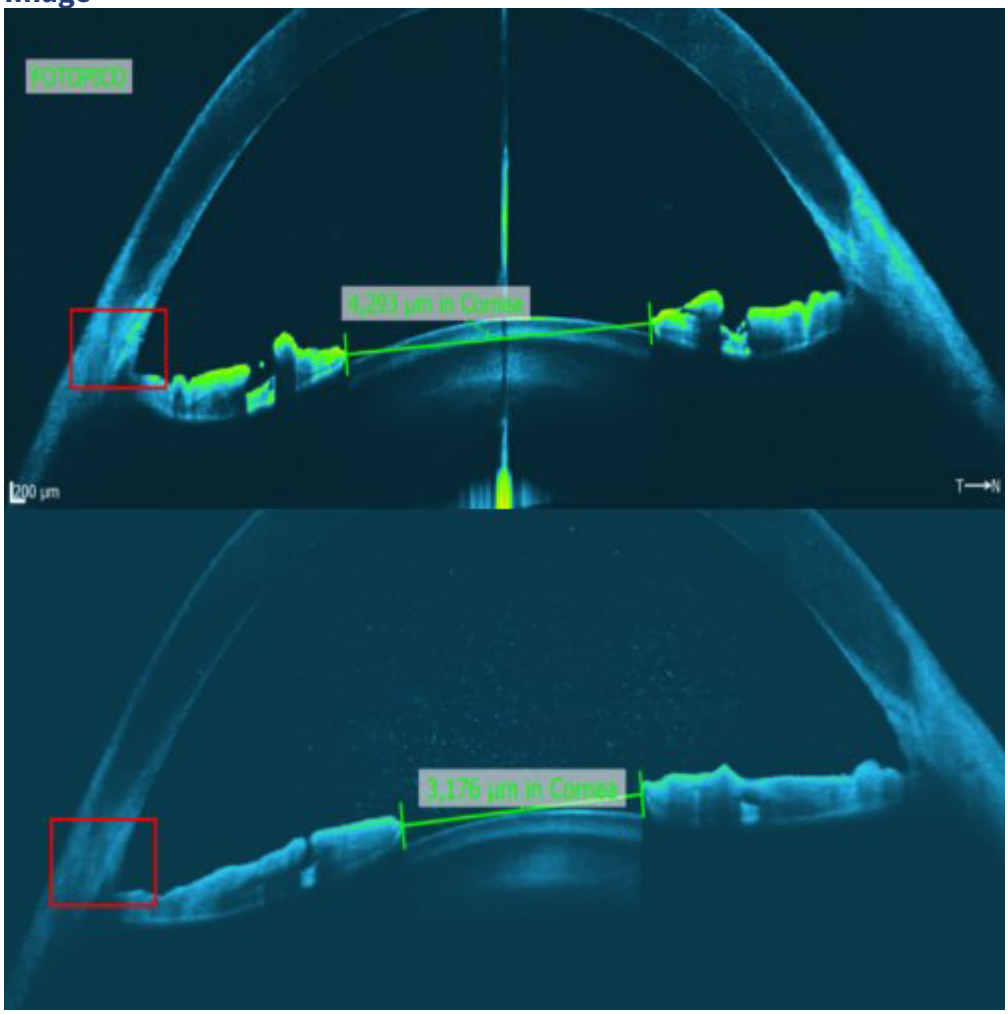
Methods

Prospective case series of non-PD glaucoma patients with RPB, who were selected based on the anterior segment characteristics of clinical examination and dynamic anterior segment Optical Coherence Tomography imaging (AS-OCT) and underwent YAG laser PI with dynamic AS-OCT control after the procedure. We report anterior segment changes, as well as clinical evolution.

Results

We included 10 patients: 3 juvenile open-angle glaucomas, 1 Axenfeld Rieger, 1 pseudophakic type 2 dysgenesis, 1 angle recession, and 4 Primary open -angle glaucomas with AS-OCT imaging evidence of RPB with no PD. Regardless of the physiopathologic singularities of each case, all cases showed anterior segment and clinical improvement after performing PI. Dynamic AS- OCT and reversal of RPB with PI was vital for treatment success.

Image



Conclusions

RPB is the result of abnormal interaction between the regulating factors controlling the proper flow of aqueous humor between posterior and anterior chamber. We propose that, these phenomena might be occurring inadvertently in a greater number of open angle glaucoma cases. The unidentified RBP could complicate the achievement of IOP control and stability. We believe that in many cases, reversing RPB with a PI could be crucial to improve aqueous humor dynamics and therefore, IOP control.

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P-572

ASSESSMENT OF OPTIC NERVE HEAD BLOOD FLOW IN PATIENTS WITH NORMAL TENSION GLAUCOMA BY LASER DOPPLER HOLOGRAPHY

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Purpose
The vascularization of the optic nerve head is disrupted in patients with normal pressure glaucoma (NTG). Many instruments have been developed to study the vascularization of the optic nerve head and to understand the relationship with glaucomatous damages. Laser Doppler Holography (LDH) is a new optic nerve head blood flow imaging technique with high temporal and spatial resolution. The aim of the study was to assess optic nerve head blood flow by LDH in NTG patients and to compare with healthy subjects.

Methods
Twenty-four eyes have been included in the NTG group and 14 in the control group. Systemic circulatory parameters were controlled and similar in both study populations. Laser Doppler holography parameters acquisition were similar amongst all eyes.

Results
The resistivity index was increased in the NTG group compared to the control group (P = 0.0047). NTG patients had a greater mean maximum velocity than control subjects (P = 0,0162).

Conclusions
Using LDH, changes in optic nerve head blood flow were observed in NTG patients, with an increased resistivity index as compared to healthy subjects.

P-573

SHOULD N 75 MARKER BE PRESENT IN VISUAL EVOKED POTENTIAL TEST IN MIGRAINE PATIENTS WITH AURA?

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Purpose

The aim of this study is to evaluate the visual system objectively from the ganglion cells in the retina to the visual cortex with visual evoked potentials and contribute to the understanding of the pathophysiology of hyperexcitability in the visual pathway in migraine patients.

Methods

Twenty migraine patients fulfilled the International Headache Society (IHS) criteria for diagnosis of migraine with visual aura. All measurements were done at the attack free period. Patients included in the study have corrected or uncorrected 1.0 visual acuity (evaluated with Snellen Chart) with normal biomicroscopic and fundus findings. In accordance to the International Society for Clinical Electrophysiology of Vision (ISCEV) standards the patients were tested by Metrovision brand monpack model visual electrophysiology device for pVEP. pVEP is made by using high-contrast (80%) checkerboard stimuli subtending the 120- min visual arc (min arc). The mean photic luminance was 50 cd/m2. The standard flash stimulus was 3.0 photopic cd.s.m-2. Data of patients with migraine were compared with the already existent data of our laboratory. Our data is appropriate for age distribution and comprises of standard values.

Results

In the analysis of VEP results, the mean P100 latency considerably decreased in migraine patients (P= 0.02). P100 amplitude and N75 amplitude substantially augmented in migraine patients (P= 0.02, P= 0.007 respectively)

Conclusions

P100 and N75 amplitudes are higher and P100 latency is lower in MA group, as determined via utilizing standard VEP stimulation parameters. Both retina and cortex are found to be hyperexcitable in migraine patients with aura.Is the N75 amplitude eminent as a result of hyperxcitability at migraine patients? Even further, can N75 amplitude be an indicator of other neurological disorders distinguishing themselves with hyperexcitability?

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P-574

REPEATABILITY AND RELIABILITY CRITERIA FOR BINOCULAR ESTERMAN VISUAL FIELD

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Purpose
To evaluate the repeatability of binocular Esterman visual field (bEVF) and to develop reliability criteria for bEVF based on the factors associated with repeatability.

Methods
This prospective and cross-sectional study included 190 eyes of 95 glaucoma patients. One 10-2 SITA-Standard and two bEVFs were performed on the same day with a Humphrey field analyzer. The repeatability of bEVF was assessed by the agreement rate of seen and not seen at all test points between the first and second tests. Factors associated with repeatability were analyzed with logistic regression analysis, and receiver operating characteristic curves were drawn for the associated factors to develop the reliability criteria.

Results
The 10-2 mean deviation values of the better and worth eyes were -16.9 ± 9.4 dB and -22.6 ± 7.7 dB, respectively. The mean agreement rate of bEVF was 88.9% (95% confidential interval: 73.9%, 99.2%). The frequencies of agreement rates exceeding 90%, 85%, and 80% were 44 patients (46.3%), 75 patients (78.9%), and 88 patients (92.6%), respectively. The false-positive (FP) response rate of bEVF was associated with a lower agreement rate (odds ratio=1.2, p<0.01). The best cutoff value based on the Youden index for the FP response rate of bEVF was >7.1% (sensitivity=71.0% and specificity=88.0%), and the cutoff value calculated based on 95% fixed specificity was >12.1% (sensitivity=28.6%).

Conclusions
Approximately 90% agreement for bEVF was observed in glaucoma patients. The FP response rate was associated with repeatability for bEVF, and the reliability criteria of FP were acceptable at <7% or at <12% in bEVF.

P-576

LONGITUDINAL MACULAR RETINAL AND CHOROIDAL MICROVASCULATURE CHANGES IN HIGH MYOPIA

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Purpose
The purpose of this study was to determine the longitudinal changes in macular retinal and choroidal microvasculature in normal healthy and highly myopic eyes.

Methods
Seventy-one eyes, including 32 eyes with high myopia and 39 healthy control eyes, followed for at least 12 months and examined using optical coherence tomography angiography imaging in at least 3 visits, were included in this study. Fovea-centered 6 × 6 mm scans were performed to measure capillary density (CD) of the superficial capillary plexus (SCP), deep capillary plexus (DCP), and choriocapillaris (CC). The rates of CD changes in both groups were estimated using a linear mixed model.

Results
Over a mean 14-month follow-up period, highly myopic eyes exhibited a faster rate of whole image CD (wiCD) loss (-1.44%/year vs. -0.11%/year, P = 0.001) and CD loss in the outer ring of the DCP (-1.67%/year vs. -0.14%/year, P < 0.001) than healthy eyes. In multivariate regression analysis, baseline axial length (AL) was negatively correlated with the rate of wiCD loss (estimate = -0.27, 95% confidence interval [CI] = -0.48 to -0.06, P = 0.012) and CD loss in the outer ring (estimate = -0.33, 95% CI = -0.56 to -0.11, P = 0.005), of the DCP. The CD reduction rates in the SCP and CC were comparable in both groups (all P values > 0.05).

Conclusions
The rate of CD loss in the DCP is significantly faster in highly myopic eyes than in healthy eyes and is related to baseline AL. The CD in the outer ring reduces faster in eyes with longer baseline AL.

P-577
USE OF ANTERIOR SEGMENT OCT IN SOME RARE TYPES OF GLAUCOMA

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Purpose
Our objective is to demonstrate, through the presentation of 3 special cases, what extra help can be provided by the anterior segment OCT in the diagnosis of uncommon types of glaucoma.

Methods
In the diagnosis of secondary glaucomas, it can be of great help if we assess the structures of the eye from several directions using a variety of methods, including imaging procedures. The anterior segment OCT used in our clinic, ANTERION®, is a high-resolution swept-source OCT. (SS-OCT) The use of Anterion is also has a great value in the diagnosis and monitoring of glaucoma with certain pathomechanisms.

Results
AS-OCT may also have a diagnostic role in unclear, blurred anterior refractive layers. The Anterion SS-OCT can be of great help to ophthalmologists with recognizing secundary mechanism that increase the intraocular pressure. On the poster, we present 3 less frequently occurring secondary intraocular pressure increase processes. In the first case, after a blunt injury, the cornea became opaque and the intraocular pressure increased significantly. Based on the clinical picture, acute cornea hydrops appeared, but the Anterion examination raised the possibility of a phacolytic mechanism, which was confirmed during the performed surgery. In the second case, an acute angle closure developed by miotic product. After the measurements of the anterior segment OCT, we found a phacomorphic cause behind the increase in intraocular pressure. (axial lenght 22,3 mm. lens thickness 5,83 mm, ACD 1,35 mm) In the third case, in a hyperopic patient we thought that the sudden increase of intraocular pressure is caused by the most common mechanism: acute angle closure by pupillary block. The cornea was quite blurred therefore we made the examination of Anterion, and found open angle and signs of herpes viral infection: extremely thickened cornea (endothelitis), inflammation in the anterior chamber. Trabeculitis may occur in herpes viral infections, which can cause secondary open-angle intraocular pressure increases. We'll present all three cases with AS-OCT images.

Conclusions
AS-OCT is a high-resolution image test that is suitable for mapping the anatomy and pathological changes of the anterior segment, measuring the parameters of the anterior chamber and the angle, recognizing diseases of the anterior chamber angle, and thereby diagnosing and recognizing less frequently occurring cases of glaucoma, thus developing the most effective treatment.

P-578

EFFECTS OF MIOSIS ON ANTERIOR STRUCTURES AFTER CATARACT SURGERY IN ANGLE CLOSURE GLAUCOMA

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Purpose

To investigate the effect of miosis on anterior structural changes after cataract surgery in angle closure glaucoma(ACG).

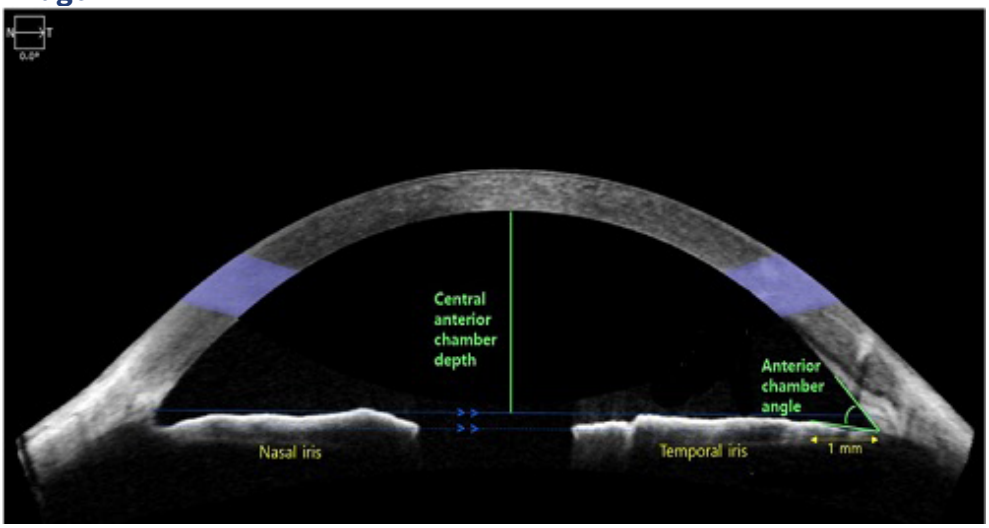
Methods

In this study, patients scheduled for Cataract surgery were examined using anterior segment optical coherence tomography before and after miosis. Intraocular pressure(IOP), three AC parameters, AC angle, anterior chamber depth(ACD), and AC area, I were analyzed before and after miosis, and then compared between open angle glaucoma(OAG) and angle closure glaucoma in pseudophakic eyes.

Results

Sixteen ACG eyes and 34 OAG eyes were enrolled. The AC angle widened after miosis in both the ACG and OAG groups ($p< 0.001$ and $p < 0.014$, respectively). After miosis the ACD deepened in both groups($p < 0.033$ and $p < 0.012$, respectively), and the AC area widened in both groups($p < 0.049$ and $p < 0.001$, respectively. Differences between pre- and post-miosis IOP, AC angle, ACD, and AC area values were not different between the ACG group and the OAG group ($p < 0.473$, $p < 0.759$, and $p < 0.667$, $P < 0.120$ respectively).

Image



Conclusions

Miosis increased the AC angle, ACD, AC area in both groups. After cataract surgery in ACG, miosis is similar to open-angle glaucoma in anterior structural changes.

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P-579

THE PREVALENCE OF GLAUCOMA IN CONFRONTATION VISUAL FIELD DEFECTS IN AN OPHTHALMIC POPULATION

B Fresco

Purpose

The confrontation visual field test has proven itself immensely useful in clinical practice and predates the use of perimetric standardised testing regimens 2. T

In this presentation of 20000 patients I report confrontation field data that, notwithstanding the limitations of the test, indicate that it can complement automated perimetry in glaucoma and other cases especially in evaluating function in the far peripheral field.

Methods

A retrospective analysis of 20 000 clinical charts was undertaken to establish the incidence of visual field loss, and specifically glaucomatous peripheral field loss detected by confrontation visual field testing, which was a routine part of every clinical exam in these patients.

The confrontation visual field test was standardised, andwas presented in the far peripheral field.

The testing distance was approximately 330 mm in exam room luminance. The target alternated between oscillating versus still and the patient response was to state whether the target was moving or stationary or simply not visible.

Results

The mean age for the positive data group was 62 years of age , the mean age for the patient population was 49 years of age. The ratio of female to male was 1 : 0.94.A confrontation visual field defect was present in 4.5% (901 / 20,000) of this population. The two diagnoses with the highest prevalence within the positive group were glaucoma and retinal disease combining to 45.8%. Glaucoma was 27.8% and retinal disease 18%. The mean age of the glaucoma cases was 70.7 years. Other diagnoses are discussed.

Conclusions

In terms of lifestyle mobility, risk, and clinical management, an examination which does not evaluate the peripheral field beyond 80 degrees area is arguably incomplete. Automated field analysers are specific for the central field but at their limit do not extend beyond 80 degrees, and are routinely used for the central 24 to 30 degrees. The importance of detecting a serious condition which may be flagged by confrontation, as well as assessing the functional peripheral visual field makes this simple and very old test important in every routine clinical exam of a patients visual function, unless the peripheral fields are more sensitively evaluated.

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P-581

COMPARATIVE STUDY OF CHANGES IN PHOTOPIC NEGATIVE RESPONSE AND PATTERN ELECTRORETINOGRAM IN NORMAL, SUSPECT AND ESTABLISHED, GLAUCOMA

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Purpose

To compare the changes in PhNR and Pattern ERG waveforms in established glaucoma, glaucoma suspects and normal subjects and to extrapolate the possibilities of PhNR and Pattern ERG being the early predictor for detection of glaucoma

Methods

Design: A prospective observational study

Participants: Group 1 – 42 established glaucoma cases (glaucomatous optic disc with field changes).

Group 2 – 42 glaucoma suspects (suspicious disc or IOP > 20 mmHg)

Group 3 - 42 normal (normal disc and normal visual field) were included in the study.

Methods: PhNR is performed with ROLAND CONSULT, ganzfeld – blue on white background in dilated pupil –duration- 5min.

PERG is performed using checker board stimulus subtended 40o x 30o of visual angles at a distance of 60 cm and presented on 21inch monochrome monitor. Pupil undilated; duration -15 min.

Active red electrode was placed on contact lens over cornea, reference blue electrodes was placed at lateral canthus, ground electrode was placed at forehead.

We obtained PERG amplitudes –N95 0.8o, 16o and PhNR.

Results

The mean of N95 amplitude in PERG were significantly reduced the established glaucoma patients (N95160- 2.49µV, N950.80-2.31 µV) as compared to normal (N950- 16 4.82 µV, N95 0.80- 5.36 µV) and suspects (N950- 163.93µV/N95 0.80- 3.98 µV). More significant reduction found with amplitude with lower check size (0.8 ^{0}) (p value <0.001) as compared to larger check size (16^{0}) (p value 0.005). PhNR amplitudes were also significantly reduced in the glaucoma suspects (38.17 µV) as compared to the normal patients (48.90 µV). (p value- <0.001). Both PhNR and N95 amplitudes shows significant reduction with severity of the disease (p value<0.001). ROC curve between glaucoma present and glaucoma absent for PhNR amplitude AUC was 0.731. Sensitivity to detect the disease was found more with PhNR (85%). ROC curve to differentiate between glaucoma suspect from normal showed AUC was more with PhNR (0.619) than N95 amplitudes (0.508).

Conclusions

PERG N95 amplitudes and PhNR amplitudes are useful tools to detect early glaucomatous changes and to detect the severity of glaucoma. Of the two PhNR performed better.

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P-582

COMPARING GLAUCOMA PROGRESSION ANALYSIS WITH PULSAR VISUAL FIELDS, OCT RETINAL NERVE FIBRE LAYER AND MACULAR SCANS, AND STEREO OPTIC DISC PHOTOGRAPHS

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Purpose

Comparison of Pulsar visual fields with OCT of the retinal nerve fibre layer and macular ganglion cell complex and optic disc stereo photographs in identifying glaucoma progression in a group of patients identified as progressing in a glaucoma sub specialist clinic.

Methods

Progression analysis of structural and functional tests in consecutive progressive cases of glaucoma identified in a sub specialist glaucoma clinic during 2021-22 were recorded. Automated Pulsar visual field progression was identified by trend analysis of Mean Deviation (MD) and cluster trend, and event analysis by Hodapp staging. Stereo optic disc photographs were assessed by the Disc Damage Likelihood Scale (DDLS) and OCT scan progression was assessed by circumpapillary Retinal Nerve Fibre Layer trend analysis (cpRNFL), and trend analysis of the macular ganglion cell complex. All were compared with glaucoma subspecialist “expert opinion” of each test.

Results

73 eyes from 42 patients were included, and there were 11 non progressive fellow eyes. Mean follow-up was 64 months (range 24 to 90 months). Progression was identified in 66% and 26% of disc photographs by expert opinion or DDLS progression respectively, and 22%, 36% and 43% of Pulsar Visual Fields with MD trend, Cluster trend and expert opinion respectively, and 82%, 78% and 76% of OCT scans for GCC, cpRNFL and expert opinion respectively.

Grouping all the techniques of identifying progression in each of the 3 tests, 34% of cases progressed in all 3 tests, 27% with disc and OCT only, 8% with field and OCT only, 3% with disc and field tests only, 25% by OCT alone, 1% with fields alone and 1% with disc changes only.

Out of 81 Spearman’s rank correlation tests (corrected for multiple testing) only 2 showed significant correlation between tests of different modalities: between expert opinion of field progression and disc progression on the DDLS scale, and expert opinions on disc and GCC progression.

Conclusions

With little correlation between optic disc progression, visual field progression and OCT progression all 3 tests are recommended for identifying progression in glaucoma. Pulsar visual fields identified progression in the expected proportion of cases. Glaucoma susbpecialist opinion was able to avoid the limitations of automated data analysis and correlate between tests.

P-583

IDENTIFYING MACULAR GANGLION CELL COMPLEX LOSS IN DIFFERENT STAGES OF GLAUCOMA

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Purpose
The purpose of the present study is to evaluate GCC parameters seen in different stages of glaucoma and to identify early progression.

Methods
This is a cross-sectional, observational study of consecutive adult primary glaucoma patients. All patients were recruited into subgroups by Hodapp, Parrish, and Anderson's criteria, and a definitive glaucomatous scotoma: i) normal visual field in one eye and a mild glaucoma with superior nasal step in the other, ii) nasal step in one eye and moderate glaucoma with superior arcuate scotoma in the other, iii) single arcuate scotoma in one eye and severe glaucoma with bi-arcuate scotoma in the other. They underwent standard automated perimetry and SD-OCT scan for macular GCC imaging. Percentage differences between eyes in these subgroups was analyzed. Later, all individual eye GCC parameters were compared.

Results
72 eyes of 36 adult primary glaucoma patients were analyzed. The percentage difference between eyes of the same patient from normal to mild, mild to moderate and moderate to severe glaucoma in average GCC was 8.7%, 17.6% and 5.42%, in inferior GCC was 10.89%, 19.24% and 0.3% and in superior GCC was 6.49%, 15.77% and 10.46%, respectively. On analyzing all normal, mild, moderate, and severe glaucomatous eyes, the average GCC thickness was 89.51±5.79, 82.77±9.15, 74.38±8.12 and 73.72±11.3 µm; inferior GCC thickness was 90.28±5.65, 81.71±11.07, 70.71±10.69 and 73.22±11.94 µm; and superior GCC thickness was 88.73±6.42, 83.87±8.15, 78.17±12.8 and 74.21±12.04 µm, respectively.

Conclusions
This study showed a loss of 10.9% in inferior GCC for a superior nasal step to develop and a further loss of 19.2% correlating with progression to superior arcuate scotoma. GLV gradually increased from 10.32% in normal eyes to 24.97% in severe glaucoma. FLV gradually increased till moderate glaucoma stage but it was decreased by 2.43% in the eyes with bi-arcuate scotoma. GCC thickness measured on OCT may serve as useful adjunct in objectively identifying early progression in mild and moderate glaucoma.

P-584

PERIPAPILLARY CHOROIDAL THICKNESS IN PRIMARY OPEN ANGLE GLAUCOMA, NORMAL TENSION GLAUCOMA AND NORMAL EYES: A SYSTEMATIC REVIEW AND META-ANALYSIS

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Purpose
To investigate differences in peripapillary choroidal thickness (PPCT) among eyes with primary open-angle glaucoma (POAG), normal tension glaucoma (NTG) and healthy eyes.

Methods
A comprehensive literature search was conducted, identifying studies from inception to May 2022. Studies that measured PPCT using optical coherence tomography (OCT) in POAG, NTG, and healthy eyes were included for analysis. Mean difference (MD) across the three subgroups were calculated for global PPCT and for all eight optic nerve head sectors. Statistical analysis was performed using R version 4.2.0. Risk of bias was assessed using the Newcastle Ottawa Scale.

Results
18 studies were included in final analysis, comprising pooled data from 935 healthy eyes, 446 NTG eyes and 934 POAG eyes. Mean age was 56.6 ± 12.8 years among healthy eyes, 57.9 ± 13.7 years among NTG eyes, and 61.8 ± 12.2 years among POAG eyes. Among studies that reported intraocular pressure (IOP) data, mean IOP was 14.8 ± 3.1 mmHg among healthy eyes, 13.9 ± 2.8 mmHg among NTG eyes, and 15.1 ± 3.5 mmHg among POAG eyes. In POAG eyes, there was a significant reduction of global PPCT [MD = -16.32 µm, 95% CI (-27.55, -5.09)] and across all sectors aside from the superonasal sector (MD range = -13.44 to -23.59 µm), compared to normal healthy eyes. In NTG eyes, there was also a significant reduction in PPCT compared to healthy eyes [global: -34.96 µm, (-49.97, -19.95), all sectors: (MD range = -19.54 to -39.89 µm)]. NTG eyes had significantly reduced global PPCT compared to POAG eyes [-26.64 µm, (-49.00, -4.28)], and in the inferior [-28.73 µm (-54.41, -3.04)] and temporal [-25.29 µm (-39.29, -11.30)] sectors.

Conclusions
Eyes with POAG and NTG have significantly reduced PPCT compared to normal healthy eyes. This may be related to choroidal vasculature atrophy in glaucoma, as demonstrated by prior OCT angiography studies, supported by other studies which have correlated reduced blood flow and thinning in the peripapillary choroid. In addition, PPCT in NTG eyes were significantly thinner compared with POAG eyes. This may be related to the underlying vascular autoregulatory dysfunction in NTG. Differences in global and sectoral PPCT may aid in diagnosis and in providing a deeper understanding of the underlying pathophysiology of various glaucoma subtypes.

P-585

MACULAR AND SUBMACULAR CHOROIDAL MICROVASCULATURE IN PATIENTS WITH PRIMARY OPEN-ANGLE GLAUCOMA AND HIGH MYOPIA

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Purpose
To characterise the influence of primary openangle glaucoma (POAG) and high myopia (HM) on the macular and choroidal capillary density (CD).

Methods
Two hundred and seven eyes were enrolled, including 80 POAG without HM, 50 POAG with HM, 31 HM without POAG and 46 normal controls. A fovea-centred 6×6 mm optical coherence tomography angiography scan was performed to obtain the CD of the superficial capillary plexus (SCP), deep capillary plexus (DCP) and choriocapillaris. Macular and choroidal CDs were compared among the groups and the association of CDs with visual field mean deviation (MD) was determined using linear regression models.

Results
Compared with normal eyes, SCP CD was decreased in the POAG without HM group ($p<0.05$), while DCP CD was significantly decreased in the HM without POAG group ($p<0.05$). Both SCP and DCP CDs were significantly decreased in the POAG with HM group ($p<0.05$). CD reduction occurred mainly in the outer rather than inner ring of the 6×6 mm scan size. In multivariate regression analysis, worse MD was associated with lower CD in the outer ring of the SCP in all the HM eyes ($p<0.05$).

Conclusions
POAG and HM reduced macular CD in different layers of the retinal capillary plexus and both particularly in the outer ring of the 6×6 mm scans. Furthermore, assessment of the CD in the outer ring of the SCP may facilitate the diagnosis of glaucoma in eyes with HM.

P-586

RETINAL NERVE FIBER LAYER OPTICAL TEXTURE ANALYSIS: IDENTIFYING UNDETECTED AXONAL FIBER BUNDLE LOSS IN OCULAR HYPERTENSION

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Purpose
To apply retinal nerve fiber layer (RNFL) optical texture analysis (ROTA) in eyes with ocular hypertension (OHT) to investigate (1) the prevalence and pattern of axonal fiber bundle loss, (2) factors associated with axonal fiber bundle loss, and (3) any corresponding change in the neuroretinal rim as determined by Bruch's membrane opening-minimum rim width (BMO-MRW) analysis.

Methods
Baseline visits of 600 eyes from 306 consecutively recruited patients with OHT (no visual field (VF) defects and unremarkable optic disc examination and optical coherence tomography (OCT) RNFL thickness analysis) were analyzed. All eyes underwent 24-2 VF testing and OCT imaging of the RNFL and optic disc. RNFL defects were identified on ROTA, the trajectories of axonal fiber bundle loss were traced, and defect location was classified according to involvement of the arcuate bundle, papillomacular bundle (*i.e.*, bundles from the macula, excluding the fovea), and papillofoveal bundle (*i.e.*, bundles from the fovea) for each eye. The risk score for glaucoma conversion was calculated according to the Ocular Hypertension Treatment Study-European Glaucoma Prevention Study (OHTS-EGPS) risk prediction model. Linear mixed modeling was applied to identify ocular, VF, and OCT parameters associated with RNFL defects.

Results
Of patients with OHT, 9.0% – 10.8% demonstrated RNFL defects on ROTA in at least one eye without VF or RNFL thickness abnormalities. The superior arcuate bundle was most frequently involved (62.2%), followed by the superior papillomacular bundle (27.0%). For each percentage increase in OHTS-EGPS risk score, the odds of RNFL defects increased by 4% (95% CI: 1.01 – 1.07, P=0.004). Although association between intraocular pressure and RNFL defects was of borderline significance (P=0.077), each dB increase in VF pattern standard deviation and percentage decrease in visual field index increased the odds of RNFL defects by 82% (95% CI: 1.01 – 3.29) and 26% (95% CI: 0.57 – 0.95), respectively, suggesting increased risk for development of VF defects in patients with RNFL defects. Glaucomatous optic disc features such as cupping (P=0.040) and narrowed neuroretinal rim (P=0.010) also increased the odds of RNFL defects. BMO-MRW sectoral classification was largely unremarkable in all patients with OHT.

Conclusions
The capacity of ROTA to detect early axonal fiber bundle loss on the glaucoma continuum underpins its role in assessing VF progression risk and guiding management of patients with OHT.

P-587

TOPOGRAPHIC ASSOCIATION BETWEEN VISUAL FIELD CHANGES AND CIRCUMPAPILLARY RNFL IN ADVANCED GLAUCOMA; A STRUCTURE-FUNCTION ANLAYSIS

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Purpose
We evaluated the structure-function relationship between visual field (VF) sensitivity and circumpapillary retinal nerve fibre layer (cpRNFL) thickness using spectral-domain optical coherence tomography (SD-OCT) and correlated sectoral changes over time in advanced glaucoma patients.

Methods
This retrospective study included 58 eyes from 58 patients with advanced glaucoma in a tertiary hospital. Spectralis cpRNFL and 24-2 VF data for five-year follow-up were reviewed. Correlations between cpRNFL thickness and visual field sensitivity in the six corresponding areas at baseline were evaluated using logarithmic regression analysis. Age-adjusted partial Pearson partial correlations analysis was done to assess the association between VF rate of progression and peripapillary sectoral RNFL parameters rate of thinning over time.

Results
The patients' average cpRNFL was 52.00 ± 3.45µm at baseline and 43.00 ± 9.69 µm at the five years follow up visit. The baseline mean 24-2 VF MD was -22.76± 10.22 dB, and follow up MD was -24.98± 8.78dB. The mean rate of VF progression was -0.53dB/year. Logarithmic associations were strongest between the superotemporal sector RNFL measurements and the corresponding visual field area at baseline. Similarly, superotemporal RNFL thickness change over the five years strongly correlated with VF progression (r=0.748, p=0.021).

Image

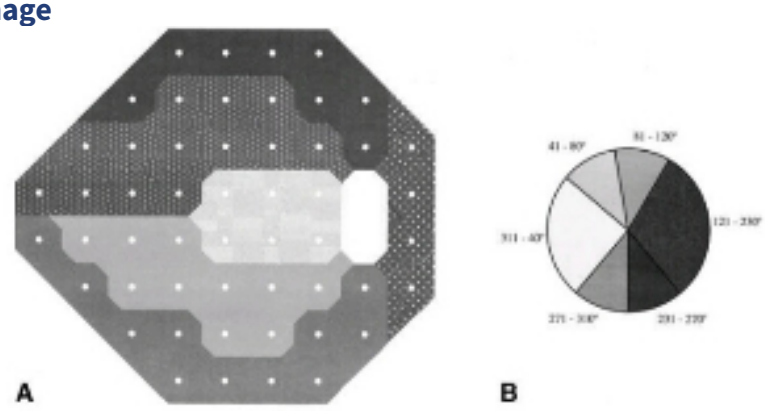


Figure 1: Garway Heath map showing division of the visual field (A) and optic nerve head (B) into sectors (right eye) (Garway-Health et.al)

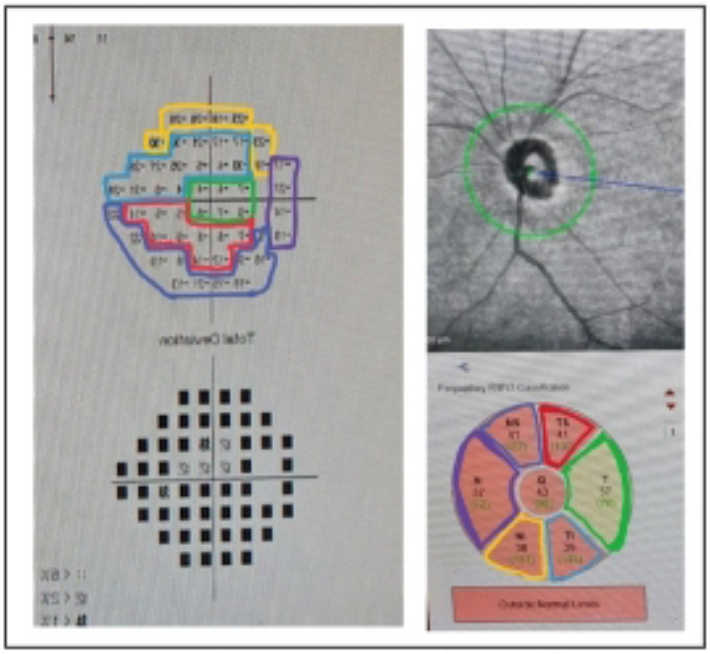


Figure 2: Adaptation from Garway-Heath map (Left eye)

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Conclusions

In advanced glaucoma stage, superotemporal RNFL showed a statistically significant relationship with functional status in VF. Sectoral RNFL measurements may be of clinical use to detect structural progression in advanced glaucoma

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P-588

CORRELATION BETWEEN FUNCTIONAL MITOCHONDRIAL IMAGING USING FLAVOPROTEIN FLUORESCENCE AND SECTORIAL OCT PARAMETERS

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Purpose

Flavoprotein fluorescence (FPF) can be measured using a noninvasive investigational device, the OcuMet Beacon (OcuSciences, Ann Arbor, MI, USA). The Beacon emits blue light to stimulate oxidized mitochondrial flavoproteins and those under oxidative stress demonstrate green autofluorescence. As mitochondrial metabolic stress may correlate with or precede axonal tissue loss in glaucomatous eyes, the study aimed to investigate the relationship between optical coherence tomography (OCT) structural parameters and FPF values in patients being monitored for glaucoma, suspicion of glaucoma or ocular hypertension.

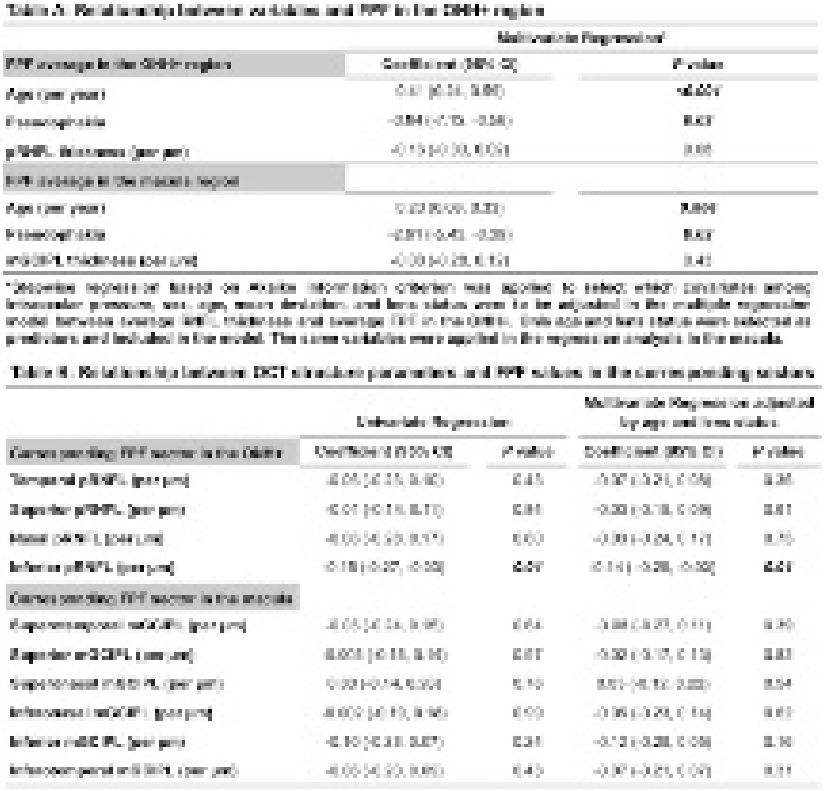
Methods

FPF images were obtained at the optic nerve head and macula. FPF intensity of the ONH and peripapillary region (ONH+) was obtained from the center of the ONH to a 16.1° circle (≈4.8mm diameter), and the ONH+ was divided into 4 sectors. For macula images, FPF intensity was calculated within an elliptical annulus and then divided into 6 sectors corresponding to the Cirrus OCT Ganglion Cell Analysis (Carl Zeiss, Meditec, Dublin, CA, USA). FPF values were averaged within each sector and adjusted for lens autofluorescence and signal attenuation by the lens.

Results

A total of 66 eyes of 66 patients with good quality FPF images were included. Older age and phakic status were statistically significantly associated with higher FPF intensity in the ONH+ and macula regions ($p<0.05$ for all, Table A). The correlation between thinner peripapillary retinal nerve fiber layer (pRNFL) and FPF is not statistically significant ($p=0.08$), and there was no statistically significant correlation between the ganglion cell–inner plexiform layer thickness over the macula (mGCIPL) and FPF ($p=0.43$). In the sectorial analysis, only the correlation between inferior pRNFL thickness and inferior ONH+ FPF intensity is statistically significant ($p=0.01$, Table B) after adjusting for age and lens status.

Image



Conclusions

In the macula and ONH+ regions, age and lens status were the main determinants of FPF values. After accounting for these covariates, FPF intensity values were mainly correlated with pRNFL thinning in the inferior sector.

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P-589

PREDICTIVE FACTORS FOR VISUAL FIELD NON-PROGRESSION AND PROGRESSION IN MYOPIC NORMAL TENSION GLAUCOMA

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Purpose
To investigate the factors associated with non-progressive and progressive visual field (VF) defect in patients with myopic normal tension glaucoma (mNTG).

Methods
Sixty eight eyes of 44 mNTG patients (refractive error ≤ -3.0 D and axial length (AXL) ≥ 24.00 mm) with serial VF examination who were followed-up at least 5 years were included. The patients were devided into two groups based on the presence of visual field progression (Non progression = group 1, Progression = group 2). Optic disc findings such as disc hemorrhage, disc tilt and rotation, and peripapillary atrophy were evaluated and horizontal enhanced depth imaging of optic disc were obtained by spectral-domain (SD) optical coherence tomography (OCT). Lamina cribrosa steepness index (LCSI) was measured at 3 locations (superior and inferior midperipheral, and midhorizontal). The participants were followed up regularly with serial visual field (VF) examination at least 1 year intervals. The rate of VF progression was determined by linear regression of serial mean deviation (MD) values over time. Regression analysis was performed to determine the risk factors for VF progression.

Results
There was no significant difference in ocular characteristic values between the two groups, including intraocular pressure (IOP), spherical equivalent (SE), axial length (AXL), and baseline MD values, except for LCSI. The mean LCSI values were 19.33 ± 5.74 and 23.70 ± 8.19 ($p = 0.02$), and the rate of changes in MD (dB/yr) were 0.12 ± 0.25 and -0.964 ± 0.60 ($p < 0.01$) in group 1 and 2, respectively. In linear regression analysis, a rate of VF progression was associated with disc hemorrhage ($\beta = -0.423$, $p = 0.004$) and steep LCSI ($\beta = -0.358$, $p = 0.017$).

Conclusions
Some patients with mNTG seem not to have progression even without IOP lowering treatment while others had fast progression despite aggressive treatment to lower IOP. In addition to disc hemorrhage, larger LCSI may be a crucial prognostic factor for patients with mNTG.

P-590

NOVEL DISCOVERIES OF RELATIONSHIP BETWEEN VITREOUS ZONULE AND ANTERIOR SEGMENT CHARACTERISTICS IN PRIMARY ANGLE-CLOSURE DISEASES

H Wu, K Lv, Z Liang, K Yang, Y Ma

Purpose

To investigate the presence of the vitreous zonule (VZ) in eyes of different subtypes of primary angle closure disease (PACD) and normal subjects, and to further explore the relationship between VZ and anterior segment characteristics in ultrasound biomicroscopy (UBM).

Methods

Patients with clinical diagnoses of acute primary angle-closure/ acute primary angle-closure glaucoma (APAC[G]) or chronic primary angle-closure / chronic primary angle-closure glaucoma (CPAC[G]) and healthy subjects were enrolled. A total of 300 eyes of 180 subjects were included. Anterior segment parameters and the presence of the VZ were assessed by UBM. The presence of VZ was compared among different subtypes of PACD. Anterior segment parameters were compared between eyes in vitreous zonule group (VZG) and no vitreous zonule group (NVZG). Logistic regression analysis was conducted to identify factors associated with the presence of VZ.

Results

APAC(G) eyes had lower VZ presence compared to the fellow eyes of APAC(G) ($P < 0.001$). VZ was more likely to be seen in the eyes of healthy subjects and primary angle closure suspect (PACS) than in the eyes of primary angle closure (PAC) and primary angle closure glaucoma (PACG) ($P < 0.05$). NVZG had shorter angle opening distance 500/750 ($P < 0.001$), smaller trabecular iris angle 500/750 ($P < 0.001$), smaller trabecular-iris space area 500/750 ($P < 0.001$), smaller trabecular–ciliary angle ($P = 0.009$), smaller iris area ($P = 0.010$), and greater lens vault ($P = 0.004$) compared to VZG. Greater lens vault (LV) was independently associated with absence of VZ (odds ratio = 0.253; 95% confidence interval, 0.109-0.586; $P = 0.001$).

Image



Conclusions

VZ was less likely to be observed in PAC/PACG eyes. PACD eyes with less VZ had narrower angle, more anteriorly rotated ciliary body and greater LV. Lack of VZ may be an indicator for the development of PACD.

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P-591

RETINAL NERVE FIBRE LAYER OPTICAL TEXTURE ANALYSIS FOR ASSESSMENT OF GLAUCOMA PROGRESSION: A 5-YEAR PROSPECTIVE STUDY

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Purpose
Retinal Nerve Fibre Layer Optical Texture Analysis (ROTA) is a novel algorithm which uncovers trajectories and optical texture of individual axonal fibre bundles with high sensitivity and specificity. This study aims to evaluate the characteristics of progressive axonal fibre bundle loss detected by ROTA in patients with glaucoma.

Methods
RNFL/GCIPL thickness was measured by Cirrus HD-OCT (Carl Zeiss Meditec) and ROTA was performed using data obtained from Triton OCT (Topcon). Progressive RNFL change in ROTA was detected by loss of optical texture of the axonal fibre bundles; progressive RNFL/GCIPL thickness reduction was determined by Guided Progression Analysis (GPA, Carl Zeiss Meditec). 50 eyes followed at 4-month intervals over 5 years with progressive axonal fibre bundle loss detected on ROTA were randomly selected for analysis.

Results
With ROTA, 56% (28 eyes) developed progressive axonal fibre bundle loss in the inferior retina alone, 30% (15 eyes) in the superior alone, and 14% (7 eyes) in both. 42.4% (25 eyes) demonstrated development of new defects, 42.4% (25 eyes) had expansion of pre-existing defects and 15.3% (9 eyes) had deepening of pre-existing defects on ROTA. The most common locations of progressive RNFL changes were found over the inferior arcuate bundle (42% [21 eyes]), the inferior papillomacular bundle (34% [17 eyes]), and the superior arcuate bundle (28% [14 eyes]). For eyes with progressive changes detected by both ROTA and GPA (44 eyes), ROTA was able to detect RNFL change before (68.2% [30 eyes]), or simultaneously with (9.1% [4 eyes]), progressive RNFL/GCIPL thinning detected by GPA, ahead by on average 51.79 months (standard deviation [SD] = 38.63 months).

Conclusions
ROTA can detect progressive axonal fibre bundle loss substantially earlier than progressive RNFL/GCIPL thickness change detected by GPA, informing the involvement of papillomacular bundles which is difficult to discern with RNFL/GCIPL thickness analysis.

P-592

RELIABILITY OF VISUALL VIRTUAL REALITY PERIMETRY AS AN ALTERNATIVE TO HUMPHREY VISUAL FIELD TESTING

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Purpose

Virtual visual field (VVF) tests are increasing in popularity and help to address the limitations of Humphrey visual field testing (HFA).The ability to conduct standardized perimetry in any office location without trial lenses provides logistical ease, improved comfort and enables simultaneous testing of both eyes.These devices are approved for clinical use by various regulatory agencies, however, clinicians may be hesitant to accept the validity of VVF results, their consistency and accurately with HFA results. The present study examines the locus-locus correlation and correlation of mean deviation (MD) scores obtained through the VisuALL Virtual Reality Perimeter (Olleyes, Inc.) and the Humphrey Visual Field Analyzer in glaucoma patients as part of an effort to develop an algorithmic approximation of HVF from VVF results.

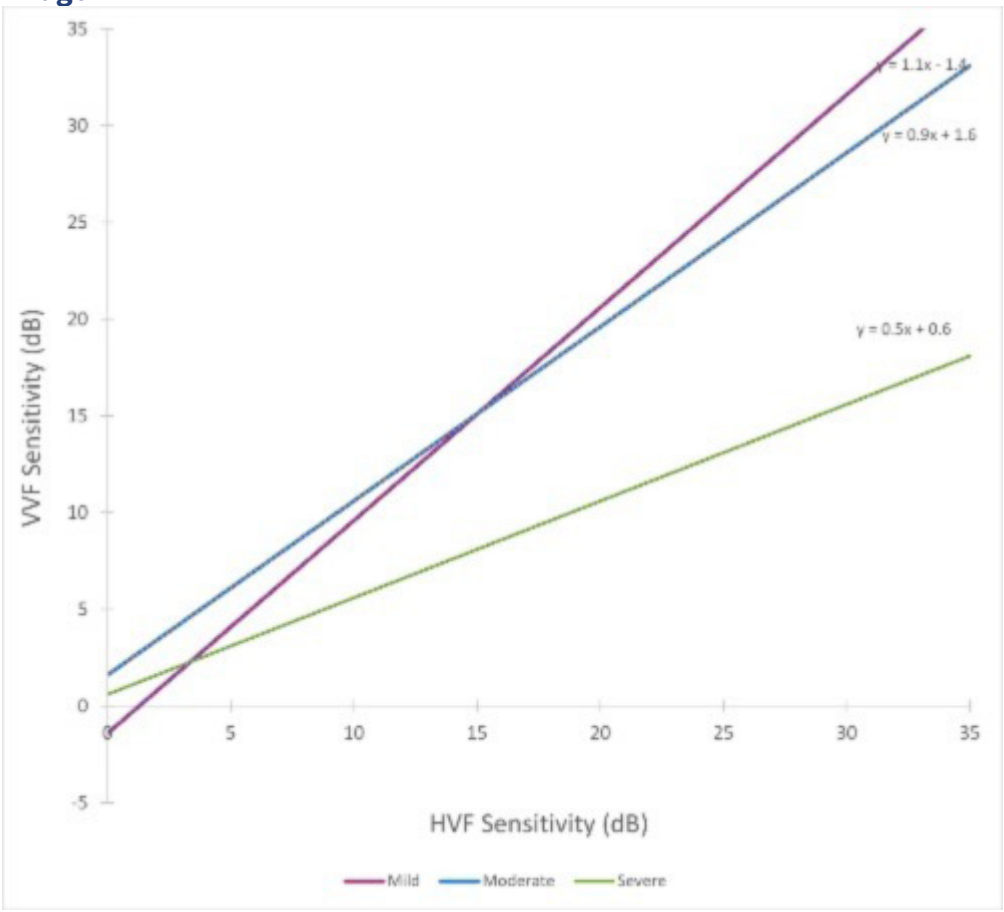
Methods

Subjects underwent 24-3 normal threshold standard automated perimetry using VVF and HVF. Sensitivities of corresponding locations were compared between VVF and Humphrey 24-2 results. Robust regression with bisquare weighting was used to estimate the linear correlation coefficient between VVF and HVF for the same eye as well as the combined binocular field. Spearman's rank correlation was used to compare mean deviation scores.

Results

47 eyes from 27 glaucoma patients (mean age = 69.67 years) were analyzed. Software analysis was used to generate a correction factor for locus-locus correlation (Figure 1). The corrected analysis revealed high parity in mild (-2 dB to -6 dB) and moderate (-6 to -12 dB) glaucoma patients. Correlation was lower in severe disease states. Spearman's correlation revealed a strong positive correlation between the two MD scores, $rs(45) = 0.849$, $p < .001$..

Image



Conclusions

Results indicate a strong locus-locus correlation and MD correlation between VVF and HVF in patients with mild and moderate glaucoma. The greatest differences between the devices arise at lower sensitivity levels and in patients with severe glaucoma. Such differences may be readily minimized by application of a standardized mathematical adjustment algorithm. In its current form, transition to VisuALL would facilitate reasonable continuity of clinical care and allow for reliable detection and monitoring of disease progression, as mild and moderate glaucoma patients require the most careful and accurate clinical monitoring.

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PLB-026

EVALUATION OF THE CONSISTENCY OF GLAUCOMATOUS VISUAL FIELD DEFECTS USING A CLUSTERED SITA-FASTER PROTOCOL

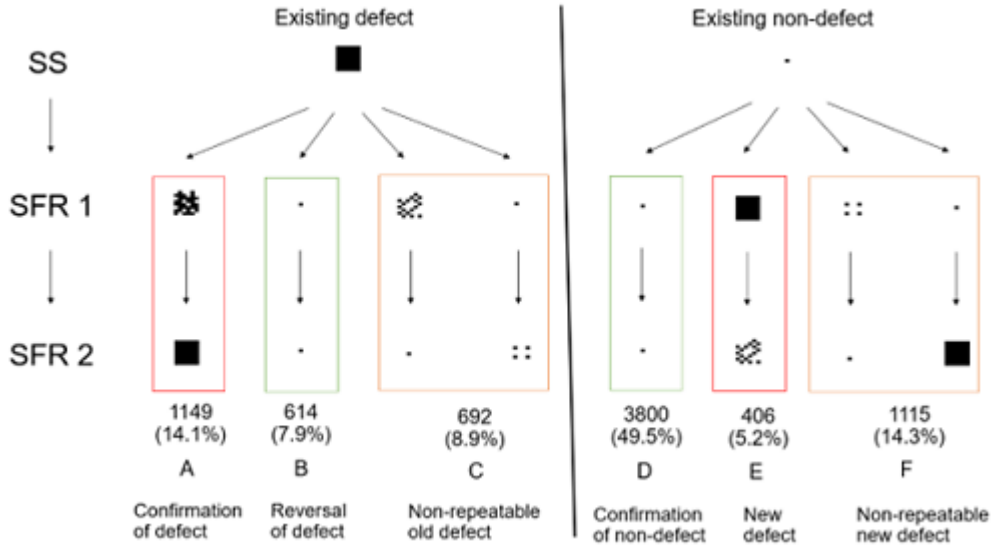
J Tan[1,2], J Phu[3,4], K Masselos[2], M Kalloniatis[3,5], A Agar[1,2]
[1]Faculty of Medicine, University of New South Wales, [2]Department of Ophthalmology, Prince of Wales Hospital, [3]School of Optometry and Vision Science, [4]Centre for Eye Health, University of New South Wales, Sydney, [5]School of Medicine (Optometry), Deakin University, Melbourne, Australia

Purpose
Evaluation of the consistency of glaucomatous visual field defects using a clustered SITA-Faster protocol.

Methods
144 eyes of 80 patients with confirmed or suspected glaucoma who had a SITA-Standard (SS) test on a previous visit underwent two SFR tests (T1, T2) per eye on the same visit. Global sensitivity, reliability indices, and pointwise deviation map probability scores from the pattern deviation grid of each patient were compared across the three sequential tests to evaluate the consistency of visual field defects.

Results
The mean age was 68.6 years and 79.2% of patients had a diagnosis of glaucoma. There was no significant difference in mean deviation across the three tests (-5.8dB, -5.3dB, -5.7dB in SS, SFR1, SFR2 respectively, p=0.88). The paired SFR tests provided repeatable VFs that confirmed existing pointwise data on the SS in 4949 (63.6%) locations, reversed an SS defect in 614 (7.9%) locations and demonstrated a new repeatable defect in 406 (5.2%) locations of the pattern deviation grid. A new defect of at least three contiguous points was identified in 20.1% of eyes. The non-repeatable points on the paired SFR displayed no significant difference in the distribution of defect/non-defect points based on test order or peripheral vs central locations. There was no significant difference in the rate of obtaining at least one reliable test result between SS and the combined SFR T1 and T2 method (p=0.77). Test duration significantly decreased from SS to SFR1/2 (379 vs 160 vs 158 seconds, p<0.0001).

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Conclusions

Frontloading SITA-Faster tests can provide repeatable data for the evaluation of the consistency of pattern deviation defects in glaucoma, with no observable decline in performance from test fatigue. This is achieved at equivalent duration and reliability as a single SS test. Frontloading SFR may be helpful in increasing testing frequency/quantity to meet recommended guidelines for progression analysis.

PLB-027

RETINAL NERVE FIBER LAYER THICKNESS MEASUREMENT BEFORE AND AFTER CATARACT SURGERY USING SPECTRAL -DOMAIN OPTIC COHERENCE TOMOGRAPHY

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Purpose
The purpose of this study is to determine the effect of Phacoemulsification Cataract extraction on measurement of retinal nerve fiber layer using spectral domain optical coherence tomography

Methods
Design: Experimental (Prospective) study.

Material and Methods

A prospective, hospital-based study of 75 patients above 45 years of age, with no other ocular morbidity except cataract and planned for phacoemulsification with IOL implantation at Vision Eye Centre, New Delhi, India. All patients underwent imaging with Cirrus SD-OCT model 400 and the optic disc cube 200x200 protocol at baseline and at 15 days follow up. Paired sample t-test was used to compare the RNFL parameters and ONH parameters.

Results
The mean age of subjects was 61.01 ± 7.32 years (31 males, 44 females). The average RNFL increased from 87.42 ± 10.15 µm to 92.08 ± 10.77µm after phacoemulsification, an increase of 5% (P <0.001) and the signal strength increased from 4.55 ± 0.62 to 8.00 ± 0.54, increasing by 75.7% (P < 0.001). There was a significant increase in the disc area (P = 0.042) and rim area (P = 0.004) but no significant change in vertical cup-disc ratio (P = 0.582) or average cup-disc ratio (P = 0.580). The quadrant-wise RNFL thickness increase in inferior, superior, nasal, and temporal quadrants was 4.368 (P < 0.001), 4.645 (P <0.001), 3.408 (P = 0.002), and 3.875 (P < 0.001), respectively. The change in RNFL thickness was maximum in posterior subcapsular cataract (P= 0.001) followed by cortical (P = 0.001) and nuclear (P = 0.001) subtypes.

Image



Conclusions

A significant increase in RNFL thickness and signal strength was observed after cataract surgery using SD-OCT. The posterior subcapsular cataract interfered with RNFL measurement maximally due to its density and proximity to nodal point. After the cataract surgery, a new baseline needs to be established by obtaining fresh OCT images for assessing the longitudinal follow-up of a glaucoma patient.

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PLB-028

CORRELATION OF MACULAR GANGLION CELL + INNER PLEXIFORM LAYER AND CIRCUMPAPILLARY RNFL THICKNESS IN GLAUCOMA SUSPECTS AND GLAUCOMATOUS EYES

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Purpose
The study aimed to correlate macular ganglion cell layer + inner plexiform layer (GCL + IPL) thickness and circumpapillary retinal nerve fiber layer (cRNFL) thickness across different stages of glaucoma and to determine the validity of GCL + IPL in the evaluation of early glaucoma and its progression to moderate-severe stages using the area under the curve (AUC) analysis in comparison to cRNFL.

Methods
We reviewed 260 charts of adult glaucoma suspect and glaucoma patients wherein macular ganglion cell analysis, optical coherence tomography (OCT) of the cRNFL and automated visual field (AVF) was done. GCL + IPL thickness (average, minimum and sectoral) and sectoral cRNFL thickness were obtained. Glaucomatous eyes were further classified into stages based on the Hodapp-Anderson-Parish Visual Field Criteria of Glaucoma Severity. AUC analysis was used to compare GCL + IPL parameters with cRNFL in glaucoma suspects and glaucoma patients.

Results
A total of 122 eyes were included in the study and were grouped into glaucoma suspects (n=43), mild glaucoma (n=40), and moderate + severe glaucoma (n=39). Both GCL + IPL and cRNFL thickness parameters showed a significant decline with greater glaucoma severity. In the determination of visual field defects across all glaucoma stages, the highest AUC was obtained by minimum GCL + IPL (AUC = 0.859) with cut-off value at ≤ 70 µm. Average GCL + IPL had the highest AUC (0.835) in detecting progression from glaucoma suspect to mild glaucoma, while the inferior sector of the cRNFL had the highest AUC (0.937) in discerning progression from mild to moderate-severe glaucoma.

Conclusions
The results of this study highlight the significance of macular ganglion cell analysis in the screening, detection and monitoring of progression in glaucoma. Compared to cRNFL, macular ganglion analysis may be more beneficial in glaucoma screening and detecting progression from glaucoma suspect to mild glaucoma.

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Surgery & Wound Healing

P-593

SURGICAL MANAGEMENT OF HYPOTONY: A RETROSPECTIVE CONSECUTIVE CASE SERIES TREATED BETWEEN 2020 AND 2022 IN A TERTIARY CENTER IN A DEVELOPING COUNTRY

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Purpose
To evaluate all cases of ocular hypotonia after trabeculectomy that were surgically treated in a tertiary service, describing the pre and postoperative clinical findings.

Methods
This was a retrospective study of ocular hypotony after trabeculectomy treated between 2020 and 2022 at the Glaucoma Center-Santa Casa/Belo Horizonte, Brazil. Normality of the data was analyzed using Kolmogorov-Smirnov test. Descriptive statistics included mean and standard deviation for normally distributed variables and median with interquartile range (IQR) for non-normally distributed variables. We analyzed: affected eye, gender, high myopia, time between the first procedure and diagnosis, intraocular pressure (IOP) in the pre and postoperative period, findings of choroidal detachment and bleb leak.

Results
Fourteen patients underwent scleral patch graft, conjunctival advancement or compressive sutures and two were excluded after analysis for not meeting the diagnostic criteria of hypotonia (intraocular pressure < 5mmHg using the WGA recommendation). Of the 12 patients, 58.3% were females and 75% of the eyes treated were the right eye (OD), with only two primary trabeculectomies performed in our service (16,7%). The mean age at which glaucoma surgery was performed was 61.6 years (SD=+9.5), while the mean age at diagnosis of ocular hypotonia was 68.2 years (SD=+10.6). The time between the primary surgery and the diagnosis of hypotony ranged from 4 months to 11 years with a mean of 6,3 years (SD=+3,8)

The presence of bleb leak was identified in 9 patients (75%) and, in addition, 4 patients (33.3%) had choroidal detachment. Regarding the IOP measurement, the preoperative median of the hypotonic eye was 2mmHg with a mean 2.83 mmHg (SD=+1.75), and postoperatively it was 13.5 mmHg with a mean IOP of 14.5 mmHg (SD=+5.2). High myopia, a known risk factor for hypotonia, was identified in only 1 patient. In 75% of the cases a single approach was needed to achieve success (defined as IOP>6mmHg and resolution of bleb leak or choroidal detachment if present). 58.3% patients underwent scleral patch graft, 25% were first submitted to compressive sutures without resolution of the condition and, therefore, subsequent performance of scleral patch and 16.7% underwent conjunctival advancement.

Conclusions
The analysis of data about ocular hypotony treatment and follow-up is important because it is a common complication after glaucoma surgery. The success of its treatment depends on early detection and adequate management.

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P-594

OUTCOMES OF BENT NEEDLE AB INTERNO GONIECTOMY IN MODERATE TO SEVERE PRIMARY OPEN ANGLE GLAUCOMA EYES

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Purpose
To assess the safety and efficacy of bent ab interno needle goniectomy (BANG) in moderate to severe primary open angle glaucoma patients, who were undergoing phacoemulsification for visually significant cataract.

Methods
This prospective interventional study was conducted at tertiary care university hospital in primary open angle glaucoma eyes with medically uncontrolled IOP with visually significant cataract, treated by single surgeon between November 2021 to December 2022. A 26-gauge needle was used to excise 30° of Trabecular meshwork using intraoperative gonioscopy in all patients before performing capsulorhexis during cataract surgery. The pre and post operative IOP and number of antiglaucoma medications, intraoperative complications were documented. These patients were followed up at 1 day, 1 week, 3,6- and 12-months post operatively. The repeated ANOVA test was used to compare preoperative and 6 months and 12 months postoperative data. P value <0.05 was considered statistically significant.

Results
Forty-six eyes of 42 patients were operated for BANG followed by phacoemulsification with VCDR 0.85:1. Preoperative mean IOP and number of antiglaucoma medication was 22.4 ±6.1 mm of Hg and 3.73 ±1.13 respectively. 40 of 46 (87%) eyes at 6-month postoperative period with mean IOP was significantly reduced to 12.5 ±2.4 mm of Hg (p =0.001) on 2.78 ±1.1 (p =0.000) topical antiglaucoma medication, while 24 of 46 (52%) eyes at 12 months postoperative follow up the mean IOP was 12 ±1.3 mm of Hg (p < 0.0001) on 2.96 ±1.2 (p =0.001) topical antiglaucoma medications. A ≥20% reduction in IOP at 6 and 12 months was 76% and 89% of eyes respectively. 27 of 40 eyes (68%) at 6 months and 20 of 24 eyes (83%) of eyes at 12 months achieved ≤12 mm of Hg (Qualified success). Reduction in ≥1 antiglaucoma medications postoperatively at 6 and 12 months was 70% (28/40) and 66% (16/24) of eyes respectively, among which 3 eyes required no topical antiglaucoma medication. 2 eyes required filtration surgery at 6 months to achieve target IOP. Post operative mild Hyphema was noted in 10 eyes.

Conclusions
A 30-degree BANG using a 26 G Needle is a safe and cost effective MIGS for developing countries with favourable IOP outcomes Upto 1 year. However, majority of patients require medication to achieve low target IOP.

P-595

REAL WORLD DATA ON THE SAFETY AND EFFICACY OF A NOVEL SUPRACILIARY MICROSPONGE IMPLANT AT 6 MONTHS

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Purpose

MINIject is a novel ab-interno minimally invasive glaucoma implant, enhancing physiological uveoscleral outflow from the anterior chamber to the supraciliary space to lower intraocular pressure (IOP). The MINIject implant is a flexible, porous, silicone microsponge, bio-integrating with surrounding tissue to provide long-term stability and drainage efficacy.1

We present six-month outcomes for the first MINIject implant series in the UK performed at The Colchester Eye Centre by a single surgeon.

Methods

Since 16/03/2022, 44 eyes with progressive glaucoma received a MINIject implant, either as a stand-alone procedure or combined with phacoemulsification. The primary outcome was IOP reduction from baseline, with a target of ≥20%. Secondary outcomes included reduction of topical eye drops, and incidence of adverse events.

Results

Baseline mean IOP was 18.7 mmHg (SD 3.8). Pre-operatively, patients were on 2.3 (SD 0.8) IOP lowering agents on average. 72.7% MINIject implants were combined with phacoemulsification procedures. Six months post-MINIject-implantation, mean IOP was 12.9 mmHg (SD 3.7), with an average reduction from baseline of 4.9 mmHg (SD 3.2), which equates to 27.2% from baseline. 70.5% of patients achieved an IOP reduction of ≥ 20%. 90.9% of patients remain drop independent. Observed complications included two persistent hyphaemas, one requiring an anterior chamber washout.

Conclusions

In our cohort, we are pleased to report no hypotony-related complications, such as choroidal detachment or maculopathy. Although the risk of haemorrhagic or hypotonous adverse events during suprachoroidal device implantation remains, in the hands of experienced glaucoma surgeons MINIject proves to be a safe and effective procedure for IOP lowering in patients with glaucoma.

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P-596

MODIFIED TRABECULECTOMY WITH RELEASABLE SUTURES: A SECURE WAY OF SUCCESSFUL GLAUCOMA FILTRATION SURGERY

B Sarker

Purpose

The purpose of this study was to describe a modified surgical technique with releasable sutures and evaluate its safety and efficacy in lowering intraocular pressure (IOP) in glaucoma patients.

Methods

This was a randomized-controlled prospective clinical trial that included 200 eyes of 170 patients diagnosed with primary open-angle glaucoma. They were divided into two groups: the 'trabeculectomy with single suture (group A) and the 'modified trabeculectomy with releasable sutures (group B) with adjunctive application of mitomycin-C (MMC) in both groups. In the modified technique the sides of the triangular sclera flap are closed with releasable sutures. The main outcome results included the cumulative probability of surgical success, IOP values, complications and the number of antiglaucoma drugs needed.

Results

There was a highly significant reduction in IOP to baseline values in both groups at the last visit at 24 months. Group B achieved higher success rate with fewer early and late postoperative complications ($P < 0.05$). Shallow anterior chamber and iridocorneal touch occurred significantly less in group B than in group A. No significant adverse effects were caused by this modified technique with releasable sutures.

Conclusions

Both procedures appear to be equivalent in lowering IOP in surgical management of glaucoma. But Modified trabeculectomy with releasable sutures could be an efficient, relatively safer technique for a successful trabeculectomy due to fewer early complications related to excessive aqueous outflow than single suture.

P-597

PRIMARY GLAUCOMA SURGERY FOR AFRICAN AND AFRICAN-CARIBBEAN PATIENTS (PEACE): A PILOT RANDOMISED CONTROLLED TRIAL

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Purpose

Trabeculectomy with Mitomycin C (Trab + MMC) is traditionally the first-line surgery for primary open angle glaucoma (POAG). However success rates are lower in patients of African/African-Caribbean descent, compared to those of European Caucasian origin, due to bleb failure from excessive scarring. Baerveldt Glaucoma Implants (BGI) may offer better outcomes as a primary procedure in this high-risk group. Although the use of MMC with BGI has not provided any advantages in other studies, it may be beneficial in this high-risk group.

Methods

African/African-Caribbean patients with medically uncontrolled POAG and no prior incisional filtering surgery were prospectively recruited at 3 clinical centres and randomised to 3 groups: Trab + MMC (0.4mg/ml for 3 minutes), BGI-350 + MMC (0.4mg/ml for 3 minutes) or BGI-350 alone. The primary outcome measure was the rate of surgical failure (IOP>21 or <6 mmHg on 2 consecutive visits, further glaucoma surgery, loss of light perception) and feasibility for recruitment. Secondary outcome measures included IOP, glaucoma medical therapy, visual acuity, visual fields and surgical complications.

Results

Fifty-one patients were recruited and randomised to the 3 groups. At 12 months, there was no significant difference in mean IOP: Trab + MMC - 12.6 ± 4.1 mmHg; BGI + MMC - 15.0 ± 4.2 mmHg; BGI - 13.4 ± 3.7 mmHg (p=0.256). There was also no statistically significant difference in visual acuity between the groups (p=0.231). However a statistically significant difference in the mean number of medications was noted: Trab + MMC - 0.44 ± 1.04; BGI + MMC - 1.21 ± 1.23; BGI alone - 2.05 ± 1.75 (p=0.005). Failures developed in 2 patients in the Trab + MMC group (12.5%) and 2 patients in the BGI alone group (11.8%) and required further revision surgery.

Conclusions

Adjunctive use of MMC with BGI shows favourable outcomes comparable to Trab + MMC and both appeared to have better outcomes than BGI without MMC. The majority of patients undergoing Trab + MMC remained medication free at 12 months with a lower mean IOP. No patients who underwent BGI + MMC required revision surgery at 12 months. Larger scale and long term trials are needed to evaluate the best filtering surgery in this high-risk group.

P-598

ASSESSING THE EFFICACY OF DIFFERENT OCULAR HYPOTENSIVE MEDICATION REGIMENS FOLLOWING MICROINVASIVE GLAUCOMA SURGERIES

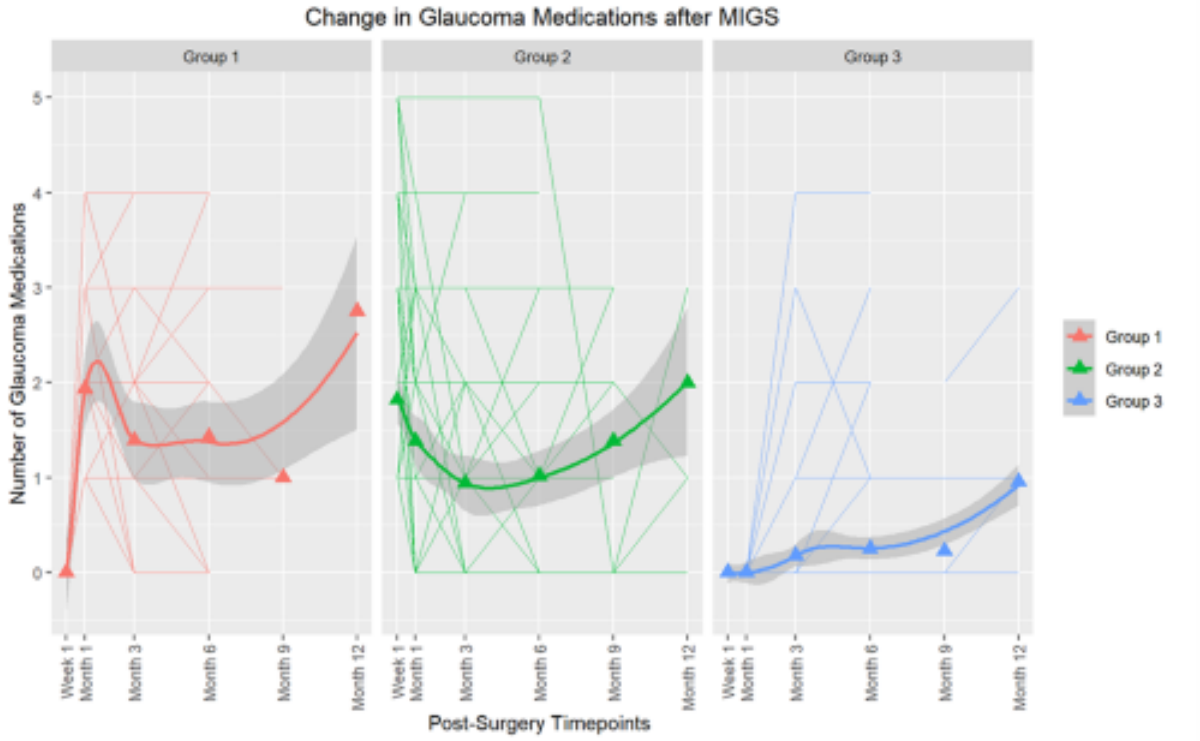
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Purpose
To compare three different patterns of managing ocular hypotensive medications following angle-based microinvasive glaucoma surgery (MIGS) in glaucoma patients.

Methods
This is a retrospective, multi-surgeon study conducted at Wilmer Eye Institute involving patients taking glaucoma medications prior to MIGS combined with cataract surgery. Subjects were placed into three groups based on patterns of postoperative medication management. Group 1 discontinued all medications immediately after surgery, then added them back to address the steroid response, then discontinued them once the target intraocular pressure (IOP) was reached. Group 2 continued medications for 1 month postoperatively, then discontinued medications one class at a time once the target IOP was reached. Group 3 discontinued medications immediately after surgery and restarted them three months after the surgery if IOP elevated above the target IOP. Qualified surgical success was defined as meeting the preoperatively set target IOP. Complete surgical success was defined as reaching target IOP, no secondary surgical interventions, and no additional glaucoma drops.

Results
There was a total of 177 eyes of 177 patients, with 31 eyes in Group 1, 56 eyes in Group 2, and 90 eyes in Group 3. There were no significant differences across groups in baseline characteristics (age, ethnicity, target IOP). However, glaucoma severity is significantly different across groups ($p<0.0001$): Group 1 is 61.29% mild, 22.58% moderate, and 16.13% severe. Group 2 is 39.29% mild, 17.86% moderate, and 42.86% severe. Group 3 is 60.00% mild, 34.44% moderate, and 5.56% severe. At 6 months, mean IOP was 13.90 ±4.07 mmHg, 15.83 ± 6.08 mmHg, and 13.96 ± 3.44 mmHg for Groups 1, 2, and 3, respectively ($p<.2$). There were fewer medications at 6 months for Group 3 (0.26 ± 0.73) compared to Group 2 (1.4 ± 1.33) and Group 1 (1.43 ± 1.43) ($P<.00001$). Qualified success rates at 6 months were 95.24% (20/21) (Group 1), 100% (35/35) (Group 2), and 97.10% (67/69) (Group 3). Complete success rates were 95.24% (20/21) (Group 1), 100% (35/35) (Group 2), and 95.65% (66/69) (Group 3).

Image



Conclusions

Postoperative medication washout and 'riding out' of the steroid response in the early postoperative period before adding them back resulted in the least number of overall medications use while maintaining low rate of complications and moderate IOP reduction at 6 months.

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P-599

MORPHOLOGICAL FEATURES OF CYSTIC VERSUS NON-CYSTIC TRABECULECTOMY BLEBS

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Purpose
Thin-walled cystic blebs are a long-term complication of glaucoma drainage surgery. This study aims to investigate the morphological differences between cystic and non-cystic blebs after Trabeculectomy surgery using optical coherence tomography (OCT).

Methods
Cross-sectional study of 80 blebs of 51 patients who had undergone Trabeculectomy with (n=45) and without (n=35) Mitomycin-C (MMC) at least one year prior for glaucoma. Swept source anterior segment-OCT (Anterion®, Heidelberg Engineering) raster slices in sagittal and coronal planes were used to capture internal bleb structures including cystic spaces and reconstruct bleb lakes in relation to the scleral flap and iridocorneal angle. Cystic blebs were defined by pre-specified criteria based on macroscopic and AS-OCT appearance. Image analysis software (ITK-SNAP) was used to segment and quantify parameters.

Results
18 out of 80 blebs fulfilled the definition for being cystic. Cystic blebs were significantly higher in cases of intra-operative MMC use vs non-MMC (31.1% vs 11.4%, p=0.04). Post-operative bleb age was significantly greater in cystic vs non-cystic blebs (10.2 vs 6.7 years, p=0.05). Cystic blebs displayed significantly greater maximal bleb height (2.1 vs 1.6mm, p<0.001) and a higher proportion of anteromedially or anterolaterally located bleb lakes (85.7% vs 25.8%, p<0.001) in relation to the scleral flap compared to non-cystic blebs. The anterior margins of these bleb lakes were also significantly closer to the iridocorneal angle (0.76 vs 1.9 mm, p<0.001). Five cystic blebs (35.7%) displayed evidence of partial scleral flap dehiscence compared to none in the non-cystic group. There was no significant difference in scleral flap thickness (312 vs 302µm, p=0.29) or width (3.6 vs 3.7 mm, p=0.35) between cystic and non-cystic blebs.

Image

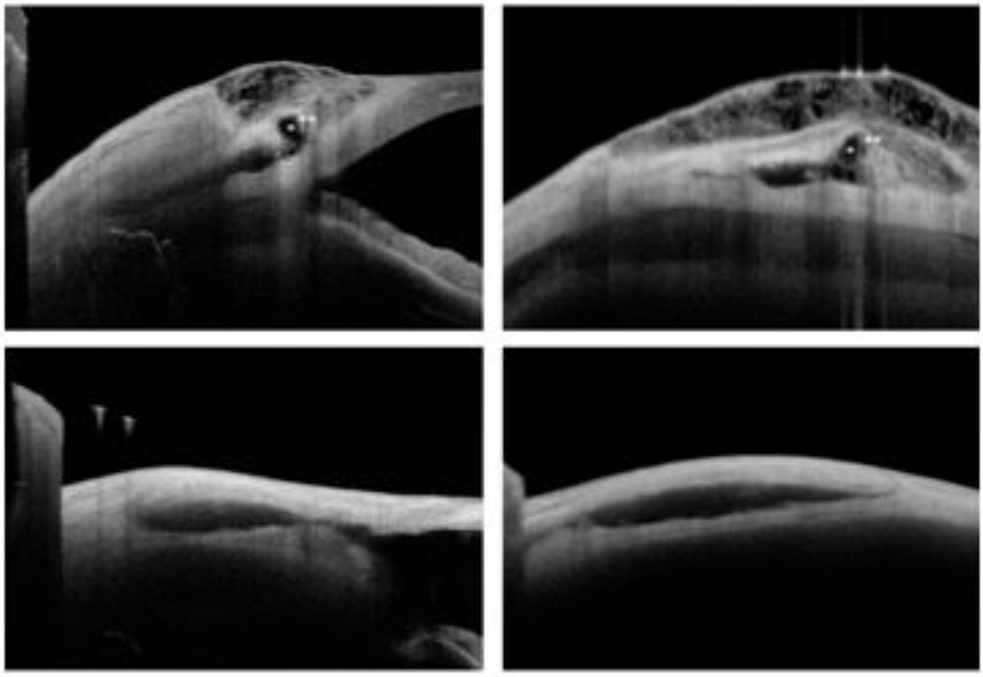


Figure 1: Sagittal (left column) and Coronal (right column) AS-OCT images of cystic (top row) vs non-cystic (bottom row) blebs. Cystic blebs had a significantly higher proportion of lakes located anteriorly and adjacent to scleral flaps (*), with connections (**) between lake and cysts often visible.

Conclusions

Intraoperative MMC use, anteriorly directed aqueous flow and scleral flap dehiscence are possible risk factors for cystic blebs following Trabeculectomy surgery. This may have implications for surgical technique in scleral flap construction and suture placement.

P-600

USE OF ADJUNCTIVE ORAL IBUPROFEN IS ASSOCIATED WITH A REDUCED LIKELIHOOD OF EARLY BLEB FAILURE IN EYES AT RISK OF SCARRING

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Purpose

To investigate the effects of early adjunctive oral ibuprofen treatment on intraocular pressure (IOP) and bleb failure in eyes at high risk of scarring.

Methods

In these retrospective analyses, 288 eyes of 273 patients (mean ± SD age: 68.56±10.47 years; 32.60% females) with primary glaucoma who underwent trabeculectomy/phacotrabeculectomy at the Singapore National Eye Centre between April 2020 to April 2021 with a follow-up duration ≥1 year were included. Of these, 77 (26.7%) eyes deemed to be at high risk of scarring were administered oral ibuprofen ≤ 3 months post-operatively (mean ± SD ibuprofen administration duration: 4.02 ± 2.28 weeks). Participants' IOPs at baseline and at post-operative weeks 1, 2-3; and months 1, 2, 3, 6, and 12 were recorded. Bleb failure was defined as two consecutive IOP readings of >21, >18 and >15mmHg, and/or requiring remedial post-operative laser or surgery.

Results

The ibuprofen group experienced significantly greater post-operative IOP reductions at week 1 (mean difference [95% confidence interval]: -2.89 [-5.22, -0.56] mmHg) and month 1 (-2.29 [-4.53, -0.05] mmHg); and substantially lower odds of bleb failure at the >18mmHg (odds ratio [95% confidence interval]: 0.39[0.20-0.79]) and >15mmHg (0.52[0.29-0.94]) thresholds, compared to the non-ibuprofen group. No differences in adverse ocular hypotony events were observed.

Conclusions

Early adjunctive oral ibuprofen administered to individuals at high risk of post-trabeculectomy scarring is associated with greater IOP reductions and reduced likelihood of bleb failure. Our results suggest that oral NSAIDs may be a safe way of improving trabeculectomy survival in high risk eyes.

P-601

AGE AS A PREDICTIVE FACTOR IN MIGS OUTCOMES IN PRIMARY OPEN ANGLE GLAUCOMA

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Purpose

To compare clinical outcomes of various angle-based minimally invasive glaucoma surgeries (MIGS) between different age groups for adult patients with primary open angle glaucoma (POAG).

Methods

A retrospective, multicenter cohort study comprising 117 eyes of 91 adult POAG patients (63 unilateral, 27 bilateral) btreated with an angle-based MIGS with phacoemulsification at Wilmer Eye Institute between July 2018 and May 2022. Demographic and clinical data were collected from medical records. Surgical interventions included iStent, Hydrus microstent, goniotomy using Kahook Dual Blade, and canaloplasty with trabeculotomy using OMNI Surgical System. Patients were stratified into three age groups by 10-year age ranges (60 to 89). A target intraocular pressure (IOP) was established for each eye by each treating physician prior to surgery based on disease severity, the rate of visual field progression, and the burden of therapy. Success was defined as attaining an IOP at or below target, without additional ocular hypotensive medications or secondary surgical interventions during the 6-month post-op period.

Results

Baseline characteristics of all groups were found to be similar, including the target IOP ($p > 0.05$, mean 17.07 mmHg). Patients in their 80s attained the highest success rates at 60.6% ($p < 0.01$). The mean age of patients meeting success (75.58 ± 7.14 years) and not meeting success (70.47 ± 6.33 years) was found to be statistically significant ($p < 0.05$). 6 month postoperative IOP reduction was also significantly better in patients in the older age group (20%) compared to those in the younger age group (2%) ($p<0.05$), whereas the reduction in medication remained similar ($p > 0.05$). The z score for age group as a predictive factor of success was 2.82 ($p < 0.01$) with an odds ratio of 1.14.

Image

Age Group	Mean Target IOP	Mean PreOp IOP	Mean 6MO IOP	Mean PreOp Meds	Mean 6MO Meds	% IOP Reduction	% Medication Reduction	Success, n (%)
60-69 (n=33)	17.32	17.13	16.78	2.03	0.83	2.04	59.11	12 (36.4)
70-79 (n=53)	16.51	16.4	13.43	1.53	0.43	18.11	71.90	25 (47.2)
80-89 (n=33)	17.58	16.64	13.33	1.49	0.67	19.89	55.03	20 (60.6)
P-values	0.768	0.69	.0036*	0.0866	0.558	0.0153*	.391	0.0048*

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Conclusions

Angle-based MIGS procedures may have greater success rates for patients in their 80s, with a 14% increase in success rate per decade of age.

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P-602

PRESERFLO MICROSHUNT VERSUS TRABECULECTOMY: 12 MONTH OUTCOMES AT A SPECIALIST REFERRAL CENTRE

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Purpose

Preserflo Microshunt is a minimally invasive glaucoma surgery (MIGS). This subconjunctival device has recently become a popular choice for the management of raised intraocular pressures.This is a report of 12-month surgical outcomes of Preserflo MicroShunt surgery with mitomycin C versus trabeculectomy.

Methods

This is a retrospective analysis evaluating surgical outcomes of the Preserflo MicroShunt versus trabeculectomy in 160 eyes of 153 patients (95 undergoing Preserflo, 65 trabeculectomy). Inclusion criteria included both primary and secondary causes of glaucoma. Primary outcome at 1 year was defined as a complete success (CS), qualified success (QS), or failure (F). CS was defined as: IOP of 6–21mmHg (inclusive) with ≥20% reduction from preoperative IOP without anti-glaucoma medications. QS was defined as the same parameters as CS but with antiglaucoma medications. Failure was defined as IOP >21mmHg or not reduced by 20%; IOP ≤5mmHg with any decreased vision on two consecutive visits; reoperation for glaucoma; or loss of light perception vision.

Results

Mean pre-op IOP was 24.76 ±9.67 (n=62) on 3.07 ±1.28 (n= 61) glaucoma medications for trabeculectomy and 25.09 ±8.23 (n=95) on 2.93 ±1.01 (n=93) glaucoma medications for Preserflo. Post-op mean IOP was 2.00 ± 4.04 (n=55) on 0.30 ±0.90 medications (n=55) for trabeculectomy and 14.65 ±6.52 (n=79) on 0.66 ±1.1 (n=64) medications for Preserflo. There was a 51.5% (p=<0.0001) and 41.6% (p=<0.0001) decrease in mean IOP in the trabeculectomy and Preserflo groups respectively. The Preserflo and trabeculectomy cohorts both had a significant reduction in the number of glaucoma medications they were using (p=<0.0001, Welch's t test) . The Preserflo cohort had 57.9% (n=45) of complete successes and 11.8% (n=9) qualified successes. 72.4% (n=42) of the trabeculectomy cohort were a complete success and 10.3% (n=6) a qualified success. 30.3% (n=23) of the Preserflo cohort failed at 12 months in comparison to 17.24% (n=10) of the trabeculectomy cohort (p=0.097, log-rank test).

Conclusions

Both Preserflo Microshunt and trabeculectomy show significant reduction in mean IOP and anti-glaucoma medication burden. This has real world implications as there was no significant difference in CS outcomes between traditional filtration surgery and Preserflo in a large cohort of mixed glaucoma aetiologies.

With further long-term outcomes this data may contribute to guide surgical decision making in primary and secondary glaucoma on maximal topical therapy.

P-603

ENDOTHELIAL CELL CHANGES IN PATIENTS AFTER PRESERFLO MICROSHUNT IMPLANTATION IN 1-YEAR FOLLOW-UP PERIOD

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Purpose

Preserflo MicroShunt is a minimally-invasive glaucoma drainage micro-tube used to shunt aqueous humor from the anterior chamber to the subtenon space. It is a common filtering surgery for patients with open-angle glaucoma and medically uncontrollable intraocular pressure (IOP). The aim of the study is to analyze the effects of Preserflo Microshunt implantation on the corneal endothelial cell density in 1-year period.

Methods

The study included 38 patients qualified for antiglaucoma procedure the Preserflo Microshunt implantation due to poorly controlled IOP on maximal acceptable medication. Patient was examined 1, 2 weeks and 1, 3, 6, 12 months after surgery. On each visit standard ophthalmic examination was performed, which included BCVA, Goldmann Applanation Tonometry, Anterior Segment OCT, Specular Microscopy to assess endothelial cells counts. The corneal endothelial cell density was examined before and 12 months post surgery.

Results

Vision acquity remained stable during the follow up period, although the slight deterioration of vision acquity during the first 1-2 weeks were observed, which resolved after 2-3 weeks after surgery. The implant position assessed in Anterior Segment OCT was stable during the observation period and no significant implant contact with the cornea was observed. There is no significant changes in endothelial cell counts before and after surgery. Mean Value 2379 cells/mm2 and 2263 cells /mm2 respectively before and after surgery.Transient hypotony with subsequent serous choroidal detachment was observed in two patients which resolved on medical therapy. No surgical intervention was needed. No sight threatening complications were observed during the observation period such as endophthalmitis, serous hypotony, hemorrhage.

Conclusions

The procedure is considered to be of high safety profile. Preserflo implantation can lead to some endothelial changes although there is not enough data to conclude that Preserflo implantation can lead to endothelial cells loss. In some particular patients the endothelial cell change is bigger than in the whole group and it has to be further examined. A long-term prospective study with pre- and postoperative endothelial cell count and AS-OCT evaluation of the device positioning would be of great interest to assess the real impact of endothelial cell loss on a bigger cohort of patients.

P-604

EYEWATCH: A NEW ADJUSTABLE DRAINAGE DEVICE IN A CASE OF REFRACTORY GLAUCOMA

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Purpose

Management of refractory glaucoma can be challenging. Glaucoma drainage devices are the option in front of conventional filtering surgeries failure.

EyeWatch is the world's first adjustable device in glaucoma. It is composed by a rotating magnetic disk connected to a non-valved aqueous shunt plate through a silicone tube graduating the aqueous humor outflow. Intraocular pressure (IOP) adjustment can be performed both intraoperatively and non-invasively in the medical office using a purpose-designed magnet.

The aim of this study is to describe the surgical procedure, efficacy, and safety outcomes of the new EyeWatch through a case report and compare it with the few available literature data.

Methods

We report the case of a 61-year-old male with advanced primary open-angle glaucoma refractory to medical and previous filtering procedures who underwent superonasal EyeWatch implantation. The video of the surgical procedure in this particular patient is provided.

Results

The patient had undergone an Express device implantation in his left eye, with early bleb failure due to severe fibrosis extending to the temporal quadrant. IOP was around 20 mmHg with triple therapy and a flattened fibrotic bleb was visible. Visual acuity was 0.7 with 0.9 optical cupping and an end stage visual field. The patient was scheduled for an EyeWatch surgery in the superior nasal quadrant in combination with a ClearPath drainage service. The silicone tube connector between both devices was placed correctly and the arrow of the watch was left between positions 5 and 6 (closed filtration) to avoid early hypotony. In early follow up visits, IOP was 8 and stabilized around 14 at 6 months, with no additional hypotensive medication or complications. The filtering position has remained in 5 since then and no other modifications have been necessary.

There is very little information available, but case series in the literature show a significant clinical decrease in the number of medications and IOP with low rate of complications. In our patient it controlled IOP without additional medication avoiding the risk of hypotony associated with non-valved drainage devices or other complications related to the release of a peritubular ligature.

Conclusions

The great advantage of EyeWatch device is the dynamic modification of the aqueous outflow to control IOP more accurately and non-invasively. It seems to be a promising option in refractory glaucoma in terms of efficacy and safety, although further investigation is needed.

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P-605

OUTCOMES OF SUPRACILIARY DRAINAGE DEVICE IMPLANTATION IN PATIENTS WITH CONSISTENTLY LOW IOP

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Purpose
The Advanced Glaucoma Intervention Study (AGIS, Am J Ophthalmol, 2000) concluded that consistent levels of intraocular pressure (IOP) ≤18 mmHg were associated with minimal visual field deterioration. We describe the 2 year outcomes in primary open angle glaucoma patients who consistently achieved IOP ≤18 mmHg up to 2 years after implantation of a new minimally invasive glaucoma supraciliary surgical device, the MINIject® (iSTAR Medical, Belgium).

Methods
The implant is 5mm long and is comprised of a network of hollow spheres made of soft, flexible, medical-grade silicone. It was implanted standalone and ab-interno into the supraciliary space.

Data from 3 prospective, multi-centre, single-arm trials evaluating the safety and efficacy of a supraciliary drainage device in medically-uncontrolled open-angle glaucoma patients were pooled. In each study, patients were assessed at regular intervals until 2 years after device implantation. No washout was performed. A total of 66 patients presented for two-year follow-up across the 3 studies. A post-hoc analysis on the eyes with no additional glaucoma surgery which achieved diurnal IOP ≤18 mmHg at 6, 12, 18 and 24 months post-implantation was performed. STAR-I: NCT03193736, STAR-II: NCT03624361, STAR-III: NCT03996200.

Results
Of 57 patients completing 2-year follow-up without additional glaucoma surgery, 40 (70%) had IOP ≤ 18 mmHg at each semi-annual follow-up. These patients had mean IOP of 23.2±3.0 mmHg on 2.1±0.9 medications. At 2-years, mean diurnal IOP was 12.5±3.3 mmHg (45% IOP reduction) on 1.0±1.3 medications (58% medication reduction) (n=40). The mean IOPs and relative reductions were similar at all follow-up visits until 2 years, representing a stable result over time. Most patients (62.5%) used on average <1 medication, 22.5% used ≥1 and <2 and 15% used ≥2 medications over 2 years. Forty-Five percent of patients were medication-free at all timepoints. It is of note that no patients had unresolved clinical hypotony or loss of visual acuity lines.

Conclusions
This post-hoc analysis demonstrates that standalone implantation of a supraciliary drainage device achieved low IOP levels in a majority of patients, significantly reducing the risk of glaucoma progression.

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P-606

PRESERFLO MICROSHUNT AFTER PREVIOUSLY FAILED TRABECULECTOMY: ONE-YEAR SURGICAL OUTCOMES

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Purpose

To compare the clinical outcomes of PreserFlo™ MicroShunt (PMS) in eyes with previously failed trabeculectomy (Group-1) vs treatment naïve eyes (Group-2)

Methods

Retrospective cohort of consecutive patients who underwent PMS implantation with MMC 0.4 mg/ml in 2 tertiary referral centres. Primary outcome was failure rate at 1-year (IOP≥21 mmHg or not reduced by 20%; IOP≤5 mmHg with vision loss on 2 consecutive visits; reoperation for glaucoma; or loss of light perception). Complete success was defined as 6≤IOP≤21 mmHg with ≥20% reduction from baseline, no IOP-lowering medications, and qualified success as above with IOP-lowering medications. Secondary outcomes were best-corrected visual acuity, number of IOP-lowering medications, complications, postoperative interventions and revisions.

Results

Sixteen eyes (16 patients) were included in Group-1, and 51 eyes (51 patients) in Group-2. Afro-Carribbean ancestry accounted for 37.5% and 37.2% of Groups 1 and 2 (p=0.98), respectively. Mean age (±SD) was 68.6±14.2 years in Group-1 and 69.6±13.4 in Group-2 (p=0.7). Failure occurred in 37.5% (n=6) and 29.4% (n=15) in Groups 1 and 2 (p=0.54), respectively. Complete success was achieved in 37.5% (n=6) and 54.9% (n=28) in Groups 1 and 2 (p=0.23), respectively. Qualified success occurred in 25.0% (n=4) in Group-1 and 15.7% (n=8) in Group-2 (p=0.4). IOP decreased from 22.1±4.9 mmHg to 15.0±7.3 mmHg at 1-year in Group-1 and from 22.8±7.5 mmHg to 13.2±5.9 mmHg in Group-2 (p=0.31). Number of IOP-lowering medications at 1 year was 0.7±1.2 for Group-1 and 0.4±0.9 for Group-2 (p<0.01). Hypotony (IOP < 5 mmHg) occurred in 31% (n=5) in Group-1 vs 12% (n=6) in Group-2 (p=0.038) and its sequela were significantly higher in Group-1 (13% vs 2% anterior chamber shallowing, p=0.034, 38% vs 6% choroidal effusion, p=0.001). Postoperative viscoelastic injections were required in 19% (n=3) and 8% (n=4) of Groups 1 and 2, respectively (p=0.11). 5-Fluorouracil injections were administered in 19% (n=3) and 37% (n=19) in Groups 1 and 2, respectively (p=0.09), and sub-conjunctival steroids were administered in 44% (n=7) and 55% (n=28) in Groups 1 and 2, respectively (p=0.22). Surgical revision was required in 19.0% (n=3) and 10.0% (n=5) in Groups 1 and 2 (p=0.17), respectively.

Conclusions

PMS appears to be a viable option for patients with previously failed trabeculectomy. The risk of clinically significant hypotony was higher in the secondary PMS group

P-607

COMPARISON OF MITOMYCIN-C AND 5 FLUORACIL TRABECULECTOMY BY ULTRASOUND BIOMICROSCOPY

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Purpose

To evaluate by ultrasound biomicroscopy (UBM) the filtering blebs and the outcome of trabeculectomy performed with mitomycin-c (MMC) or 5-fluoracil (5-FU).

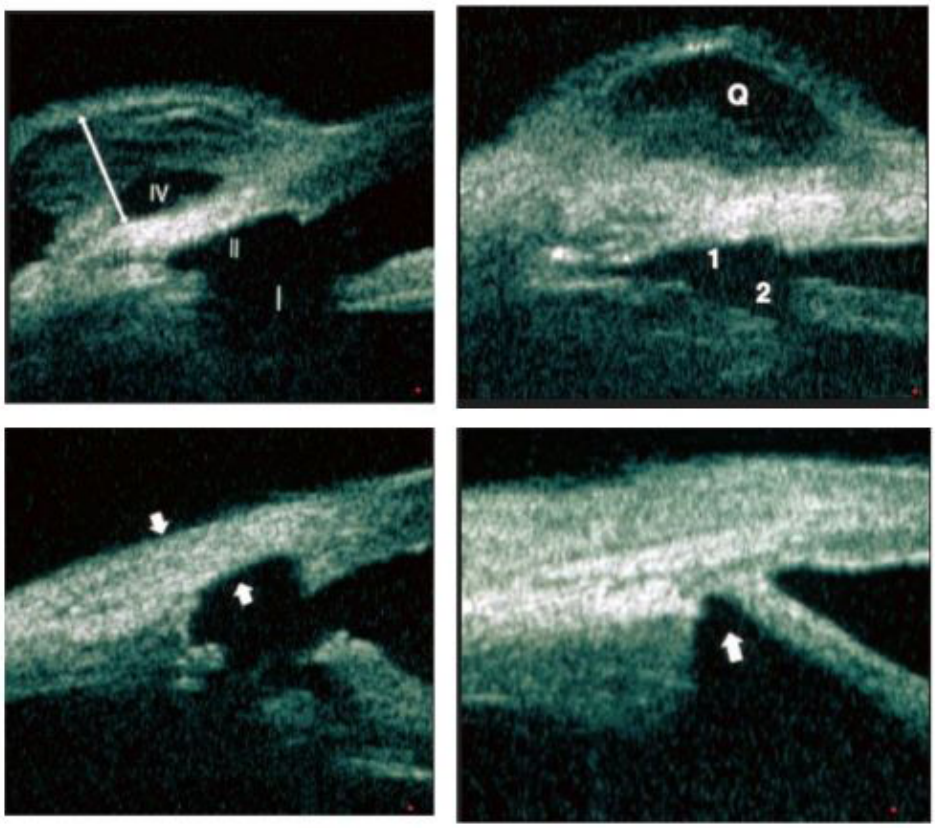
Methods

The study included 52 eyes from 52 patients diagnosed with primary open angle glaucoma (POAG) which underwent trabeculectomy with 0.4 mg/ml of MMC for 3 minutes (n=27) or 50 mg/ml of 5-FU for 5 minutes (n=25). UBM was used to study the filtering blebs (height and reflectivity) and the visibility of the drainage route under the scleral flap. Intraocular pressure (IOP) was also measured. Patients were examined 2 days before surgery and 3 and 6 months after surgery.

Results

The group receiving MMC showed higher filtering blebs, lower intrableb reflectivities and lower intraocular pressures (IOPs). However, differences were not statistically significant. Surgical success, defined as a postoperative IOP less than 21 mmHg without antiglaucoma medications, was observed in 45 cases: 24 eyes (88.8%) from the MMC group and 21 eyes (84%) from the 5-FU group. Surgical failure was observed in 7 cases: in 5 cases, 1 from the MMC group and 4 from the 5-FU group, a flap bleb with an invisible route under the scleral flap was observed. The 2 other failures belonged to the MMC group: one eye had an encapsulated bleb an the other one developed an iris incarceration into the internal sclerostomy site.

Image



Conclusions

Patients treated with MMC trabeculectomy showed higher blebs, lower intrableb reflectivities and lower IOPs compared to those treated with 5-FU, although this was not statistically significant. Surgical success rates were similar between both groups.

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P-608

LONG TERM SURGICAL SURVIVAL OF PRESERFLO® FILTERING SURGERY: A RETROSPECTIVE 2-YEAR ANALYSIS

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Purpose
To analyze long-term surgical survival of Preserflo® filtering surgery at our tertiary glaucoma center, factoring glaucoma etiology and combination with cataract phacoemulsification surgery.

Methods
Retrospective, cohort study. Consecutive glaucoma patients who underwent Preserflo® surgery from December 2019 to January 2021 were included. Clinical data was retrieved from patient files. Our primary outcome was surgical survival at 2 years after surgery, defined as intraocular pressure (IOP) of ≤18 and ≥ 6 mmHg and at least 30% reduction from baseline. Need for additional glaucoma surgeries, surgical revision, or failure to meet these criteria in two consecutive visits after 3 months of surgery was considered surgical failure. Absolute success was achieved if no IOP-lowering medication was needed and qualified success if otherwise. Safety outcomes were also analyzed. A standardized protocol was followed in all cases, which included mitomycin C application. Surgical survival was analyzed using a Kaplan-Meier survival analysis.

Results
A total of seventy eyes from fifty patients fulfilled inclusion criteria. Mean patient age at time of surgery was sixty-nine years (±16.7). Surgeries were in majority primary procedures (75.7%) and nearly a fifth (18.6%) of them combined procedures. Mean preoperative pressure and number of glaucoma medications were 22.9 (±5.63) mmHg and 2.86 (±0.96) respectively. Qualified surgical success criteria were met in 73.7% of isolated Preserflo® filtering surgery and 46.2% of combined surgery (p = 0.119). Absolute surgical success criteria were met in 56.1% of isolated Preserflo® filtering surgery and 30.8% of combined surgery (p = 2.44). All complications were early, mild, and self-limited. There was no hypotony case requiring post-operative intervention.

Conclusions
Preserflo® filtering surgery appears to demonstrate adequate long-term surgical survival. Despite not reaching statistical significance, surgical survival had a tendency towards a better profile in isolated procedures than in combined surgery.

P-609
EFFICACY AND SAFETY OF AB EXTERNO CANALOPLASTY: 3-YEAR FOLLOW-UP

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Purpose
The aim of the study was to evaluate the efficacy and safety of ab externo canaloplasty in a 3-year follow-up.

Methods
This retrospective single-centre trial included adult patients with open-angle glaucoma (OAG) who underwent 360° ab externo canaloplasty with placement of a tensioning suture, between January 2019 and December 2021. This study was conducted at the Department of Ophthalmology Medical University of Bialystok, Poland. A total of 60 eyes (60 patients) with primary OAG, secondary OAG in pseudoexfoliative syndrome, pigmentary glaucoma and normal tension glaucoma patients were included in the study. The follow-up period was 3 years. Primary outcome measures were intraocular pressure (IOP) reduction and number of glaucoma medications. Secondary outcome measures were glaucomatous progression in optical coherence tomography (OCT) or visual field, best-corrected visual acuity (BCVA), endothelial cell density (ECD) and complication rate.

Results
Preoperative IOP was 19.23±4.33 mmHg and decreased postoperatively to 15.39±2.00, 16.00±9.13, 15.52±3.79 mmHg respectively after 12, 24, 36 months ($p < 0.001, 0.025, < 0.001$). Medication usage decreased from 2.69±1.05 to 0.05±0.29, 0.08±0.42, 0.32±0.75 at 12, 24 and 36-month follow-up, respectively ($p<0.001$). Pre-surgery BCVA was 0.73±0.29 and increase to 0.77±0.28, 0.82±0.23, 0.76±0.34 at 12, 24, 36-month follow-up, respectively ($p= 0.107, 0.091, 0.452$). Surgical success was measured as IOP decrease ≥ 20%, compared to baseline IOP level. At the 36-month follow-up, the unmedicated IOP reduction ≥ 20 mmHg was achieved in 78% of patients. Among the intraoperative and early postoperative complications we observed: hyphema (55%), incorrect passage of the microcatheter during cannulation (10%), bleb formation (7%), hemorrhagic Descemet's membrane detachment (5%), hypotony (0%).

Conclusions
Canaloplasty is an effective and safe surgical method in the 3-year follow-up. Provide IOP reduction with avoiding many clinically significant complications associated with the formation of a filtering bleb in trabeculectomy. It is willingly used in monocular patients with a high risk of hypotension, scarring and inflammation. Minimally interference in the eye structures is associated with faster recovery after the procedure and with a low burden of the patient's eye.

P-610

LONG-TERM UPDATE ON DEEP SCLERECTOMY VS. COMBINED TRABECULOTOMY TRABECULECTOMY

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Purpose

To compare the efficacy and safety of DS Vs. CTT on a long-term follow-up.

Methods

Clinical trial design to assess the long-term findings in terms of both procedures. Bilateral cases were recruited, where OD was conducted as DS and the OS as CTT. Demographic and clinical indices were evaluated, preoperative, and immediate, 3-month, 6-month, one year, two years, and at the last follow-up visit.

Results

One hundred and forty eyes of 70 patients were recruited. Subjects were in the mean (SD) age of 1.6 (2.3), [0.03 – 12] months, out of them, 29 (41.4%) were Male, and 41 (58.6%) were Female. In both groups, the IOP has significantly reduced with a p-value <0.0001. The complete success rate was 49 (71%) in the DS eyes, while it was 35 (51.5%) in the CTT eyes (p=0.016), while the overall success was 58 (82.9%) 41 (58.6%) in the DS and CTT eyes, respectively (p=0.001). Intraoperative complication rate was 3(4.3%) in the DS, while it was 17(24.3%) in the CTT eyes (p=0.002). The postoperative complication rate was 6(8.6%) in the DS eyes while it was 21(30.0%) in the CTT eyes (p=0.005).

Conclusions

Deep sclerectomy is superior to combined trabeculotomy/trabeculectomy in terms of both efficacy and safety as assessed by the increased success rate and the lower rate of both intraoperative and postoperative complications

P-612
MEDIUM AND LONG-TERM SURGICAL OUTCOMES OF THE PRESERFLO MICROSHUNT

E Mingorance, J Téllez

Purpose
To evaluate the clinical profile and the mid and long term surgical outcomes of the Preserflo microshunt.

Methods
Retrospective review of Preserflo implant surgeries performed between december 2019 and september 2021 in a Barcelone public hospital (Spain). 95 eyes of 87 patients were included with a minimum follow-up of 3 months. Data collected from the patient history included clinical profile, surgical technique characteristics, intraocular pressure (IOP) measurement, and postoperative complications.

Results
Thirty-eight of 87 patients were men and 49 women, with a mean age of 74 years. Primary open-angle glaucoma was the most common glaucoma diagnosis (78%), followed by pseudoexfoliation glaucoma (10%). The 90.5% of eyes (n=86) had no previous glaucoma surgeries. Mean baseline IOP was 21 mmHg with a mean 2.3 hypotensive medications. Preoperative lens status was phakic in 14 eyes and a Phaco+Preserflo combined procedure was performed in 5 of them. Adjunctive mitomycin C was used in all microsunt surgeries (0.2 mg/mL in 85 eyes and 0.4 mg/mL in 10 eyes) and Ologen collagen matrix in 95 eyes. The mean IOP at 3, 6 and 12 months postoperatively was 12.6, 12.9 and 12.8 mmHg respectively. Only 14 eyes (14.7%) needed to associate 2 IOP-lowering medications, 8 eyes of whom finally required surgical revision of the implant and 3 eyes a new glaucoma surgery. Most of postoperative complications were mild, being hypotony (<6 mmHg) the most frequent (34.7%) followed by hyphema (7.4%). Malignant glaucoma in the early postoperative period of 2 eyes was registered as a serious adverse event.

Conclusions
Preserflo implant is safe and effective in open-angle glaucoma patients. Its hypotensive effect remains stable during the first year, approaching the results of classical filtering surgery. The IOP drop makes early hypotony frequent, usually transient and without structural changes limiting the final visual function.

P-613

TWO YEARS EFFECTIVENESS AND SAFETY OF XEN45 IMPLANT IN GLAUCOMA PATIENTS

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Purpose

To evaluate the 2 year effectiveness and safety of the XEN 45 implant, either alone or in combination with cataract surgery (CS), in patients with glaucoma.

Methods

This multicenter, prospective, observational study was conducted on consecutive glaucoma patients, who were enrolled in the Italian XEN-Glaucoma Treatment Registry (XEN-GTR) and have a 2 year follow-up. Primary outcome measure was the proportion of patients classified as success, defined as intraocular pressure (IOP) <18 mmHg and 20% IOP reduction from preoperative visit, over 2 years of follow-up. Secondary outcomes included % IOP and ocular hypotensive medications (OHM) reduction, % of eyes achieving IOP ≤15 mmHg at 2 years, complications and needlings.

Results

A total of 239 eyes (239 patients) were analyzed, 144 (60.2%) eyes in the XEN-solo group and 95 (39.8%) eyes in the XEN+CS one. One hundred-sixty-five (69.0%) eyes achieved overall success, with no statistically significant differences between groups (p=0.06). Complete success and qualified success were achieved in 113 (47.2%) and 52 (21.7%) eyes respectively. Preoperative median (IQR) IOP was significantly lowered from 23.0 (20.0 - 26.0) mmHg to 14.0 (12.0 - 16.0) mmHg (p<0.01) with 97 (40.6%) of the eyes reaching a final IOP ≤15 mmHg. The mean number of OHM was significantly reduced from 2.7±0.9 at baseline to 0.7±1.1 at 2 years (p<0.01). Preoperative IOP <15 mmHg (HR: 3.1; 95%CI: 1.05 - 9.05, p<0.05), diabetes (HR: 2.1; 95%CI: 1.1 - 4.2, p<0.05) and temporal-positioning of the surgeon (HR: 3.78; 95%CI: 2.35 - 6.1, p<0.01) were significantly associated with surgery failure. One-hundred-fifty-one (63.2%) eyes did not experience any complications during surgery. Only 2 eyes experienced a serious postoperative complication (blebitis), adequately treated without sequelae. Needling was performed in 57 (23.8%) eyes at least once during follow-up.

Conclusions

At 2 years, XEN45 implant, either alone or combined with CS, shows significant effectiveness in lowering IOP and number of ocular hypotensive medications coupled with an excellent safety profile in glaucoma patients.

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P-614

VISCOCANALOPLASTY AND TRABECULOTOMY WITH OMNI DEVICE IN PATIENTS WITH DIFFERENT TYPES OF GLAUCOMA – REAL WORLD DATA

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Purpose
To provide real world data on the efficacy of viscocanaloplasty with trabeculotomy using the OMNI device in patients with open angle glaucoma (OAG), primary angle closure glaucoma (PACG) and normal tension glaucoma (NTG).

Methods
79 eyes of 73 patients underwent viscocanaloplasty with trabeculotomy using the OMNI device, either in combination with cataract surgery, or standalone. Success was defined as postoperative intraocular pressure (IOP) between 6 mmHg and 18 mmHg, or at least 20% reduction compared to baseline, on the same or fewer glaucoma medications. Patients with primary angle closure glaucoma were included, provided that at the conclusion of cataract surgery the angle was open and no peripheral anterior synechiae (PAS) were present.

Results
All 79 eyes were included. The rate of success was 82%, 87.5%, 89% and 87% at 1 week, 1 month, 3 months and 6 months postoperatively, respectively. The mean preoperative IOP was 20.2 mmHg ± 4.6 ($p<0.001$). The mean postoperative IOP was 15.5 mmHg ± 8.4 ($p <0.001$) at week 1, 15.2 mmHg ± 5.3 ($p <0.001$ at 1 month, 14.7 mmHg ± 3.8 ($p <0.001$) at 3 months and 12.9 mmHg ± 3 ($p < 0.004$) at 6 months. The mean number of medications decreased from 2.46 preoperatively to 1.57, 1.45, 1.25 and 1.85 at 1 week, 1 month, 3 months and 6 months postoperatively, respectively. No significant difference in IOP reduction was found between patients who had 360 viscocanaloplasty plus 180 trabeculotomy and 180 viscocanaloplasty plus 180 trabeculotomy. Three eyes needed surgical intervention due to clinical hypotonous maculopathy linked to cyclodialysis cleft.

Conclusions
Viscocanaloplasty and trabeculotomy using the OMNI device provide significant reduction in IOP and number of hypotensive drops required, when performed in combination with cataract surgery and as a standalone procedure. Despite clinical hypotony being reported, it has an overall good safety profile.

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P-615

OUTCOMES OF BLEB NEEDLING WITH HIGH DOSE(40MG) INJECTABLE SUBCONJUNCTIVAL MITOMYCIN C IN FAILING OR FAILED BLEBS

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Purpose
To evaluate the outcomes of bleb needling with High dose(40µg) injectable subconjunctival Mitomycin C (MMC) in failing or failed blebs.

Methods
Prospective, noncomparative, interventional study. 30 eyes of 30 consecutive patients, who had raised Intraocular pressure(IOP) following trabeculectomy (>6 weeks and <1year postoperative) with a patent internal ostium on gonioscopy,flat bleb with visible scleral flap, bleb encapsulation, and/or required Antiglaucoma medications (AGM) for IOP control were included. Bleb needling with subconjunctival injection of high dose (40 µg) MMC was performed in supine position in an operating room.The subconjunctival injection is given 8-10 mm away from the bleb area.A bent 26 needle is introduced 2 mm away from the bleb and advanced towards the scleral flap and subconjunctival fibrosis is cut with a firm back & forth motion. Then the needle is introduced below the scleral flap and into the anterior chamber through the internal ostium and any subscleral fibrosis is cut along the way.The endpoint was change in the appearance and size of the bleb, with adequate elevation. Baseline & follow-up visits were compared to find out the significant difference in the number of antiglaucoma medications (AGM), IOP, and Best Corrected Visual Acuity(BCVA).

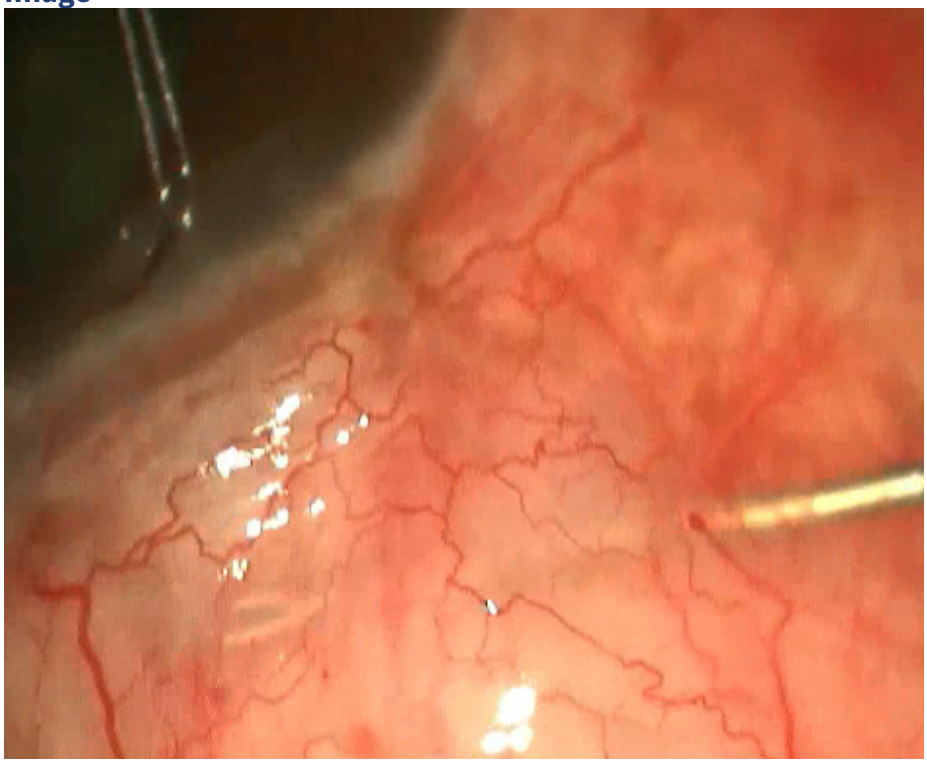
Results
Thirty eyes of 30 patients were included. The mean (SD) of age was 59.93 (9.7) years. The median follow-up was 12 months. All statistical analysis was done using the statistical software STATA 11.1 (Texas, USA).The IOP decreased significantly from mean 24.72+/-6.5mmHg (range12–43) to 17.52+/-4.2mmHg (range13–28) after needling at the last follow-up (P < .0001). The number of topical AGM reduced from a mean 2.32+/-1.02(range 0–4) to 1.96+/-1.11(P=0.050, range 0-4) at the final visit which is not statistically significant. LogMAR BCVA improved marginally from a median of 0.18 (6/9) (range 0 - 1.30) to a median of 0.09 (6/6) (range 0 – 1.78) and was borderline statistically significant (P = 0.434). The overall success rate(complete +qualified) was 78.2% after 1 year. The failure rate was 21.7% after 12 months. There were no significant complications post-needling.

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Image



Conclusions

Bleb needling with high-dose injectable subconjunctival MMC appears to be a good option for effectively rescuing failing or failed filtration without compromising safety.

P-617

ANTERIOR SEGMENT OPTICAL COHERENCE TOMOGRAPHY CHANGES DURING THE POST OPERATIVE COURSE AFTER INSERTION OF A SUPRACHOROIDAL MINIJECT DEVICE

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Purpose

The iSTAR MINIject device is a new generation microinvasive glaucoma surgical procedure designed to lower intraocular pressure through drainage to the suprachoroidal space. This study describes changes observed in the suprachoroidal space over the early post operative period and the intraocular pressure (IOP) outcomes.

Methods

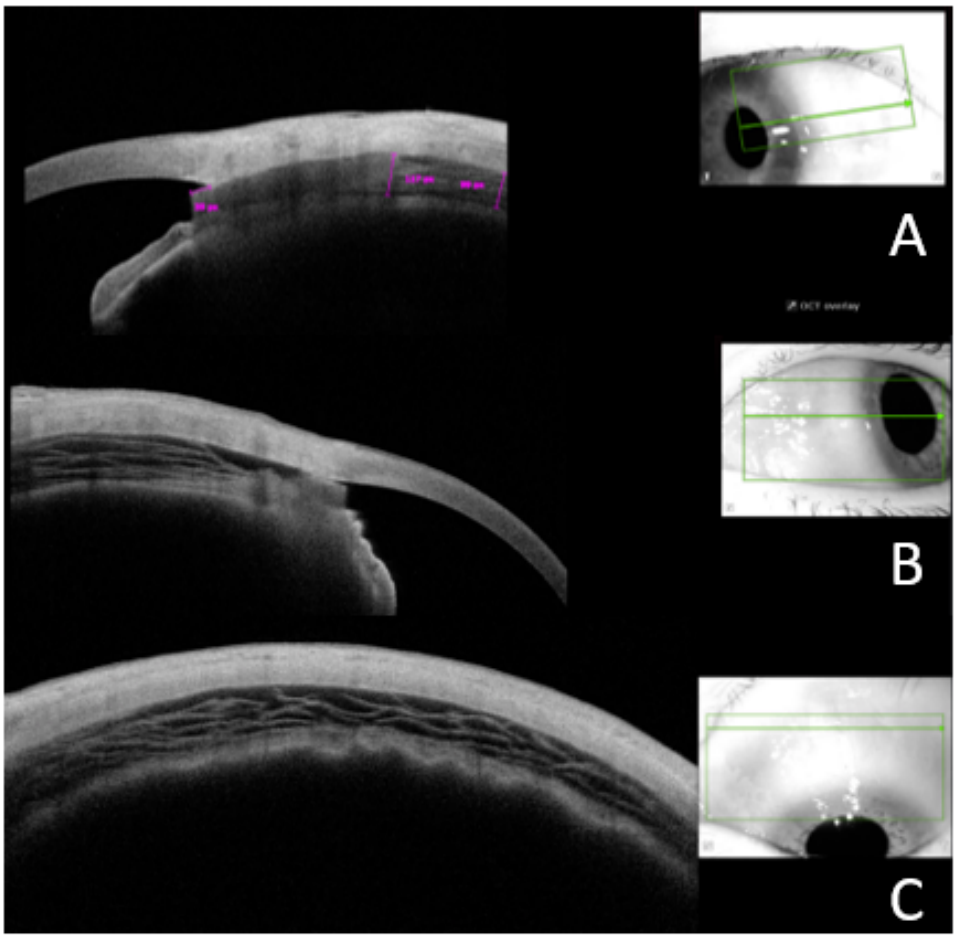
Six patients underwent nasal insertion of a MINIject during a combined phaco-MINIject procedure. The patients had pre operative and post operative anterior segment optical coherence tomography (AS-OCT) images performed at day 1, week 1, 1 month, 3 months and 6 months. Swept Source AS-OCT imaging was performed obtaining multiple images in the sagittal and coronal planes using the Heidelberg ANTERION®. Measurements were acquired using the width of the device as the standard and averages taken from the sagittal and coronal measurements. Surgical outcomes were compared to intraocular pressure outcomes.

Results

AS-OCT imaging successfully imaged the suprachoroidal space (Figure 1). The average length of the proportion of the MINIject in the anterior chamber at day 1 was 274.8 ±31.4µm (mean ± standard deviation) and 260.6±16.4µm at one month. The height of the suprachoroidal space at the posterior end of the 5.0mm long device was 897.0±76.4µm at day 1 and 974.2 ±30.2µm at 1 month. The height of the suprachoroidal space at the posterior limit of the suprachoroidal space on levo/dextroversion was 783.0± 87.5µm on day 1 and 876.9±90.7 µm at 1 month. Further follow up visits are awaited and will be presented subsequently. AS-OCT demonstrates septations/ bands in the suprachoroidal space that extended to the superior aspect of the eye as shown in Figure 1C. The intraocular pressure was 24.6±7.8 mmHg on a range of 0-2 drops pre operatively which reduced to 12±5.2 mmHg at day 1 and 13.3±2.3mmHg on 0 drops at 1 month.

Image

Figure 1. Swept Source Anterior Segment-OCT images of the suprachoroidal space after implantation of the MINIject device. A) Delineates the MINIject device in situ and the measurements taken including the length of the device in the anterior chamber, the height of the suprachoroidal space at the poster end of the tube and the height of the space at the posterior limit. B) Demonstrates the septations seen in the space behind the device. C) Demonstrates the superior suprachoroidal space post operatively.



Conclusions

The advent of new AS-OCT imaging technology allows high resolution imaging of the supra-choroidal space created by new generation suprachoroidal devices. The initial month after surgery demonstrates that this suprachoroidal space is maintained, whilst providing IOP control and reduction of medications.

P-619

RETROSPECTIVE ANALYSIS AND OUTCOME COMPARISONS BETWEEN 3 SCHLEMM'S CANALOPLASTY SURGICAL DEVICES FOR GLAUCOMA

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Purpose

Minimally Invasive Glaucoma Surgery (MIGS) is at the cutting edge of modern glaucoma management. MIGS aims to reduce the burden of drops and deliver lower intraocular pressures without resorting to more invasive surgery such as trabeculectomy. A wide variety of devices are available and of these, we evaluated three that increase aqueous outflow via Schlemm's canaloplasty:

1. Hydrus implant (microscopic metallic device)

2. iTRACK Advance (microcatherisation and viscodilation)

3. Omni device (microcatheterisation and viscodilation followed by trabeculotomy)

This retrospective single surgeon study aims to characterise intra- and post-operative efficacy and safety of the aforementioned techniques.

Methods

A retrospective analysis of records at Colchester Hospital, UK, was performed to identify all cases involving Hydrus, iTRACK Advance, and Omni devices, as a stand-alone procedure or combined with phacoemulsification, between March 2021 and October 2022. The primary outcome was measured as a reduction in intraocular pressure (IOP) from baseline. Secondary outcomes included reduction of drop dependence, visual function preservation or improvement, and incidence of adverse events.

Results

86 cases (39 Hydrus vs 4 iTRACK Advance vs 43 Omni) were identified. The average number of drops reduced at 6 months compared to baseline were 1.39 to 0.5 (Hydrus), 1.26 to 0.53 (Omni) and 1 to 0.25 (ITRACK Advance).

Intra-operatively, there were no complications.

Post-operatively, there was cystoid macular oedema in the iTrack (n=1, 25%) and Omni (n=1, 2.3%) cases. The Omni cases had other complications including uveitis (n=2, 4.6%) and choroidal folds (n=2, 4.6%), all of which resolved.

Conclusions

Hydrus, iTRACK Advance, and Omni devices safely deliver clinically significant IOP reduction and decreases drop burden for uncontrolled glaucoma patients.

P-620
CHALLENGING MANAGEMENT OF OCULAR HYPOTONY AFTER TRABECULECTOMY

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Purpose
The aim pf this study was to assess the causes of ocular hypotony after trabeculectomy and to describe its management.

Methods
Retrospective, consecutive, noncomparative case series. The medical records of patients with early ocular hypotony (IOP< 5mmhg) after trabeculectomy with 5FU were reviewed. The causes of ocular hypotony and its management were assessed retrospectively. All patients underwent ophthalmic evaluation, anterior segment OCT, and macular OCT.

Results
A total of 14 eyes from 14 patients were included in the series. Mean intraocular pressure (IOP) was 2.6 ± 1.5mmHg. Postoperative ocular hypotony was due to an over-filtration in 8 cases, and bleb leakage in 6 cases. All patients underwent surgical bleb revision, six patients underwent anterior chamber reformation with viscoelastic, and four patients receirved systemic corticosteroids for choroidal detachment.

Conclusions
Revision technique with conjonctival advancement or resuture of the scleral flap is associated with good long-term control of IOP and improved visual acuity in eyes with ocular hypotony after trabeculectomy.

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P-621
XEN® IMPLANT: LONG-TERM OUTCOMES AND SAFETY PROFILE

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Purpose
XEN45® Gel Stent implant is an ab-interno device based on subconjunctival/transscleral filtration used in patients with mild to moderate open-angle glaucoma. This study aimed to evaluate the long-term efficacy and safety of XEN45 gel stent implant in these patients.

Methods
Retrospective study conducted in consecutive primary or secondary open-angle glaucoma patients who underwent XEN45® gel stent implantation, alone or in combination with phacoemulsification, with at least 12 months of follow-up. Primary outcome was the variation of intraocular pressure (IOP) throughout follow-up. Complete success was defined as an IOP reduction ≥20% from baseline without topical anti-hypertensive drugs or additional glaucoma surgery, and qualified success resorting to topical anti-hypertensive drugs. Pre- and post-procedure IOP and number of topical anti-hypertensive drugs were compared using paired sample t-test, and Wilcoxon signed-rank test.

Results
A total of 107 eyes (82 patients) were included. Total follow-up was between 12 and 67 months (average 29.51; sd 17.91). Mean age was 73.23 (sd 10.26) years. Seventy-two eyes were phakic (67.3%), 2 (1.9%) had previous trabeculectomy, and 4 (3.7%) previous laser trabeculoplasty. Most cases (56.1%) had combined XEN-phacoemulsification.

XEN® gel stent significantly reduced mean IOP from 20.56 (sd 4.19) at baseline to 15.72 (sd 3.88), 14.59 (sd 4.33), and 15.41mmHg (sd 4.69) at 12, 36 months and last observation, respectively ($p<0.001$). Mean number of topical anti-hypertensive drugs was significantly reduced from 3.42 (sd 0.72) to 1.04 (sd 1.22), 1.53 (sd 1.34), and 1.67 (sd 1.40) at 12, 36 months and last observation, respectively ($p<0.001$). No serious ocular adverse events were reported. Bleb needling or conjunctival revision surgery was required in 25 eyes (23.4%). Fourteen eyes required additional glaucoma surgery due to suboptimal IOP control.

Success was achieved in 68.5, 68.0, and 63.6% of eyes at 12, 36 months, and last observation, respectively. Complete success was achieved in 36.0,15.9, and 18.3% of eyes at 12, 36 months, and last observation, respectively. Similar results were achieved with stand-alone or combined XEN implantation.

Conclusions
This study demonstrates the long-term efficacy and safety of XEN45® Gel Stent implant, significantly and sustainedly reducing IOP and the burden of topical anti-hypertensive drugs in patients with open-angle glaucoma, although at the expense of possible bleb revisions and needlings.

P-622
THE PRESERFLO MICROSHUNT: A MULTI-CENTRE CLINICAL STUDY

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Purpose
To evaluate the efficacy and safety of the PreserFlo MicroShunt device in two centres in the West Midlands, UK.

Methods
Retrospective clinical data was collected for PreserFlo operations performed by three glaucoma consultants at University Hospitals Birmingham and University Hospitals Coventry & Warwickshire NHS Trusts in the West Midlands, UK, from May 2021 through October 2022. Baseline characteristics, pre-operative logMAR visual acuity (VA) and intra-ocular pressure (IOP) were extracted from electronic medical records as well as the number of topical glaucoma agents used. VA and IOP measurements at post-operative visits up to 6 months were recorded alongside any complications or further procedures required.

Results
The study captured a total of 55 PreserFlo operations across 51 patients. The primary indication was primary open angle glaucoma (60%), followed by primary angle closure and pseudoexfoliation (9% each). Pre-operative glaucoma status was advanced with an average cup-to-disc ratio of 0.9. Mean pre-operative IOP was 23.3mmHg and mean number of glaucoma drops was 3, with 56% of patients on concurrent oral acetazolamide. At 6 months, the mean IOP was 14.7mmHg (38% reduction), and mean number of drops was 0.7 (77% reduction). Acetazolamide was stopped in all but 1 patient due to uncontrolled IOP in the fellow eye. 42% of eyes had early hypotony of IOP <6mmHg; all but 4 of these resolved spontaneously, with the remaining 4 requiring AC reformation with viscoelastic due to persistent choroidal effusions or hypotony maculopathy. 4 patients required a return to theatre: 2 for bleb re-needling, one for AC washout for a total hyphaema and another for PreserFlo revision at 4 months. Post-operative effects on VA were largely temporary with an average change of 0.0 logMAR by the end of the study period.

Conclusions
This multi-centre analysis of the PreserFlo MicroShunt demonstrates very good efficacy over a 6-month period. The procedure was well-tolerated with most hypotony-related complications being mild although a small proportion required AC reformation or further surgery. Evaluation of longer-term follow-up data is required to determine if the reduction in IOP and glaucoma drops can be sustained.

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P-623

DELAYING TRABECULECTOMY WITH TRABECULOTOMY USING THE OMNI SYSTEM: A CASE SERIES

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Purpose

To evaluate the safety and efficacy of trabeculotomy performed with the OMNI system to prevent further glaucoma surgery in glaucoma patients.

Methods

A retrospective case review of patients who underwent trabeculotomy with or without cataract surgery in a tertiary university hospital in the UK from August 2021 to November 2022. All patients had progressive glaucoma; diagnosed by a consultant ophthalmologist specialising in glaucoma, who would have otherwise required a trabeculectomy.

The primary outcome measure was failure of treatment leading to further glaucoma surgery. This was defined as requiring incisional glaucoma surgery or cyclodiode laser. Secondary outcome measures were number of eyes meeting target IOP without medication, number of eyes meeting target IOP with medications, mean IOP change post surgery and adverse events.

Results

Thirty five eyes were analysed (15 normal tension glaucoma, 15 primary open angle glaucoma, 2 pigment dispersion glaucoma, 2 pseudoexfoliative glaucoma and 1 secondary glaucoma after retinal detachment surgery) with a mean listing IOP of 17.3mmHg (±7.0) on 2.7 (±1.0) mean number of medications.

Thirty one eyes (88.6%) did not require further glaucoma procedures and achieved target IOP. Of those that failed 2 required trabeculectomy, 1 required glaucoma drainage tube surgery and 1 required cyclodiode laser. Six eyes (17.1%) achieved target pressures without medication. The latest mean IOP was 13.4mmHg (±8.4). A mean change of -3.9mmHg occurred between listing and latest IOP ($p<0.01$)

Adverse events included 13 patients with early, postoperative self-limiting hyphaema of less than 1mm height and 1 hypotony (2mmHg, 6/9 visual acuity with choroidal folds).

Conclusions

Trabeculotomy with the OMNI system is a beneficial option in the control of progressive glaucoma and delaying the need for further glaucoma surgery.

P-624

PEPTIDE GEL, CK2-085, MAINTAINS OPERATIVE FIELD VISIBILITY DURING GLAUCOMA SURGERY: FIRST-IN-HUMAN RANDOMIZED CLINICAL TRIAL

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Purpose

To investigate whether a transparent, self-assembling peptide gel, CK2-085, is safe and able to improve intraoperative visibility during glaucoma surgery.

Methods

We conducted a single-masked, multicenter, prospective, randomized, parallel-group, first-in-human clinical trial. Sixty-eight glaucoma patients were randomly assigned, 1:1 using an interactive response system, to receive glaucoma surgery with or without the use of CK2-085. Subjective Interoperative Visibility Evaluation (IVE), Surgical Feasibility Evaluation (SFE) and Diathermy Evaluation (DE) scores were used to assess the surgery itself. Postoperatively, the surgical outcome was assessed by measurements of intraocular pressure (IOP), best-corrected visual acuity and corneal endothelial cell density, along with slit lamp microscopic and fundus examinations and an evaluation of adverse events.

Results

Intraoperative visibility when using CK2-085, scored at 51.5%, was significantly higher than that in the control, non-CK2-085 group (17.6%, p = 0.004). The surgical feasibility evaluation showed equivalence between CK2-085 and non-CK2-085 groups, with neither outcome was affected by the use of diathermy. IOP one month after the operation was 9.9 ± 4.5 mmHg in the CK2-085 group and 10.9 ± 5.1 mmHg in the control group, not significantly different (p = 0.54). Occasional adverse events were temporary and occurred equally in both groups.

Conclusions

CK2-085 is a safe and effective material for use in the maintenance of intraoperative visibility during glaucoma surgery.

P-625

IMPACT OF POSTOPERATIVE CHOROIDAL DETACHMENT ON TRABECULECTOMY OUTCOMES: A FOUR-YEAR COMPARATIVE STUDY

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Purpose

The aim of this study was to compare trabeculectomy outcomes in patients with and without post-operative serous choroidal detachment (CD) and establish an association between CD and trabeculectomy outcomes.

Methods

In this 4-year retrospective cohort study, medical records of glaucoma patients older than 18 who underwent primary trabeculectomy with Mitomycin-C between 2012 and 2020 were reviewed. Phakic eyes without history of intraocular surgery and with at least one year of follow-up were included in the study. Cases were categorized into two groups; with and without CD, and trabeculectomy outcomes were compared. Comparison was carried out using postoperative intraocular pressure (IOP), glaucoma medications and surgery success. Two levels of success were defined; criteria A) 5<IOP<19 mmHg and criteria B) 5<IOP<16 mmHg. In addition to the defined IOP ranges, IOP reduction less than 20% from baseline and further glaucoma surgery were also counted as surgery failures.

Results

Total of 183 patients including 153 without CD (mean age 58.73±11.40years, mean IOP 23.7±6.63mmHg) and 30 with CD (59.00±12.59 years, mean IOP 22.2±3.83mmHg) entered the study. Post-trabeculectomy mean IOPs were significantly higher in the CD group at all follow-up visits at year 1 through 4 (14.70, and 14.82mmHg vs. 11.03, and 12.59mmHg; p-value<0.05). Similarly mean number of glaucoma medications was higher in the CD group at all follow-up visits (p-value>0.001). Based on success criteria A, cumulative probability of success of patients with CD wasn't significantly different compared to those without CD at years 1 through 4 (80.0%, and 69.6% vs. 88.2%, and 74.1% respectively; p-value>0.05log-rank). However, based on success criteria B, patients with CD had significantly lower cumulative probability of success at years 1 through 4 (50.0% and 8.9% vs. 79.7% and 59.8%, p-value<0.001).

Conclusions

We established that post-trabeculectomy serous choroidal detachment is associated with adverse surgery outcomes. Higher rate of surgery failure, mean post-operative IOP and glaucoma medications were observed in patients with post-trabeculectomy choroidal detachment and this was more pronounced in patients who required more stringent IOP control (success definition 5<IOP<16mmHg).

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P-626

A NEW "TUBE IN TUBE" METHOD TO EXTEND GLAUCOMA DRAINAGE DEVICES USING A PAUL GLAUCOMA IMPLANT

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Purpose

To describe a new and simple technique of glaucoma tube extension using a segment of tube from a PAUL® Glaucoma Implant that carries advantages over previously described techniques in cases of tube retraction.

Methods

A retrospective noncomparative case series of 3 adult patients with glaucoma tube retraction managed by the "tube-in-tube" technique using a segment of PAUL® Glaucoma Implant to extend and reposition the glaucoma device in the anterior chamber without the need for a completely new device. The follow-up duration ranged from 2 months to 12 months.

Results

Adequate tube position and length were seen in all cases throughout the follow-up period. No tube migration was seen. The intraocular pressure was maintained without the need for changes to glaucoma medication in both the immediate and longer-term post operatively. Pre operative IOP was 10,18 and 14mmHG and post operative IOP was 11,16 and 12mmHG respectively. There was no visual loss because of the procedure.

Image



Conclusions

This new “tube-in-tube” technique is quick, safe, and simple to perform. It has many advantages over previously reported techniques; it does not add significant bulk and the lengthened tube sits nicely along the contour of the globe owing to appropriate rigidity of the extended segment. The new segment of tubing has a snug fit preventing any leak from the joint without the need for additional sutures and by placing a smaller diameter tube in the anterior chamber compared to other glaucoma drainage devices the surface area between the tube and corneal endothelium is reduced which subsequently reduces the rate of endothelium loss. In addition, it does not require any changes to glaucoma medication either in the immediate postoperative period or longer term as the PAUL® Glaucoma Implant is thought to not offer any flow resistance. The main disadvantage of this technique is cost, this can be overcome by planning theatre case load and having an additional case on the same theatre list using the plate and remaining length of the tube ensuring no waste. This technique can be used for all types of glaucoma drainage devices and can be used in both adult and paediatric patients.

P-627

THREE YEAR OUTCOMES OF THE PAUL® GLAUCOMA DRAINAGE DEVICE IN A TERTIARY REFERRAL CENTRE

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Purpose
To report the first three year outcomes of the PAUL glaucoma implant (PGI), a novel glaucoma drainage device in a tertiary referral centre in the UK.

Methods
A consecutive cohort study of patients undergoing PGI between February 2019 and January 2020 with a minimum of 3 year follow-up.

Our surgical technique is described in detail in the literature1. Briefly the PGI is most commonly placed in the superotemporal quadrant. The plate is inserted beneath the recti muscles following application of mitomycin-C soaked sponges to the scleral bed. A 6/0 prolene suture is inserted into the tube lumen (there is no external ligature). A 26G needle is used to create the tunnel for the tube into the anterior chamber.

Primary outcome measures include failure (IOP > 21mmHg or less than 20% reduction of IOP, further glaucoma intervention or visual loss to no light perception). Secondary outcomes include mean IOP, number of medications, visual acuity and complications.

The 1 year outcomes from this cohort have been published in the Eye journal1. We describe the late post-operative outcomes and complications from the same cohort.

Results
At the time of this abstract preparation 50 eyes have reached 1 and 2 year follow-up and 18 eyes have reached 3 years. All 50 will reach 3 years by the time of the WGA congress. Mean preoperative IOP in this cohort was 27.7±8.1mmHg on 3.7±0.9 medications falling to 12.6±3.1mmHg on 1.2±1.2 medications at 3 years. This represents a 55% IOP reduction and 67% reduction in medication. 64% (n=32) had prolene stent removed at a mean 5.4 months post-op.

Complete success, defined as unmedicated IOP ≤21 mmHg and >5mmHg and reduction of at least 20% from baseline was achieved in 33% eyes (n=6). 89% (n=16) were qualified successes (with or without topical medication). 2 cases were deemed as failures because of failure to achieve >20% reduction in IOP.

Early post-operative complications included 1 case of hypotony managed conservatively. Late post-operative complications included 1 case of corneal graft failure and 1 case of hypotony at 10 months which resolved with re-stenting the PGI with 6/0 prolene.

Conclusions
This study presents the first reported 3 year outcomes of the PGI and demonstrates a significant and sustained reduction in IOP and number of medications with a low rate of post-operative complications.

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P-628

EFFICACY OF INTRAOPERATIVE INJECTION VERSUS SPONGE APPLICATION OF MITOMYCIN C FOR TRABECULECTOMY

D Aryasingha

Purpose

purpose is to determine the efficacy and safety of Mitomycin C intra operative use by sub-conjuncival injection as opposed to sponge application during trabeculectmy.

Methods

It is a prospective randomized study conducted from 2020 December to 2022 March. Inclusion criteria included patients who underwent trabeculectomies with MMC as the primary surgical procedure for primary or secondary glaucoma. Patients were randomized into 2 groups. Group I- injection (n -17) and Group S - Sponge application (n-20). Mitomycin concentration used in both groups was same (0.2%). Data was analyzed at the end of one year follow up of patients.

Results

Mean preoperative IOP in group I was 26.70 ± 5.36 mmHg and group S was 32.45 ± 6.99 mmHg, which reduced to 13.23 ± 3.06 mmHg and 13.35 ± 2.79 mmHg at final visit at one year follow up. Mean preoperative anti-glaucoma medications was 2.47 ± 0.49 in group I and 3.05 ± 0.73 in group S, which reduced to 0.58 ± 0.59 and 0.55 ± 0.66 post- peratively respectively. The complete success rate was 47.05 % in the injection group and 55 % in the sponge group at the end of 1 year. All patients in both groups underwent argon LASER suturlysis at some point during post-operative period. 6 patients in the sponge application group and 5 patients in the injection group needed bleb needling with 5 Fluorouracil. 2 patients developed choroidal detachment and one patient had malignant glaucoma in group S. 3 patients in the injection group did not comply with the follow up.

Conclusions

Intra operative Mitomycin C injection is as effective as conventional sponge application in trabeculectomy with similar complete treatment success. With regards to safety and ease of application of Mitomycin C, intraoperative injection is better than conventional sponge application.

References

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P-629

EFFICACY AND SAFETY OF AB EXTERNO PHACO-CANALOPLASTY VERSUS PHACO-ISTENT FIRST-GENERATION IN PATIENTS WITH POAG - EARLY RESULTS

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Purpose
The aim of the study was to compare early surgical outcomes after iStent bypass implantation combined with phacoemulsification versus phaco-canaloplasty in patients with primary open-angle glaucoma (POAG).

Methods
A retrospective chart review were conducted including consecutive adult patients with POAG that underwent iStent bypass implantation combined with phacoemulsification or canaloplasty between April 2022 and September 2022. The study took place in Department of Ophthalmology Medical University of Bialystok, Poland. Primary outcome measures were intraocular pressure (IOP) reduction and number of glaucoma medications. Secondary outcome measures were best-corrected visual acuity (BCVA), endothelial cell density (ECD) and complication rate. A total of 92 eyes (82 patients) with POAG were included in the study, of which 47 eyes were treated with ab externo phaco-canaloplasty (PC), and 45 eyes were implanted with the iStent device combined with phacoemulsification (PiS).

Results
The follow-up period was approximately 6 months. Preoperative IOPs were 17.30 (15.00; 19.85) mmHg and 17.50 (15.10; 20.90) mmHg in the PC and PiS groups, respectively (p = 0.876). At the end of the follow-up, IOP decreased to 15.00 (13.00; 16.00) mmHg and 15.00 (14.00; 17.00) mmHg in the PC and PiS groups, respectively (p = 0.438). Medication usage decreased from 2.08 to 0.12 and 1.40 to 0.04 in PC and PiS eyes, respectively. Most patients in both groups were medication-free at 6 months follow-up. After 6 months of observation, ECD in PC and PiS groups decreased from 2309.50 (2032.00; 2533.00) to 1966.50 (1262.00; 2353.50) and 2160.00 (1958.50; 2372.50), to 1231.00 (1089.00; 2050.00), respectively (p = 0.037). Pre-surgery BCVA was 0.80 (0.50; 1.00) and 0.60 (0.40; 1.00) in PC and PiS eyes, respectively (p = 0.456). Follow-up BCVA was 0.95 (0.60; 1.00) for PC and 1.00 (1.00; 1.00) for PiS. Hyphema and corneal oedema were noted on the first day post-surgery in both groups. Subsequent complications included a transient increase in IOP in the PC group.

Conclusions
In conclusion, both types of treatment are effective in lowering IOP and medication. The phaco-canaloplasty has a more favorable safety profile over 6-month follow-up in patients with POAG.

P-630

CHANGES IN INTRAOCULAR PRESSURE AND TONOGRAPHIC OUTFLOW FACILITY FOLLOWING COMBINED VISCOCANALOPLASTY AND TRABECULOTOMY WITH THE OMNI SURGICAL SYSTEM

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Purpose
To compare changes in intraocular pressure (IOP) and outflow facility, pre and post treatment with the OMNI surgical system in pseudophakic patients with glaucoma or ocular hypertension.

Methods
We prospectively recruited pseudophakic participants with open angle glaucoma or ocular hypertension on topical glaucoma medications. Participants underwent glaucoma medication washouts for a minimum of 28 days and had IOP measurements using ocular response analysis and tonographic outflow facility with Schiotz tonography at baseline and at 3 months post-surgery. All participants had 360° viscocanaloplasty and 120-180° of trabeculotomy with the OMNI system (Sight Sciences, CA, USA). Anterior segment optical coherence tomography (OCT) (Anterion, Heidelberg, Germany) was performed at all post op visits. Paired t-test was performed for comparison of pre and post-op measurements.

Results
24 patients received treatment and had pre and post-op washout IOP and outflow measurements. We found a statistically significant reduction in washout IOP from a baseline mean of 26.06mmHg to 22.25mmHg at 3 months (-3.8mmHg P=0.043; 13.4% reduction) and mean medications from 2.67 to 1.25 (-1.42 P=<0.001). There was also a significant increase in mean outflow facility from 0.0724µl/min/mmHg at baseline to 0.1404 µl/min/mmHg at 3 months post-surgery (0.068 µl/min/mmHg P=<0.01; 94% increase). A significant proportion of patients (13/24; 54%) had suprachoroidal fluid evident day 1 postop on anterior segment OCT, indicating cleft formation. Most of these closed spontaneously within 3 months post-op however 2 persisted beyond this timepoint. There were no reoperations; only mild self-limiting hyphemas (25%) and anterior uveitis (8%) were reported.

Conclusions
This is the first study on the OMNI device, evaluating washout IOP, tonographic outflow facility and anterior segment OCT to look for suprachoroidal fluid in all patients. We found that there was a significant change in IOP, medication use and increase in outflow facility following surgery. There was a notable prevalence of small clefts postop which resolved spontaneously with time.

P-631

ACUTE POST-OPERATIVE INTRAOCULAR PRESSURE SPIKES FOLLOWING CATARACT SURGERY IN GLAUCOMA: A STUDY OF TRANS-INCISIONAL AQUEOUS RELEASE ('WOUND BURPING')

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Purpose
Intraocular pressure (IOP) spikes are common after cataract surgery. Although evidence on the long-term effect of this postoperative complication is scarce, acute IOP elevation has the potential to adversely affect vision, particularly in glaucoma. The aim of this study is to evaluate the safety and efficacy of trans-incisional aqueous humour release (AHR, also known as wound burping) in treating IOP spikes following uneventful phacoemulsification.

Methods
This prospective, interventional study was conducted at Moorfields Eye Department, at Bedford Hospital, UK. Patients with angle-closure or open-angle glaucoma who underwent routine uncomplicated cataract surgery at the investigation site and whose 2-hour post-operative IOP was elevated were enrolled. In all patients, AHR was performed at the slit-lamp, through the superior paracentesis with a sterile insulin needle. IOP was measured immediately after the procedure and again 2-3 hours later. The procedure could be repeated as many times as required until IOP was deemed satisfactory. Side effects and IOP were recorded at the time of the procedure, the following day and after 5 weeks. The mean deviation (MD) of the last pre-operative visual field (VF) was compared with that of the first post-operative VF in both eyes.

Results
In all, 14 patients (42.9% females, 74.1 ± 12.1 years) were enrolled. Mean IOP raised from 18.4 ± 4.4 mmHg pre-operatively to 34.9 ± 8.3 mmHg 2 hours after surgery. Following AHR, mean IOP dropped to 10.5 ± 6.1 mmHg, and increased to 32.1 ± 5.8 mmHg 2-3 hours later. Ten patients (71.4%) underwent AHR a second time. Mean IOP decreased to 8.1 ± 4.9 mmHg and increased again to 27.2 ± 9.6 mmHg after 2-3 hours. Four patients (28.6%) underwent a third AHR, reducing IOP to 9.3 ± 2.2 mmHg. Mean IOP was 15.2 ± 4.9 mmHg at day 1 and 17.2 ± 5.7 mmHg at week 5. No complications were observed in any of the patients. Mean VF MD progressed by -0.87 ± 0.63 dBs perioperatively in operated eyes compared to -0.64 ± 2.68 dBs in contralateral eyes (p = 0.809).

Conclusions
Trans-incisional aqueous humour release was safe and effective in managing IOP spikes following cataract surgery in glaucoma eyes. However, the efficacy of a single AHR was often temporary, and a significant proportion of patients required repeat procedures over the first 24 hours post-operatively. Close monitoring and aggressive post-operative IOP management may contribute to preventing perioperative glaucoma progression.

P-632

A NOVEL GLAUCOMA DRAINAGE DEVICE. 18 MONTHS SAFETY AND EFFICACY DATA OF THE EYEPLATE-300

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Purpose

Evaluate safety and efficacy of the novel Glaucoma Drainage Device (GDD) eyePlate-300 (Rheon medical SA). The eyePlate-300 is a non-valved silicone drainage implant with a plate size of 300mm^2 and the tube part has an internal diameter of 0.3mm.

Methods

This is a retrospective non comparative study of 14 eyes of 13 patients managed with the eyePlate-300 at a tertiary referral glaucoma centre, between March 2020 and January 2023, with 18 months follow up. Of note no Mitomycin-C was used. Our patient cohort included very high risk recalcitrant glaucoma patients who were ethnically diverse and many of whom had undergone previous incisional glaucoma surgery and or ciliary body laser. 5/14 (35%) had POAG, 9/14 (65%) had secondary glaucomas. Assessments made pre and post surgery included IOP, visual acuity, number of glaucoma medications, central retinal thickness and need for further interventions.

Results

Success was defined as an IOP of lower than 18 mmHg or an IOP reduction of more than 20% from baseline, with or without the use of IOP lowering agents. Definition of failure also included loss of vision to light perception, requirement of oral acetazolamide to control pressure in the same eye, and need for further glaucoma surgery.

There was a significant reduction of IOP ($p<0.05$) at all time frames assessed within the 18 months period. At 18 months post op, 12/14 (85.17%) had achieved more than 20% pressure reduction in comparison to listing pressure. There had been a significant reduction of mean number of drops needed, from 3.4 pre-op, to 1.4 at six months period and at 18 months ($P<0.05$). At 18 months 7 of the 14 eyes (50%) did not require any glaucoma drops. No patients required further pressure lowering surgery at 18 months. One patient with hypotony required intervention to reform the anterior chamber and another with a limbal leak required conjunctival re-suturing. There was no statistically significant change in mean visual acuity over the course of the 18 months period.

Conclusions

The initial 18 months results suggest that this new (GDD) has a safe and effective profile when used in a very high risk cohort of glaucoma patients from a multi ethnic background, many of whom have undergone previous glaucoma filtration surgery or ciliary body diode. Longer periods of observation and further studies are still needed to verify the long term outcomes

P-633

A REAL WORLD PROSPECTIVE STUDY INTO THE EFFICACY OF THE PRESERFLO MICROSHUNT OVER A 12 MONTH PERIOD IN A UK TERTIARY CENTRE

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Purpose

To evaluate the early preoperative efficiency and safety of the Preserflo microshunt implantation in eyes with uncontrolled intraocular pressure (IOP) over a 12 month period.

Primary Outcomes

- The percentage of eyes successfully achieving an IOP of <21 mmHg at 1 week, 6 weeks, 3 months, 6 months and 12 months post-operatively

- The percentage of eyes achieving a ≤20% reduction in their IOP at 1 week, 6 weeks, 3 months, 6 months and 12 months

Secondary Outcomes

- The number of eyes needing supplementary anti glaucoma medications

- Surgical revision and bleb needling rates

- To evaluate the success rates in primary vs secondary glaucomas

Methods

We conducted prospective data collection for all eyes undergoing Preserflo microshunt insertion from November 2021 to December 2022. Data were analysed using Microsoft Excel.

Eyes were included in the study with both primary glaucomas (primary open angle glaucoma, pigment dispersion glaucoma, pseudoexfoliation glaucoma and normal pressure glaucoma) and secondary glaucomas (uveitis, steroid response and neovascular glaucoma). We also included eyes that had undergone a failed glaucoma surgery in the past (trabeculectomy and deep sclerectomy).

Results

83 eyes were included in the study with a mean preoperative IOP of 24.8 ±7.7. The mean number of topical anti glaucoma medications preoperatively was 2.9 ±0.7, with 10 eyes also using oral acetazolamide.

The mean IOP at one week post op was 7.2 ± 3.1mmHg, at 6 weeks the mean was 10.4 ± 6.0mmHg, 3 months 12.1 ± 7.5mmHg, 6 months 11.7 ± 4.1mmHg and 12 months 14.1 ± 8.3mmHg. There was no statistically significant difference in mean IOP between eyes with primary glaucoma vs secondary glaucoma over the 12 months (p= 0.205).

One week postoperatively, 98.6% of eyes achieved a ≥ 20% reduction in IOP from their preoperative pressure. 94.4% had a ≥20% reduction at 6 weeks, 90.7% at 3 months, 87.9% at 6 months and 77.8% at 12 months.

Eight eyes (9.6%) required at least one topical anti-glaucoma medication to be restarted during the 12 month follow up.

Postoperative interventions included eight bleb needlings, two bleb revisions, one insertion of an intraluminal stent, one Preserflo removal at 4 weeks due to hypotony and one glaucoma drainage device insertion.

Conclusions

Insertion of Preserflo microshunt successfully reduced IOP in the majority of patients over an observation period of 12 months. IOP reduction was comparable for primary vs secondary glaucomas.

P-634
SECONDARY GLAUCOMA AFTER CONGENITAL CATARACT SURGERY

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Purpose
To establish risk factors for developing secondary glaucoma or ocular hypertension (OHT) after congenital cataract surgery.

Methods
Retrospective study of pediatric patients who underwent congenital cataract phacoemulsification from 2009 to 2019 in the Department of Ophthalmology of Centro Hospitalar Universitário S. João. Included patients had to present a minimum follow-up of 24 months. Demographic and clinical data (age at surgery, phakic status after surgery, need for surgical reinterventions, concurrent ocular diseases, and systemic diseases) were collected. Our primary outcome was the development of secondary glaucoma or OHT. Secondary outcomes were the number of glaucoma medications required, need for glaucoma surgical treatment, the number of glaucoma surgeries required, final visual acuity (VA) and final intraocular pressure (IOP).

Results
110 eyes from 74 pediatric patients were included, 38 with unilateral and 36 with bilateral congenital cataract surgery. Average surgery timing was 117.7 weeks of age [2-827], with 74 eyes (67.9%) undergoing surgery ≤12 weeks of age. Average follow-up was 132.9 months [32-481] after surgery. 50 eyes (45.5%) developed OHT or secondary glaucoma following surgery, of which 31 eyes (62%) required ≥3 glaucoma medications, while 28 eyes (56%) required glaucoma surgery. Eyes who underwent cataract surgery ≤12 weeks of age presented a higher prevalence of glaucoma/OHT (68.6% vs. 33.8%; p=0.001), as did aphakic eyes (64.4% vs. 32%; p=0.001). Presence of other ocular disorders was also associated with a significantly higher prevalence of secondary glaucoma/OHT (p=0.004). Need for surgical reintervention (p=0.210) and presence of systemic disorders (p=0.818) were not associated with the prevalence of secondary glaucoma/OHT. Surgery ≤12 weeks of age (p=0.044) and presence of other ocular diseases (p=0.023) remained significant predictors of development of secondary glaucoma/OHT in a multivariable logistic regression model that also included phakic status after surgery as a possible predictor (p=0.226).

Conclusions
Eyes who present other ocular disorders or who undergo congenital cataract surgery ≤ 12 weeks of age present an increased risk of developing secondary glaucoma/OHT. Aphakic eyes also present an increased risk of developing this outcome, but this might be explained in part due to the underlying concurrent ocular disorders who complicate cataract surgery and do not enable intraocular lens implantation during surgery.

P-635

CORNEAL TATTOO FOR SYMPTOMATIC GLARE AFTER LASER PERIPHERAL IRIDOTOMY: SINGLE VS DOUBLE LAMELLAR POCKET TECHNIQUE

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Purpose

Laser peripheral iridotomy (LPI) is a common treatment for primary angle closure/suspect. A small minority of patients may consequently suffer from disabling glare, caused by light transmitted through the LPI aperture. A 'tattoo' of the peripheral cornea (PCT), placed in front of the LPI, should resolve such symptoms by preventing light from entering the iridotomy. Preoperative tests can be useful to differentiate between patients who would benefit from PCT and those who have glare for other reasons (*e.g.* early cataract). The 'ink test' uses a surgical marker pen to mimic the effects of a PCT. Alternatively, the 'lid test' involves covering the LPI aperture by manually lowering the lid. We audited the outcomes of PCT in our routine practice.

Methods

With Local Clinical Audit Department approval, we reviewed records of all patients who had PCT at our hospital since 2017. We used the lamellar pocket technique (LPT): a keratome is used to make a pocket in the stroma, parallel to the epithelium, then commercially-available tattoo ink is irrigated into the pocket. Surgeon A routinely used a single pocket LPT, whereas surgeon B used a double-pocket LPT.

Results

In 5 years, 15 patients had PCT (29 eyes). Surgeon A operated on 8 patients (15 eyes); 4 of whom had preoperative lid testing. Repeat PCT, for incomplete resolution of symptoms, was done for 3 patients (38%), 6 eyes. Final visual outcome data was available for 7 patients, all of whom (100%) had 'good' resolution of glare symptoms. Surgeon B operated on 7 patients (14 eyes), all of whom had preoperative ink test. One patient (14%) had repeat PCT in 1 eye. Visual outcome data was available for 6 patients, all of whom (100%) had 'good' resolution of glare. Adverse events attributable to PCT were transient blurry vision, foreign body sensation and discomfort/pain. One patient (surgeon B) had long-term discomfort (continuing at 3 years), without obvious cause.

Conclusions

PCT has a high success rate in improving symptoms of glare after LPI, and is generally well tolerated. This small audit suggests that a double-layer PCT may be more likely to resolve symptoms without the need for repeat surgery. Pre-operative testing is useful in predicting whether PCT will resolve glare.

P-636
OUTCOMES OF COMPLICATED CATARACT SURGERY IN PATIENTS WITH GLAUCOMA

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Purpose
To report and compare the outcomes of complicated cataract surgeries in glaucomatous and non-glaucomatous eyes.

Methods
In this multicenter retrospective clinical cohort study we extracted data from 5178 cataract extractions by phacoemulsification that were complicated with posterior capsular rupture, zonular dialysis, dropped lens material or choroidal hemorrhage. Glaucomatous eyes were identified as cases (n=592) and non-glaucomatous eyes were controls (n=4,586). Eyes undergoing combined cataract and glaucoma surgery were excluded. Post-operative visual acuity outcomes and complication distribution rates were analyzed.

Results
Glaucomatous eyes presented worse mean visual acuity change (LogMAR) in the 1st post-operative month visit (-0.06 vs. 0.16, P<0.001). After the 1st post-operative month, the change in visual acuity improved in both groups, but there was still significantly less visual acuity gain in the glaucoma group at both the 1-3 months (0.08 vs. 0.35, P<0.001), and 3-6 months (0.14 vs. 0.39, P<0.001) post-operative visits. Zonular dialysis (OR=1.44, 1.20-1.47 95%CI) and choroidal hemorrhage (OR=3.05, 1.97-4.72 95%CI) were more common in glaucomatous eyes than controls. The odds for vitreous loss, dropped lens material and need for anterior vitrectomy were similar between groups.

Conclusions
In this large clinical dataset, glaucoma was associated with worse visual acuity in the first post-operative month visit following complicated cataract surgery, while controls presented an improvement. After the first post-operative month, both groups presented improvement in visual acuity, but glaucomatous eyes improved less than controls. Zonular dialysis and choroidal hemorrhage were more common in the glaucoma group.

P-637

LONG-TERM OUTCOME AFTER AB-EXTERNO CANALOPLASTY AS SIMPLE GLAUCOMA SURGERY OR IN COMBINATION WITH PHACOEMULSIFICATION

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Purpose

To study the long-term outcome of canaloplasty in the treatment of open-angle glaucoma (OAG) simple or combined with phacoemusification after 12 years of experience.

Methods

Study of prospective recordings of the efficacy and safety results of a consecutive series of uncontrolled open-angle glaucoma patients or patients with cataract associated with OAG controlled or uncontrolled under maximal medical therapy that underwent canaloplasty alone or combined with cataract surgery respectively by a single surgeon. Goldmann intraocular pressure (IOP), mean number of drugs (ND) ,and complications were recorded at 1 day, 1 week, 1-3-6-9-12 months and every year. Success rates at and total failure rate were calculated.

Results

280 surgeries were performed (119 canaloplasties, 146 phacocanaloplasties). The mean IOP (mmHg) dropped from 21.7 ± 6.8, in canaloplasty, and from 19.7 ± 8.1, in phacocanaloplasty, preoperatively, to medium-low levels at all follow-up periods (12.5 ± 3.1 and 13,5 ± 3.5, at 7 years in canaloplasty and phacocanaloplastyrespectively). ND dropped from 3.2 ± 0.8 in canaloplasty and 3.1 ± 0.8 in phacocanaloplasty to a lower than 1 value in all follow-up periods (0.5 ± 1.2 and 0,3 ± 0.6 at 7 years, respectivelly). At 7 years for a IOP criteria ≤18 mm Hg, complete success rate was 90% and 100% and qualified success rate was 65% and 75%, for canaloplasty and phacocanaloplasty , respectively. The frequency of surgical and postsurgical complications was low with no serious adverse recorded events, besides 2 corneal hematomas needing surgical drainage. Failure occurred in4,5 % cases at mean time of 3,9 years. needed subsequent surgical treatment

Conclusions

As a bleb-independent procedure, canaloplasty simple or combined with phacoemulsofcation, may be a true alternative to classic filtering surgery, providing sustained IOP reduction to medium-low levels, drug independence and a better safety profile.

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P-638

COMPARISON OF OUTCOMES AT SIX MONTHS BETWEEN GONIOTOMY AND HYDRUS IN OPEN ANGLE GLAUCOMA

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Purpose

To evaluate the safety and efficacy of goniotomy and Hydrus Microstent implantation in open-angle glaucoma (OAG).

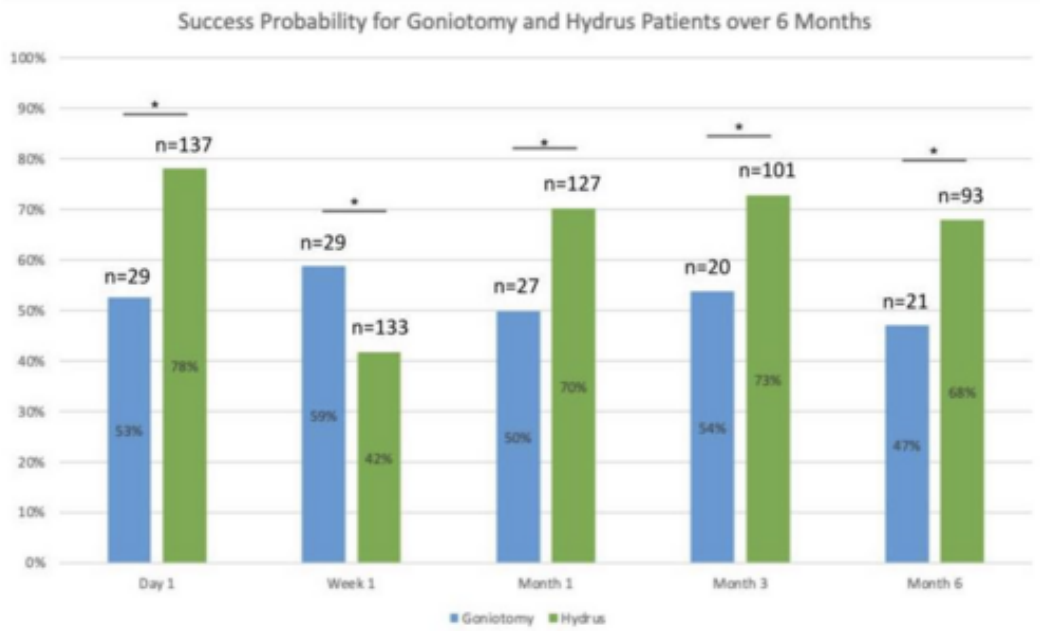
Methods

Patients with mild-to-moderate OAG who underwent Hydrus Microstent implantation (140 eyes of 103 patients; Alcon, Forth Worth, Texas) or goniotomy (30 eyes of 28 patients) at the time of cataract surgery were included. Goniotomy was performed nasally 90 degrees using a bent needle or a Kahook Dual Blades (New World Medical, Cucamonga, California). Mean ocular hypotensive medications and intraocular pressure (IOP) were assessed preoperatively and at 1 day, 1 week, 1 month, 3 month, and 6 month. Adverse events and secondary surgical interventions (SSIs), including laser procedures, within 6 months were also documented. Success was defined as reaching the preoperatively determined target IOP, without additional medications or SSIs, and compared across groups using Pearson's chi-squared test.

Results

At 6 months, 47% of the eyes were considered successful for goniotomy patients, compared to the 68% of Hydrus (p=0.03). There were no significant differences between the two groups for baseline demographics and ocular characteristics, except for race and history of previous glaucoma procedures (p<0.05). Hydrus group has a higher proportion of Caucasian patients and a lower proportion of patients that have a prior glaucoma procedure. Target IOP was not statistically different between groups (mean target IOP of both groups = 17.3 mmHg; p = 0.6). At 6 months, mean IOP was 15.4 mmHg (7% reduction) for the goniotomy group and 14.0 mmHg (13% reduction) for the Hydrus group (p = 0.19). Mean baseline medications for goniotomy reduced after 6 months from 1.69±1.31 to 0.52±0.93 (69% reduction), while Hydrus reduced from 1.60±1.12 to 0.52±0.84 (68% reduction). 71.4% of goniotomy and 64.5% of Hydrus eyes were off all glaucoma medications (p = 0.74). No SSIs occurred in either group. Goniotomy adverse events included hyphema (n=1), and steroid response (n=1). Hydrus adverse events included uveitis (n=1), cystoid macular edema and epiretinal membrane in the same eye (n=1), corneal edema (n=1), and IOP spikes (n=1).

Image



Conclusions

Hydrus provided significantly higher likelihood of reaching target IOP without additional glaucoma treatment at 6 months compared to goniotomy.

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P-639

CLINICAL OUTCOMES OF PRESERFLO® MICROSHUNT PROCEDURE WITH MITOMYCIN C ALONE VERSUS WITH MITOMYCIN C AND BEVACIZUMAB

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Purpose

The PRESERFLO ® Microshunt procedure is considered as a safe and effective alternative to trabeculectomy procedure, but with lower probability of success.[1]

The adjuvant use of anti-VEGF agents has been studied with Trabeculectomy procedure, however evidence on long term safety and efficacy is still controversial. Some studies showed that the adjuvant use of anti-VEGF agents with MMC in Trabeculectomy procedure offers higher success rates, while others showed that it adds no benefit.[2,3]

The purpose of this study is to compare the outcomes of PRESERFLO® Microshunt procedure using MMC alone versus MMC augmented with Bevacizumab in patients with open angle glaucoma to a follow-up time of 6 months.

Methods

Retrospective, single-surgeon case series of consecutive patients receiving PRESERFLO ® Microshunt at Queen Victoria Hospital, United Kingdom. From December 2018 to January 2020, eligible patients underwent PRESERFLO® Microshunt implantation with MMC alone, while from February 2020 to January 2022, patients underwent PRESERFLO® Microshunt implantation with MMC and adjuvant bevacizumab. Efficacy outcomes were analyzed, including changes in IOP and changes in medication use. Postoperative complications and postoperative interventions were also reviewed.

Results

A total of 75 eyes were included in the analysis, 38 eyes received MMC alone while 37 eyes received MMC combined with bevacizumab. There were no statistically significant differences in the demographic or clinical profile of patients between treatment groups.

Both strategies were effective in terms of IOP lowering (baseline versus 6 months postoperatively: 20.0 ± 6.8 versus 12.8 ± 3.7 mm Hg in the MMC group; 23.6 ± 6.9 mm Hg versus 11.9 ± 4.2 mm Hg in the MMC+ bevacizumab group; $p<0.001$ in both comparisons).

Mean anti-glaucoma medication use also reduced significantly from baseline with no difference between both groups.

A higher proportion of patients required postoperative interventions (5-FU injection, needling and bleb revision) in the MMC alone group (N=16; 42.1%) compared to the MMC+ bevacizumab group (N=4; 9.9%) which was statistically significant (Pearson's $\chi 2$ test; $p=0.002$).

Image



Figure 1. Change in IOP and medications between Bevacizumab (Avastin) and control group over the 6-month study period

Conclusions

The adjuvant use of Bevacizumab in MMC-augmented PRESERFLO® Microshunt procedure is associated with lower IOP and better bleb morphology in the early postoperative period, when compared to MMC alone. Therefore, it could help reduce rates of postoperative interventions (injection, needling and revision) needed to maintain a functioning bleb

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P-640

12-MONTH OUTCOMES AFTER PHACO-ELIOS PROCEDURE – A REAL WORLD STUDY

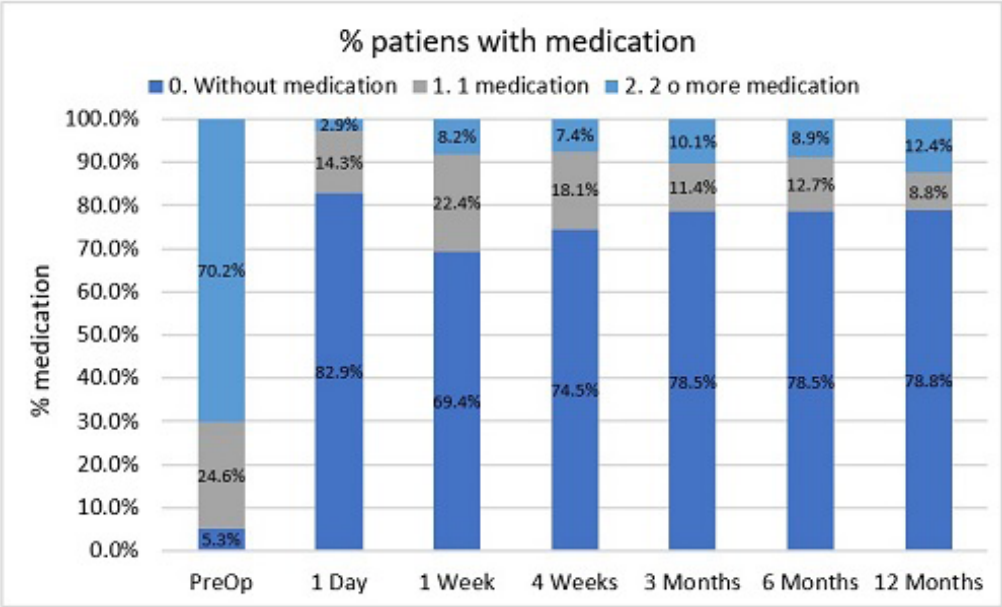
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Purpose
To describe the change in medication use and intraocular pressure in patients with glaucoma who have undergone a combined phacoemulsification-ELIOS procedure at 12 months.

Methods
Retrospective, multicenter chart review of adult patients diagnosed with ocular hypertension or glaucoma who were underwent cataract surgery at 2 centers in Spain. Preoperative and postoperative clinical data was collected and analyzed up to 12 months. The main outcome measure was the mean change in medication as compared to baseline. Intraocular pressure was analyzed as a secondary outcome. Surgical approach consisted of routine cataract surgery combined with a 308 nm excimer laser delivered through an intraocular fiberoptic probe to create 10 microchannels through the trabecular meshwork up to the inner wall of Schlemm´s canal with postoperative management and follow-up comparable to routine standalone phacoemulsification.

Results
112 eyes of 112 patients were included in this study. Sixty (53.6%) were female and 52 (46.4%) were male with a mean age of 70.5 years. This sample included patients with OHT (8.9%), primary open angle glaucoma (71.4%), chronic angle closure glaucoma (8.0%) and other types of glaucoma (11.6%). Mean intraocular pressure (IOP) at baseline was 19.8 mmHg with a mean number of medications of 1.8. Mean number of medications at 12 months was 0.36 representing a mean medication change from baseline of -1.46. 93 patients (83%) showed a reduction in the number of medications used with respect to baseline, 81 of them (72%) were medication free at 12 months. 56% of patients had a combined result of medication reduction down to zero and IOP decrease with respect to baseline at 12 months. At 12 months mean IOP was 16.6 mmHg representing a mean percentage of reduction as compared to baseline of 14%.

Image



Conclusions

Combining phacoemulsification with ELIOS in adult patients with OHT or glaucoma showed a significant reduction in medication use with almost three quarters of the patients being medication free at 12 months.

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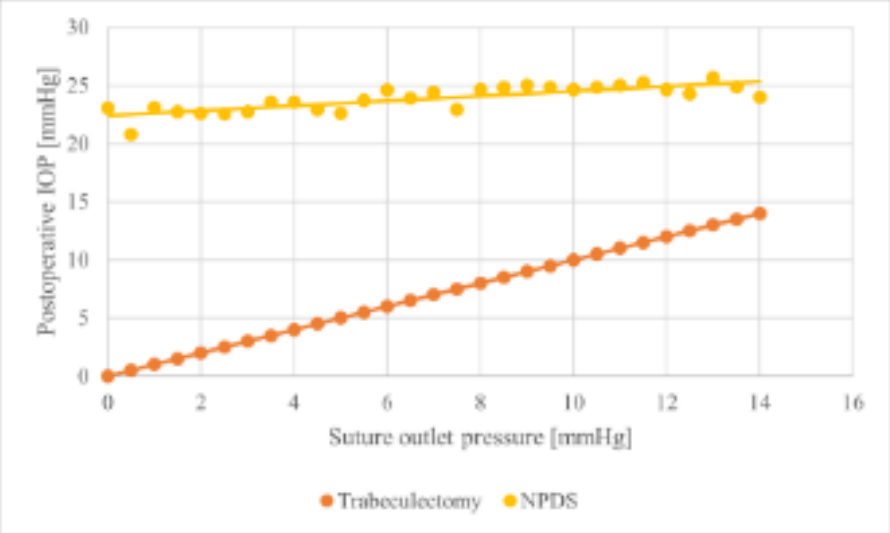
P-641
A COMPUTATIONAL COMPARISON OF THREE GLAUCOMA FILTRATION SURGERIES

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Purpose
Trabeculectomy is the current “gold standard” of glaucoma filtration surgeries. As such, the effectiveness of newer filtration procedures, like non-penetrating deep sclerectomy (NPDS), is still being questioned. Although comparative *in vivo* studies have been performed, these are subject to different eye geometries and unknown eye parameters that may distort the results. The purpose of this study is to compare trabeculectomy and NPDS procedures computationally, and how suturing tightness may affect the surgical outcome.

Methods
Using computational fluid dynamics (CFD), a computational eye model can indicate the intraocular pressure (IOP) and aqueous humour flow under various conditions. An idealized 3D model of the eye anterior segment was created. The permeability of the trabecular meshwork can be adjusted to simulate various glaucomatous conditions. Thereafter, trabeculectomy and NPDS procedures, as well as a modified NPDS procedure, were simulated. The modified NPDS procedure includes the removal of the juxtacanicular membrane. Additionally, a parametric study was conducted on each model by varying the suture tightness to determine its effect.

Results
The trabeculectomy simulation resulted in an IOP decrease of 74.1%. However, the anterior chamber experienced low flows, especially at the corneal wall. This may explain why trabeculectomy often presents with complications like hypotony. For the NPDS procedure, the scleral flap removal, as well as the deroofing of SC, is simulated, which achieved an overall IOP reduction of only 13.3%. The modified NPDS procedure was further simulated by removing the juxtacanicular membrane. The modified NPDS procedure a showed comparable effectiveness to that of trabeculectomy, with an IOP decrease of 74.1%. The outcome of the suture tightness parametric study is illustrated in the figure.

Image


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Conclusions

The computational simulation results confirm that trabeculectomy is more effective at lowering IOP than NPDS. However, modified NPDS results are comparable to that of trabeculectomy in terms of lowering IOP, indicating that the removal of the juxtacanicular membrane is crucial to the success of the NPDS procedure. The results also showed that suture tightness is a more critical factor during trabeculectomy than NPDS procedures.

P-642

VISUAL AND REFRACTIVE OUTCOMES IN GLAUCOMA PATIENTS AFTER COMBINED PHACOEMULSIFICATION WITH ACRYSOF VIVITY IOL AND ISTENT INJECT IMPLANTATION

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Purpose

To report visual and refractive outcomes of patients with glaucoma who underwent combined phacoemulsification with an extended depth-of-focus AcrySof Vivity® intraocular lens and iStent inject® implantation.

Methods

We retrospectively review patients with glaucoma who had undergone phacoemulsification of both eyes with Vivity IOL and iStent inject implantation in both eyes since January 2021 to September 2022 with at least 3 months of follow-up.

Results

Mean follow-up was 9.8 months (3 to 20 months). AcrySof Vivity IOL and iStent inject were implanted in 54 eyes of 27 patients. Mean long and near distant uncorrected LogMAR visual acuity (UDVA and UNVA respectively) one month after surgery was -0.0074 ± 0.054 and 0.14 ± 0.11. At the last follow-up visit long distance UDVA was -0.014 ± 0.060 and UNVA was 0.12 ± 0.11. Mean spherical equivalent was -0.053 ± 0.16 one month after surgery and -0.071 ± 0.22 at the last follow-up visit. One month after surgery 92.6% were within ±0.25 diopters of target spherical equivalent and this value did not change significantly during follow-up.

Conclusions

Predicted refractive error in eyes with combined iStent inject glaucoma surgery and AcrySof Vivity IOL was low one month after surgery with no clinical or statistical change during follow -up. Visual outcomes were excellent so the implantation of this type of lens may be considered in this type of combined surgeries.

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P-643

PHACOEMULSIFICATION WITH GONIOSCOPY-ASSISTED TRANSLUMINAL TRABECULOTOMY VERSUS PHACOEMULSIFICATION ALONE IN PRIMARY ANGLE CLOSURE GLAUCOMA

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Purpose
To assess the safety and efficacy of combining phacoemulsification with gonioscopy-assisted transluminal trabeculotomy (GATT) compared to phacoemulsification alone in the management of primary angle closure glaucoma (PACG).

Methods
Prospective, institutional study in which eyes requiring surgery for PACG were randomized to undergo phacoemulsification followed by GATT (phaco-GATT group) or phacoemulsification alone. Success was defined as having a final IOP of 6-20mmHg with no subsequent glaucoma surgery or vision-threatening complications.

Results
36 eyes underwent phaco-GATT with 360° angle incision and 38 eyes underwent phacoemulsification alone. IOP and glaucoma medications were significantly lower in the phaco-GATT group at 1, 3, 6, 9 and 12 months. The success rate in the phaco-GATT group was 94.4% after 12.16±2.03 months, with 75% of eyes being off medications compared to 86.8% after 12.47±4.27 months in the phaco group, with 42.1 off medications. (P=0.008).Hyphema and fibrinous anterior chamber reaction were the most common complications in the phaco-GATT group and resolved with conservative treatment or required YAG capsulotomy. Although this delayed visual rehabilitation in the phaco-GATT group, it did not affect the final visual outcome with no significant difference in the final best-corrected visual acuity between both groups (P=0.25).

Conclusions
Combining phacoemulsification with GATT in PACG yielded more favorable outcomes in terms of IOP, glaucoma medications and surgical success. Although the postoperative hyphema and fibrinous reaction may delay visual rehabilitation, GATT further lowers the IOP by breaking residual peripheral anterior synechiae and removing the dysfunctional trabeculum circumferentially, while avoiding the risks inherent to more invasive filtering procedures.

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P-644

OUTCOME OF PRIMARY TRABECULECTOMY WITH MITOMYCIN-C (0.02%) IN JUVENILE OPEN ANGLE GLAUCOMA PATIENTS: A RETROSPECTIVE ANALYSIS IN INDIAN EYES

R Bharti, S Raj, N Chauhan, J Singh, S Pandav, S Kaushik, F Thattaruthody

Purpose

Juvenile open-angle glaucoma (JOAG) is a rare subset of glaucoma diagnosed in individuals greater than 3 years old and less than 40 years of age. These patients often present with very high intraocular pressures(IOP), refractory to medical therapy often necessitating surgery.[1] Exaggerated healing response in young eyes decreases the success of trabeculectomy in JOAG as compared to primary open angle glaucoma(POAG).[2]The purpose of the present study was to analyze the success and complications of primary trabeculectomy with MMC in JOAG patients.

Methods

This was a retrospective observational study at a tertiary care eye institute. We included 53 eyes of 35 JOAG patients who underwent primary trabeculectomy with mitomycin-C (0.02% for 2 minutes) between January-2010 and December-2019. The primary outcome measure was success, defined as complete, if intraocular pressure (IOP) was >5 and ≤21 mmHg without antiglaucoma medications or overall if IOP was >5 and ≤21 mmHg with or without antiglaucoma medications. Secondary outcome measures were mean and percentage IOP reduction, number of antiglaucoma medications and complications (if any). A minimum follow-up of 12 months was taken post-surgery. Patients who underwent a second procedure for IOP control during follow up were considered as failure.

Results

The mean age at presentation was 29.86± 6.87 years (range :17-40). Mean optic cup disc ratio was :0.835± 0.0982 (range: 0.6-0.9). At 1 year, the percentage of complete success was 77.35% (n = 53), at 3 years it was 36% (n = 25) and at the end of 5 years, it was 33.33% (n = 15). The percentage of overall success was 86.79% (n = 53) at 1 year, 80% (n = 25) at 3 years, and 73.33% (n = 15) at the end of 5 years. The mean IOP reduced from 35 ± 10 mmHg to 13 ± 2.5 mmHg ($p< 0.001$) 1 year after trabeculectomy. Mean number of AGM reduced significantly from 3.43 ±1.11 to 0.26±0. at 1 year. The most common post-operative complication was hypotony (6/53) seen in 11.32 % subjects of which 3 patients had hypotony maculopathy requiring surgical intervention (compression suture) in 2 of them.There were no vision threatening severe complications like endopthalmitis.

Conclusions

Primary trabeculectomy with MMC in Indian eyes has good success rate in JOAG patients.[3] However,the success declines over the course of 5 years. Hypotony is the most frequent post-operative complication encountered.

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P-645

THE CORRELATION OF SIMPLIFIED FILTRATION-BLEB GRADING SYSTEM AND INTRAOCULAR PRESSURE AFTER TRABECULECTOMY IN THAILAND

N Kitnarong, T Phongsuphan, P Ruangvaravate

Purpose

To evaluate the correlation of simplified filtration-bleb grading system (SFGS) and intraocular pressure (IOP) in glaucomatous patients with filtering blebs in Thailand.

Methods

This was a cross-sectional study (during January 2021 to December 2022) of glaucomatous patients who underwent trabeculectomy with mitomycin C at the Faculty of Medicine Siriraj Hospital, Mahidol University, Bangkok, Thailand between January 2000 to January 2022. The photograph of filtering bleb of each patient was taken and evaluated by 3 well-trained observers using SFGS which included 4 parameters: bleb height (low, moderate, high), bleb extent (1, 2, >3 clock hours), bleb wall (thick, mixed, and thin) and bleb vascularity (extensive, moderate, and mild). Data collection included age, gender, glaucoma type, intraocular pressure (IOP), post-operative anti-glaucoma medications and the duration since the operation. The correlation between IOP and other factors including SFGS parameters were analyzed using bivariate analysis.

Results

There were 79 eyes of 60 patients with the mean age of 64.6 (18.1) year-old enrolled into the study. Thirty-six patients (60%) were male and 24 (40%) were female. The underlying diagnosis included primary open angle glaucoma 55 eyes (70%), primary angle-closure glaucoma 12 eyes (15%) and secondary glaucoma 12 eyes (15%). The mean duration since trabeculectomy was 8.8 (5.0) years (range 0.8-20.1). The mean IOP was 11.9 (4.7) mmHg (range 2-23). The overall success rate was 97% (77 eyes), which were categorized as a completed success (IOP less than 21 mmHg without anti-glaucoma medication) 72% (57 eyes) and a qualified success (IOP less than 21 mmHg with anti-glaucoma medication) 25% (20 eyes). According to bivariate analysis by Spearman's correlation coefficient, IOP was significantly correlated with bleb height (p=0.007), bleb extent (p=0.048) and the SFGS score (p=0.045). The completed surgical success had the mean SFGS score of 9.1(1.9) out of 12.

Conclusions

The simplified filtration-bleb grading system significantly correlated to IOP of glaucomatous patients with filtration bleb. SFGS is simple and well reproducible and can be used to follow-up the change of bleb morphology in patients after filtration surgery.

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P-646

INFERIOR KAHOOK DUAL BLADE-GONIOTOMY EFFICACY IN OPEN-ANGLE GLAUCOMA

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Purpose

To assess the IOP and medications - lowering effect of excisional goniotomy, performed with Kahook Dual Blade in the inferior(lower) quadrants of anterior chamber angle in adult patients with open-angle glaucoma over 12 month period.

Methods

Prospective, comparative, single-centred, longitudinal interventional case series in adult patients with postoperative follow up over a period of 12 months.

Interventional model: Parallel: 45 eyes of 42 patients were enrolled.

First group of 23 eyes received 120°- excisional goniotomy with Kahook Dual Blade in the lower (inferior) quadrants of the anterior chamber angle combined with phacoemulsification.

In the second group of 22 eyes 120°- inferior Kahook Dual Blade - goniotomy was performed as a stand-alone procedure

Our primary goal was to investigate the effectiveness of a case series of patients with KDB-excisional goniotomy out of its standart nasal localisation.

Results

In the first group the mean IOP reduction at the end of the follow up was 12 ± 5.6 mmHg /-48% / (preoperative IOP of 26.0 ± 6.2 mmHg, which 12 months postoperatively was 14 ± 2.2 mmHg) and the mean medication's reduction was -1.4 ± 0.7/ - 40%/.

In the second group the mean reduction of IOP was 12.7 ± 6.6 mmHg /48.2% / (preoperative IOP of 27.2 ± 5.6 mmHg to postoperative IOP of 13.7 ± 2.4mmHg at month 12).The observed mean reduction of the number of local therapy was – 1.7 ± 1.1 /-40%/.

Conclusions

Inferior KDB-goniotomy achieved statistically and clinically significant IOP and medication reduction as a stand-alone procedure as well as combined with phacoemulsification.

There are different personal patient's and surgeon's restrictions when performing nasal goniotomy (eg. low pigmentation, limited neck mobility, surgeon preferences) but nowadays with the new generation gonyoscopic lenses we could use our standard phacoemulsification position if the nasal one is not comfortable for some reason.

P-647

MANAGEMENT OF PRIMARY ANGLE CLOSURE – REAL WORLD DATA FROM A TERTIARY REFERRAL CENTRE IN THE UK

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Purpose

To compare the efficacy of two different regimes for treatment-naïve primary angle closure (PAC): peripheral iridotomy followed by phacoemulsification with viscogonioplasy (pi-PhacoVGP) versus phacoemulsification plus viscogonioplasty not preceded by peripheral iridotomy (PhacoVGP).

Methods

Retrospective, observational study. Data was retrieved from electronic medical records. Subjects involved were patients newly diagnosed with PAC between 2015 and 2019, with no evidence of glaucoma and no previous treatment (*i.e.* no previous eye surgery, nor laser eye surgery). Exclusion criteria comprises any other eye comorbidity, poor or insufficient clinical data. Postoperative follow up assessments have been carried out at 2 weeks, 3 months, 6 months, 12 months and 24 months. Primary outcomes measured were intraocular pressure (IOP) reduction and number of anti-glaucoma agents. Secondary outcomes consisted of best corrected visual acuity (BCVA), visual field (VF) progression on Humphrey Field Analyser, defined as more than 3 dB deterioration in mean deviation (MD) and postoperative complications.

Results

Sixty-six eyes underwent pi-PhacoVGP and 56 underwent PhacoVGP. The IOP reduction at 2 years post-surgery was 15.45% (from baseline mean 19.17 ± 4.86 to 16.20 ± 3.88 mmHg, p <0.00001) and 23.04% (from baseline mean 19.89 ± 4.67 to 15.31 ± 3.23 mmHg, p <0.00001) in the pi-PhacoVGP and PhacoVGP group respectively. The average number of glaucoma medications increased by 0.36 ± 1.06 in the pi-PhacoVGP but remained stable in the PhacoVP group at 2 years. The BCVA improved by 6.16 letters (from baseline mean 73.14 ± 10.51 to 79.30 ± 6.54 letters, p <0.03358) in the pi-PhacoVGP and by 10.67 letters (from baseline mean 67.29 ± 12.11 to 77.93 ± 7.20 letters, p <0.00001) in the PhacoVGP at two years after surgery. The rate of VF progression was 1 in 66 in pi-PhacoVGP and 1 in 56 eyes in PhacoVGP respectively. Postoperative uveitis was more frequent in the PhacoVGP group. No posterior capsule rupture was reported in either group. No statistically significant difference between the two groups was reported regarding postoperative IOP spikes and macular oedema.

Conclusions

Both pi-PhacoVGP and PhacoVGP can improve the visual acuity and reduce the IOP at two years, although maintaining or increasing glaucoma drops is still required to control the target IOP. Both regimes have a good safety profile and there was no statistically significant difference in term of VF deterioration at two years

P-648

CLINICAL OUTCOMES OF CANALOPLASTY WITH TRABECULOTOMY AND TRANSLUMINAL DILATION WITH GONIOTOMY IN PSEUDOPHAKIC EYES WITH SEVERE GLAUCOMA

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Purpose
To evaluate safety and efficacy outcomes after standalone canaloplasty and trabeculotomy with the OMNI Surgical System (OMNI) or transluminal dilation and goniotomy with the STREAMLINE Surgical System (SL) in the treatment of pseudophakic eyes with severe glaucoma (defined as characteristic visual field defects in both hemispheres or within five degrees of fixation, and/or optic disc changes compatible with advanced glaucoma).

Methods
A retrospective review of 12 eyes which received 180-degree canaloplasty with 120-degree trabeculotomy ("OMNI" surgery) and 11 eyes which received transluminal dilation with goniotomy, spanning 3 clock hours ("SL" surgery). Primary outcome measures included reduction in both intraocular pressure (IOP) and number of glaucoma medications from baseline through 3 and 6 months post-operatively (analyzed with paired sample t-tests). Secondary outcome measures included percentage of eyes achieving an IOP ≤17 mmHg and/or ≥ 20% IOP reduction from baseline at 6 months (analyzed with Pearson's chi-squared test).

Results
Baseline medicated mean IOPs and number of glaucoma medications in both groups were as follows, OMNI: 28.0 ± 3.3mmHg, 1.3 ± 0.5 medications; SL: 25.9 ± 6.2 mmHg, 2.4 ± 1.1 medications. At 3 months post-operatively, there was a 49% IOP reduction after OMNI ($p<0.01$) and a 54% IOP reduction after SL ($p<0.01$), while medications were reduced by 33% ($p=0.1$) and 17% ($p=0.1$), respectively. At 6 months post-operatively, there was a 48% IOP reduction after OMNI ($p<0.01$) and a 40% IOP reduction after SL ($p<0.05$), while medications were reduced by 25% ($p=0.2$) and 6% ($p=0.6$), respectively. At 6 months, 100% of eyes after OMNI and 50% of eyes after SL achieved an IOP of ≤ 17 mmHg ($p<0.05$), with 83% of OMNI eyes versus 75% of SL eyes experiencing ≥ 20% IOP reduction from baseline ($p=0.7$). No vision-threatening complications or adverse events were observed.

Conclusions
In pseudophakic eyes with severe glaucoma, both OMNI and SL produced significant IOP reduction with no adverse events, up to 6 months post-operatively.

P-650

SIX MONTHS SURGICAL OUTCOMES OF THE COMBINED CATARACT SURGERY AND PRESERFLO MICROSHUNT WITH MITOMYCIN C : REAL WORLD DATA

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Purpose

Background/aims: To evaluate the efficacy and safety of the combined Phacoemucification with intraocular lens implant and PreserFlo MicroShunt with Mitomycin C in moderate to advanced glaucoma.

Methods

All consecutive patients who had combined Phacoemulcification with intraocular lens implant and Preserflo micro shunt with mitomycin-C (MMC) 0.5 mg/mL from March 2021 to July 2022 Southend University Hospital NHS Foundation Trust.

The primary outcome measured was complete success off medication at 6 months.

Qualified success was defined as complete success with use of added antiglaucoma medication at 6 months.

Failure was defined as intraocular pressure >21 mmhg; <20% reduction of IOP; IOP ≤5 with more than 2 lines loss of vision on 2 consecutive visits; revision or re-operation for glaucoma or loss of perception of light. Secondary outcomes were IOP, number of medications, best corrected visual acuity, interventions, re-operations, and complications.

Cases were identified from the glaucoma surgical data, electronic and written medical records. Identifiable patient data were anonymized and analyzed using Excel.

Results

36 patients (36 eyes) had the combined cataract surgery with Preserflo with MMC during this period. The mean age of the patients 72.8 years (range 39 to 91 years). Data available from 26 patients at 6 months. One patient died before the 6 months and data from 9 patients are not available. Complete success at 6 months was 73.07% (N=19) qualified success was 7.69% (N=2). Failure happened in 19.23% (N=5). We observed a significant reduction in intraocular pressure from 24.23mmHg (SD 10.88, N=26) to 12.11mmHg (SD 2.84, N=26) ($p<0.00001$) at 6 months. Use of antiglaucoma medication also decreased from 2.69 (SD 0.95. N=26) to 0.34 (SD 0.82. N=26) at six months.

Early complications observed were hypotony (19.23%; N=5), choroidal detachments (7.69%; N=2), hyphaema (7.69%; N=2) and bleb leak (3.84%; N=1). Needling and 5-fluorouracil injections were performed in 7.69% (N=2) and 7.69% (N=2), respectively, and 7.69% (N=2) required revision and further glaucoma surgery.

Conclusions

The combined Phacoemulcification with intraocular implant and PreserFlo MicroShunt with MMC 0.5 mg/mL is a safe procedure with an overall success rate of 80.76% at 6 months, which also showed a significant reduction in IOP and antiglaucoma medication required. The few early adverse effects had been resolved before the 6-month review.

P-651

SURGICAL OUTCOMES OF INDONESIA'S VIRNA GLAUCOMA IMPLANT ON PRIMARY OPEN ANGLE GLAUCOMA AND JUVENILE GLAUCOMA: 1-YEAR OF FOLLOW-UP

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Purpose
To analyze the safety and efficacy of Indonesia's local glaucoma drainage device, Virna Glaucoma Implant, on Primary Open Angle Glaucoma (POAG) and juvenile glaucoma subjects.

Methods
This is a retrospective cross-sectional study. The subjects were patients with POAG and juvenile glaucoma in Cipto Mangunkusumo Hospital, Jakarta, Indonesia, who underwent surgery from 2019 – 2020 and were followed up until 1 year post-operatively.

Results
Forty-four eyes out of 41 subjects were included in this study, of which 24 of them (58.54%) diagnosed with POAG, and 72.73% of the subjects were categorized as severe glaucoma. The median age was 49.5 years-old (11-77). Baseline clinical characteristics of the subjects showed median IOP of 30 mmHg, visual acuity of 0.5 (LogMAR) with 3 glaucoma medications. Post-operatively, on average, subjects had hypertensive phase at 3-weeks and the IOP stabilized at 2-months. At 1-year follow up, the IOP were reduced to 51.85% from baseline or around 14 mmHg, with median of 2 glaucoma medications needed. Visual acuity were improved by 2 Snellen lines or from 0.52 to 0.4 in LogMAR. Complications occurred in 38.64% or 17 subjects, where 11 could be managed by additional intervention. Survival analysis showed subjects with POAG had 1.9 times more risk of having eye death in compare to juvenile glaucoma subjects. Cumulative success rate was 81.08%, of which 10.81% had complete-success and 70.27% had qualified-success.

Conclusions
Indonesia's local glaucoma drainage device, Virna Glaucoma Implant (VGI), is a non-valved GDD firstly developed in 2016. In this study, it was found that subjects were having hypertensive phase on 3rd week post-operative until 2 months, however the IOP reduction at 1 year was similar to another non-valved GDD, Aurolab Aqueous Drainage Implant (AADI). Complication rate found in this study was also similar or even lower than previous GDD studies using Baerveldt and AADI, and in this study 64.7% of the complication were still able to be managed with additional intervention. Therefore, from current study, VGI is an effective and safe GDD to be used in POAG and juvenile glaucoma subjects.

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P-652

COMPARISON OF OUTCOME AND PREOPERATIVE BLEB MORPHOLOGY BETWEEN NEEDLING AND SURGICAL BLEB REVISION USING ANTERIOR SEGMENT OPTICAL COHERENCE TOMOGRAPHY

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Purpose

To compare the efficacy and preoperative bleb morphological characteristics of needling or surgical bleb revision in eyes with failed trabeculectomy.

Methods

A retrospective case series of 70 eyes from 69 glaucoma patients who received needling with subconjunctival injection of mitomycin C and intrableb injection of 2.3% sodium hyaluronate (28 eyes) or surgical bleb revision with sponged mitomycin C (42 eyes) for the failed trabeculectomy bleb at Okayama Saiseikai General Hospital between March 2016 and January 2022. The primary outcome measure was the evaluation of preoperative bleb morphology by Anterior Segment Optical Coherence Tomography (ASOCT), including the volume of fluid space above the scleral flap, the height of the fluid space, and the preoperative bleb height in the two groups. Secondary outcome measures were mean IOP, glaucoma medications, complications, and success defined as IOP ≤ 15 mmHg and more than 20% of IOP reduction without glaucoma medications or additional glaucoma surgeries.

Results

The volume of fluid space above the scleral flap, the height of the fluid space, and the preoperative bleb height evaluated via ASOCT were significantly higher in the needling group (P<0.001). The preoperative IOP (P=0.017) and glaucoma medication (P<0.001) were significantly higher in the surgical bleb revision group, however at 12 months, there were no differences in IOP (P=0.346) and medication (P=0.053) between the groups. The success rate at 12 months was 53.6% and 73.8% for the needling and surgical bleb revision group respectively and there was a significant difference between the groups (P=0.045). Complications included a shallow anterior chamber (P=0.359), hyphema (P=0.350), hypotony maculopathy (P=0.079), choroidal detachment (P=0.587), bleb leak (P=0.210), transient hypotony (P=0.678), decreasing visual acuity (P=0.516), and progression of cataracts (P=0.643), although there was no significant difference between the groups.

Conclusions

Both needling and surgical bleb revision may be an efficient approach for revising failed bleb after trabeculectomy. The needling group's preoperative intrableb fluid space above the scleral flap is frequently larger and taller. Contrarily, surgical bleb revision is effective even in a completely flat bleb.

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P-653

TREATMENT OUTCOMES OF SUBTENON INJECTION AND SOAKED SPONGE APPLICATION OF ADJUNCTIVE MITOMYCIN-C IN TRABECULECTOMY: A META ANALYSIS

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Purpose

Adjunctive Mitomycin-C has already been proven to have better outcomes in trabeculectomy. Applying through subtenon injection prior to peritomy has been popular in recent years. However, subconjunctival application of soaked sponges is still preferred by some surgeons. There is still limited evidence on the differences on overall outcomes between the two delivery approaches.

This meta-analysis aims to systematically review recent evidences comparing treatment outcomes of Mitomycin-C application in trabeculectomy, through subtenon injection versus the soaked sponge application.

Methods

A systematic search of clinical trials on various electronic databases was conducted. Main outcomes were post operative intraocular pressures (mean & difference), success rates and bleb morphology. A meta-analysis was conducted on selected studies with clinical and methodological homogeneity.

Results

Four randomized clinical trials were eligible for meta-analysis. Results show that pooled standardized mean difference in post-operative IOPs (SMD=0.06, z=0.53, p=0.596, 95% CI=-0.16 to 0.27) was not statistically different between the two groups with no heterogeneity among the studies. Mean change of IOP from baseline was higher in soaked sponge group (SMD=0.86, z=2.99, p=0.003, 95% CI=-0.30 to 1.42) but with a high heterogeneity (Q=24.95, p=0.001, I2=84.00%, τ2=0.35).

For complete and qualified success rates, pooled risk analysis was not significant (RR= 0.98, z=0.21, p=0.83, 95% CI=-0.84 to 1.15; and RR=0.98 z=0.21, p=0.83, 95% CI=-0.84 to 1.15) with no heterogeneity detected (Q=0.45, p=0.929, I2=0.0%, τ2=0.0; and Q=0.02, p=0.999, I2=0.0%, τ2=0.0).

Bleb morphology outcomes resulted the subtenon group having significantly lower bleb heights (SMD=0.49, z=3.62, p=0.001, 95% CI=-0.76 to -0.23) with low, non-significant heterogeneity (Q=3.81, p=0.282, I2=21.3%, τ2=0.02), higher bleb extents (SMD=0.52, z=4.35, p=0.001, 95% CI=-0.29 to 0.76) with no heterogeneity (Q=2.89, p=0.410, I2=0.0%, τ2=0.0) and lower bleb vascularity (SMD=-0.70, z=2.79, p=0.005, 95% CI=-1.19 to -0.21) but with high heterogeneity (Q=12.43, p=0.006, I2=75.90%, τ2=0.19).

Conclusions

Despite similar outcomes with post operative IOPs and success rates, the subtenon injection route of Mitomycin-C in trabeculectomy seems to have improved outcomes in bleb morphology compared to the soaked sponge application, which might achieve better bleb longevity. However, more studies to further strengthen our current evidence is recommended.

P-654

CASE SERIES OF NON-PENETRATING GLAUCOMA SURGERY TO TREAT EYES WITH RAISED INTRA-OCULAR PRESSURE AFTER PREVIOUS TREATMENT FOR INTRA-OCULAR MALIGNANCY

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Purpose

There are concerns about seeding tumour cells when using traditional penetrating glaucoma surgery for the treatment of raised intraocular pressure in eyes which have previously been treated for an intra-ocular malignancy[1,2]. European Glaucoma Society guidelines suggest incisional surgery only after successful tumour control is achieved[3], which may be difficult to determine. Some glaucoma specialists therefore consider cyclodestructive procedures[4] to avoid traditional penetrating surgery, but this may not be as effective.

Methods

A case series of six patients who underwent non-penetrating glaucoma surgery (deep sclerectomy) for treatment of raised intra-ocular pressure, following treatment for previous intra-ocular melanoma with plaque brachytherapy or proton beam radiation. All cases were performed under general anaesthetic to reduce the risk of accidental penetration. Mitomycin C was used in three cases.

Results

Intraocular pressure changed from 25.3 (range 18-35) pre-operatively, to 9.3 (range 4-13) post-operatively, with a follow up ranging from 7 months to 8 years. Pre-operatively, patients were on 2-4 topical glaucoma drops and one was taking oral acetazolamide. Two patients failed requiring further glaucoma surgery, one of which, has since passed away due to metastatic disease. Neither of these cases had mitomycin C used. Of the remaining four, these cases require no glaucoma drops to control their eye pressure. There were no signs of local seeding to the ocular surface, or ocular adnexa at follow-up.

Conclusions

This case series demonstrates that a deep sclerectomy is safe and effective to lower the eye pressure in patients who have had previous intra-ocular malignancy, when medication alone is not effective. It supports the use of mitomycin C. Given it is non-penetrating, it is likely to be a safer option in terms of seeding, compared to traditional penetrating glaucoma surgery.

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P-655

OBJECTIVELY MEASURED CHANGES IN POST-OPERATIVE AQUEOUS FLARE AFTER GLAUCOMA OPERATIONS

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Purpose

To objectively quantify postoperative aqueous flare in patients following trabeculectomy, Preserflo microshunt and aqueous shunt surgery (Baerveldt implants and Ahmed valves) using a laser flare photometry (FM-600, Kowa, Nagoya, Japan).

Methods

The FM-600 was used to assess glaucoma patients visiting post-operative clinics following their surgery as part of their standard care. An average of 5-6 flare readings were taken on each patient prior to any drop instillation. Filtering operations included patients who may have had cataract surgery previously and the tube group included patients who may have had a previous failed trabeculectomy. Scans were taken from July 2019 - September 2022.

Results

76 eyes received trabeculectomy, 56 eyes received Preserflo microshunt and 38 eyes received aqueous shunt surgery. At 12 months the average flare reading was highest for trabeculectomy patients in comparison to microshunt patients (29.6 ± 6.83 vs 16.23 ± 6.74 photons/ms). Where patients had received cataract surgery prior to microshunt insertion, consistently higher average flare readings were found at all time points. Tube surgery patients had the highest flare readings at 12 months (38.28 ± 4.7 photons/ms). Tube patients had a noticeable increase in flare at around 6 months, likely due to supramid removal during that time period.

Conclusions

The highest average flare is found during the first 2 months of the post-op period in all treatments. For glaucoma operations, trabeculectomy shows a higher initial level of inflammation than microshunt, likely due to the need for intra-operative iridectomy. Tube surgery was found to be the most pro-inflammatory of all glaucoma operations.

P-656

SURGICAL OUTCOMES OF PRIMARY FILTERING SURGERIES IN SECONDARY CHILDHOOD GLAUCOMA PATIENTS: A RETROSPECTIVE COHORT STUDY

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Purpose

To evaluate and compare long-term surgical outcomes of primary filtering surgeries including trabeculectomy and combined trabeculotrabeculectomy (CTT) in secondary childhood glaucoma (SCG) patients according to Childhood Glaucoma Research Network classification.

Methods

SCG patients who underwent either trabeculectomy or CTT as their first operation at a joint glaucoma clinic of 2 tertiary hospitals between 2008 and 2018 were reviewed. Failure criteria were an intraocular pressure < 5 or > 21 mm Hg for 2 consecutive visits, or when an additional glaucoma surgery, besides bleb needling and an antifibrotic agent injection, was required, or an eye with subsequent no light perception. Kaplan-Meier analysis was used to evaluate surgical success. Survival curves were compared using a multilevel mixed-effect Weibull model with an adjustment for age.

Results

Sixty-four eyes from 50 SCG patients were included with male (60%) and left-sided (57.8%) preponderance. Glaucoma associated with non-acquired ocular anomalies (SCGO) included 31 eyes (48.4%) from 23 patients. Median (interquartile range) age and follow-up time were 63.6 (13.1, 108.7) and 18 (7.5, 48) months, respectively. Most eyes (55 eyes from 45 patients, 85.9%) underwent trabeculectomy. Overall cumulative probabilities of success were 57.8% at 1 year, 55.1% at 3 years, and 50.1% at 5 years. For trabeculectomy (55 eyes), the cumulative probabilities of success were 59.5% at 1 and 3 years, and 52.0 % at 5 years. For CTT (9 eyes), the cumulative probabilities of success were 44.4 at 1 year, which decreased to 33.3% at 3 and 5 years. There were no statistically significant differences for the following comparisons of success: trabeculectomy and CTT for all SGC patients; trabeculectomy between SCGO and non-SCGO groups. Hypotony was the most common early complication (6 eyes). Two SCGO eyes eventually developed phthisis bulbi.

Conclusions

Primary filtering surgeries had limited long-term success in SCG patients. Trabeculectomy and CTT demonstrated comparable long-term results.

P-657

6-YEAR EFFICACY AND SAFETY OF ITRACK AB-INTERNO CANALOPLASTY AS STANDALONE PROCEDURE AND COMBINED WITH CATARACT SURGERY IN PRIMARY OPEN-ANGLE GLAUCOMA

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Purpose

To evaluate the long-term effectiveness of iTrack (Nova Eye Medical Inc., Fremont, USA) ab-interno canaloplasty in reducing intraocular pressure (IOP) and glaucoma medications in patients with primary open-angle glaucoma (POAG).

Methods

In this retrospective monocentric consecutive case series, 27 eyes of 22 patients, with a mean age of 77.3 ± 5.8 years were treated with ab-interno canaloplasty (iTrack microcatheter) performed as a standalone procedure or combined with cataract surgery and followed for up to 6 years following the procedure. The iTrack was used to circumferentially intubate and viscodilate Schlemm's canal over 360 degrees. Primary efficacy endpoints included intraocular pressure (IOP) and number of glaucoma medications (without washout) at baseline, 12, 24, 36, 48, 60 and 72 months after surgery.

Results

Mean IOP was statistically significantly reduced from 19.8±5.2mmHg at baseline to 14.6±3.6 (n=15) mmHg at the 6-year follow-up ($p<0.001$). The number of glaucoma medications was statistically significantly reduced from 1.93±1 at baseline to 0.94±0.9 at the 6-yeear follow-up ($p<0.001$). At 6 years, the mean percentage reduction in IOP was 26%; 39% of eyes were medication free and 72% on 1 medication or less. One eye that was initially referred to us was excluded from the study because after an IOP raise due to non-compliancy with medications, an external surgeon has implanted an iStent.

Conclusions

iTrack ab-interno canaloplasty performed as a standalone procedure or in combination with cataract surgery significantly reduced IOP and medications in patients with POAG up to 6 years after the procedure.

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P-658

EFFECT OF PILOCARPINE IN PATIENTS UNDERGOING GONIOSCOPY-ASSISTED TRANSLUMINAL TRABECULOTOMY SURGERY

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Purpose
Theoretically, Pilocarpine may improve surgical outcomes of gonioscopy-assisted transluminal trabeculotomy (GATT) by inhibiting anterior chamber (AC) angle wound healing. Here we aim to evaluate the effect of postoperative use of Pilocarpine in patients with ocular hypertension and primary open-angle glaucoma undergoing GATT.

Methods
This single-center retrospective comparative case series included 38 eyes of 38 patients who underwent GATT surgery alone or combined with cataract extraction. Patients were divided into two groups according to the use of topical Pilocarpine. In the Pilocarpine group, Pilocarpine 2% was prescribed 2 times a day starting after the surgery and continuing for 4 weeks. Data were collected preoperatively and postoperatively at 1 day, 1 week, 1, 3, and 6 months after surgery. Changes in intraocular pressure (IOP), the number of antiglaucoma medications, best-corrected visual acuity (BCVA), and postoperative complications were analyzed.

Results
Pilocarpine (n=18) and control group (n=20) were comparable in baseline characteristics, including age, preoperative IOP, and preoperative antiglaucoma medications. A reduction in mean medicated IOP from baseline to month 6 was observed in Pilocarpine (18±5.1 to 13.6±3.0 mmHg) and control group (19.1±5.0 to 13.8±2.4 mmHg) with no significant difference between both at each follow-up point. Considering the Pilocarpine as 1 drug, the mean number of antiglaucoma medications was higher in the Pilocarpine group compared to controls at 1 day, 1 week, and 1 month. However, after 3 months, no difference was observed. In their last follow-up visit, the two groups had no significant difference in BCVA (P=0.28). The 2 groups had similar complication rates. The most common adverse events in the Pilocarpine and control group were AC inflammation (77.7%vs.45%) and peripheral anterior synechiae 50%vs.65%). Although the Pilocarpine group demonstrated a trend toward more AC inflammation during the 1-month visit, the difference did not reach statistical significance (P=0.016).

Conclusions
This study suggests that using Pilocarpine during the first postoperative month does not offer any advantage for short-term clinical outcomes of GATT surgery. Moreover, clinicians should be aware of the potential increased risk of AC inflammation during the first postoperative month.

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P-659

BASELINE CHARACTERISTICS OF PARTICIPANTS IN THE CONCEPT RANDOMISED CONTROLLED TRIAL (COMPARING PHACO VS PHACO WITH ENDOSCOPIC CYCLOPHOTOCOAGULATION)

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Purpose

To describe baseline characteristics of participants enrolled in the CONCEPT randomised controlled trial. The study will compare the effectiveness of phacoemulsification with endoscopic cyclophotocoagulation (ECP) laser to phacoemulsification alone for patients with cataract and primary open angle glaucoma (POAG), or pigmentary glaucoma at 1 and 2 years post-surgery.

Methods

4 UK based centres enrolled patients from March 2020 to October 2022 to participate in the study. All participants have mild to moderate glaucoma and undergo washout diurnal intraocular pressure (IOP) measurement at baseline. Repeat washout IOP measurement is planned at 1 and 2 years postop. Patients have a cataract with vision of 6/9 or worse and no history of prior glaucoma surgery, but may have had previous selective laser trabeculoplasty. Participants are randomised to receive phacoemulsification alone or combined with ECP at the point of uneventful cataract surgery. The study is registered on clinicaltrials.org (NCT04295122).

Results

162 participants were recruited. The mean age is 70.5 (8.3) with 85 male and 77 female participants. There is an approximately equal split of Caucasian participants (45.68% n=74) and African/Caribbean participants (49.38% n=80). The majority (96.3%) have POAG and remainder pigmentary glaucoma. Average baseline acuity is 0.36 (0.19) logMAR, with a low myopic spherical equivalent (-0.96D +/-3.02). As included glaucoma cases are mild/moderate, the mean visual field mean deviation is -4.75dB (3.49), with 1.75 (1.09) mean medications preop. Following washout of glaucoma medications the mean baseline IOP was 25mmHg (4.7) with 36 participants (21.6%) having an IOP of >30mmHg.

Conclusions

The CONCEPT study is the first ever randomised controlled study to compare phacoemulsification with ECP to phacoemulsification alone in open angle glaucoma. The balanced split of Caucasian and African/Caribbean participants will allow for novel comparison of different ethnicities response to ECP and safety in these groups.

P-660
SAFETY AND EFFICACY OF CANALOPLASTY – A 12-YEAR RETROSPECTIVE STUDY

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Purpose
Canaloplasty is a non-penetrating surgery for the reduction of intraocular pressure (IOP) in patients with glaucoma, restoring aqueous humour drainage through the trabecular meshwork and Schlemm's canal. In this study we aim to review its safety and efficacy.

Methods
12-year retrospective study, which included all patients with primary or secondary open-angle glaucoma subjected to canaloplasty/phaco-canaloplasty as a primary procedure for IOP reduction. Primary outcomes comprised IOP and visual field (VF) change during the follow-up period; secondary outcomes included procedure related complications, and surgical success, cathegorized as one of the following: complete - IOP <21 mmhg without added medication/surgery; qualified - IOP <21 mmHg with added medication; failure - IOP - 21 mmHg with maximum topical therapy, requirement of additional surgery to lower IOP or presence of sight-threatening complications.

Results
92 eyes of 80 patients were included in the study, with a mean age of 76,8 years. Most (94%) had either primary open-angle or pseudoexfoliative glaucoma. Mean pre-operative IOP was 21,7 mmHg, controlled with an average 2,8 different medications. IOP above the target range despite adequate medical therapy was main reason for surgery referral; 7,6% were elected due to intolerance to topical medication. Patients were monitored for an average of 67 (6-132) months; IOP at the end of the follow-up period was 16,6 mmHg (with the phaco-canaloplasty group presenting a significant lower IOP at the 1- and 84-month mark). Surgery was successful in 35 patients; 36 had to be re-started on hypotensive drops (at an average follow-up of 22 months, with a mean 2,3 different drugs); 21 patients received additional intervention (mainly trabeculectomy), typically 50 months after the initial procedure. Regarding VF, average mean deviation and pattern standard deviation were -10,45 dB and 11,27 at the end of the follow-up, respectively, with no significant differences to the preoperative VF parameters. Common complications included descemet membrane detachment, hyphema and early post-operative IOP spike; all were managed with medical therapy, without relevant iatrogenic damage.

Conclusions
Canaloplasty remains a safe, non-penetrating, surgical technique, successfully reducing IOP and the need for hypotensive medication in certain patients. Additional research is needed to identify the ones who may be at higher risk of failure, for whom a different strategy may be advised.

P-661

TWO-YEAR OUTCOMES OF ANTERIOR VERSUS POSTERIOR SCLERAL APPLICATION OF MITOMYCIN C-SOAKED SPONGE IN TRABECULECTOMY

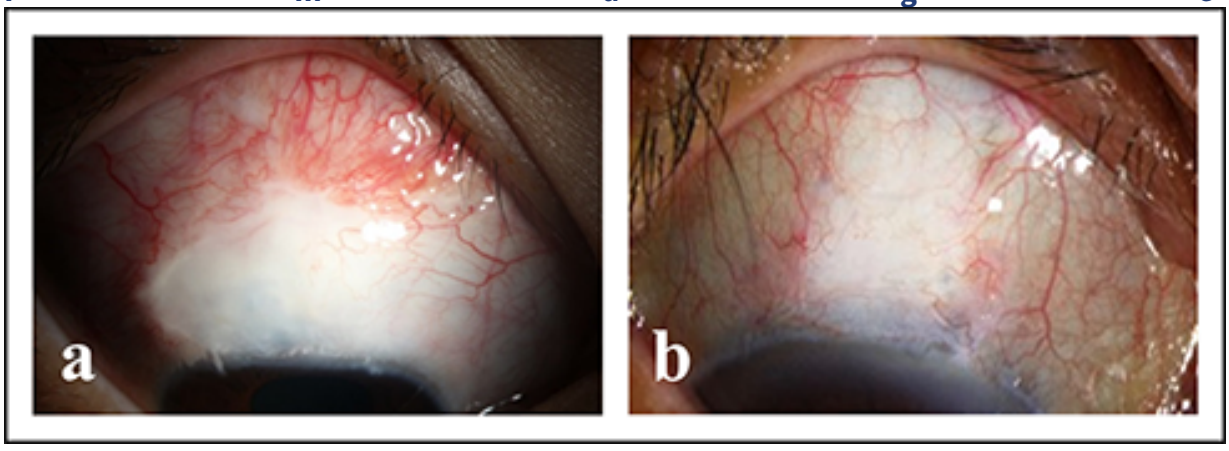
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Purpose
To compare the safety and efficacy of two different application methods of mitomycin C (MMC)-soaked sponge in trabeculectomy.

Methods
We included 71 eyes of 71 patients that had undergone trabeculectomy in this retrospective study. In the anterior scleral application group, 36 eyes were treated using the long side of the mitomycin C-soaked sponge placed parallel to the limbus. The efficacy and safety of these eyes were compared with eyes treated with posterior scleral application of MMC in which 35 eyes were treated with the long side of the mitomycin C-soaked sponge placed perpendicular to the limbus. The follow-up period was 2 years. The safety of the procedure, including bleb morphology and complications, was the primary outcome, and the success rate was the secondary outcome.

Results
The cumulative success rate at postoperative 2 years was 94.4% and 94.3% in the anterior and posterior scleral application groups, respectively (P = 1.000). However, with the posterior scleral application of the mitomycin C-soaked sponge, blebs were more low-lying (P = 0.048), more limited in extent (P < 0.001), more normal vascularized (P = 0.027) and more posteriorly directed (P < 0.001). Furthermore, the incidence of thin-walled cystic bleb (P = 0.028) and bleb leakage (P = 0.025) was significantly lower in the posterior scleral application group than in the anterior group.

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Conclusions
Although there were similar success rates, the posterior scleral application of mitomycin C-soaked sponge with trabeculectomy was safer with a better bleb morphology than the anterior scleral application.

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P-662

SAFETY AND EFFICACY OF THE HYDRUS MICROSTENT DURING THE INITIAL LEARNING CURVE

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Purpose

To examine the safety and efficacy of Hydrus Microstent during the learning curve of 3 surgeons new to the procedure.

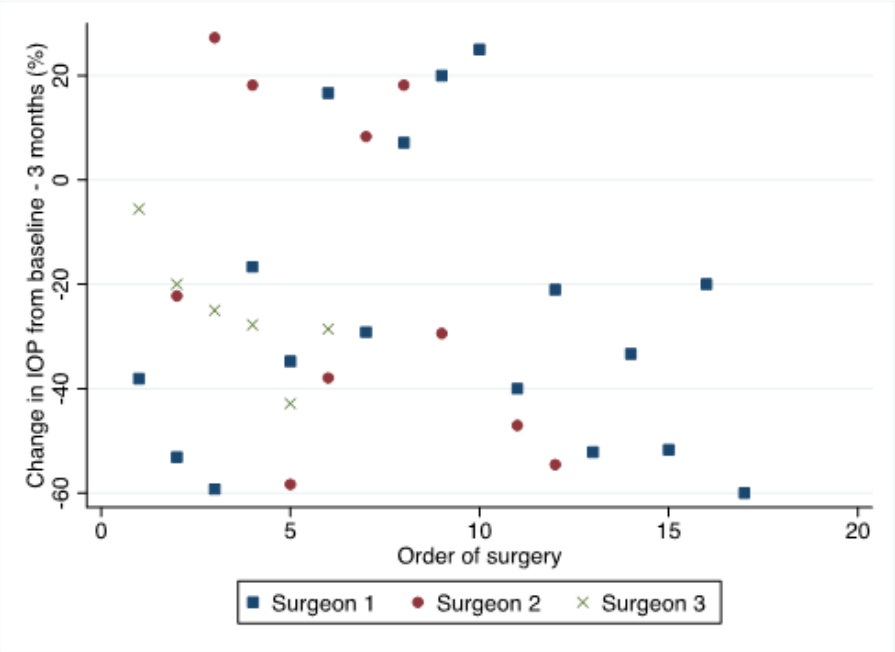
Methods

A retrospective study including a consecutive series of the first 38 Hydrus procedures performed by 3 surgeons (AJT, TRM, SD). 2 were experienced cataract and glaucoma surgeons with previous experience of Schlemm's canal minimally invasive glaucoma surgery (MIGS) (istent, ab interno canaloplasty, ab interno trabeculotomy) and 1 a glaucoma fellow with no previous experience of MIGS (surgeon 3). All patients were followed for a minimum of 3 months, with the primary outcomes, percentage, and absolute change in IOP from baseline (IOP at time of listing for surgery) compared to the visit after and closest to 3 months post-op. Secondary outcomes included number of glaucoma medications and complications. The relationship between order of surgery and IOP reduction was examined using regression analyses.

Results

37 eyes were treated with combined phacoemulsification-Hydrus. Mean IOP at baseline was 20.5±6.5 mmHg (range 11 to 35mmHg), using an average of 2.0 topical medications for glaucoma (range 0 to 4). Average visual field mean deviation (MD) was -9.9 ±7.4 dB. Peak IOP prior to surgery was 26.3±5.8 mmHg. Average IOP at 3 months was 14.8 ± 3.6 mmHg, significantly lower than baseline (P<0.001). 29 of 38 eyes (81.6%) had ≥20% reduction in IOP on the same number or fewer medications. The average reduction in IOP was 23.3±27.1% (5.7±6.7 mmHg), with an average reduction of 1.4±1.2 medications. Eyes with higher baseline IOP had significantly greater reductions in IOP with Hydrus (0.9, 95% CI 0.7 to 1.1 mmHg, greater reduction in IOP per 1mmHg higher baseline IOP, P<0.001, R-squared=0.70). Baseline MD and surgeon experience during the initial learning curve (chronology of procedure) did not significantly influence efficacy (Figure 1). The only complications were small hyphaemas in 2 eyes on day 1, which resolved by week 1. In one eye Hydrus insertion was attempted but it was immediately removed and not reimplanted due to inability to sufficiently advance the device within Schlemm's canal.

Image



Conclusions

Surgeon experience during the initial learning curve for Hydrus had no apparent effect on efficacy or safety at 3 months. The study was limited by lack of corneal endothelial cell measurements, which may be affected more by less experienced surgeons, however 5-year data from the HORIZON study indicated a high level of corneal safety even with long-term presence of the implant.[1]

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P-663

OUTCOME OF ISTENT TRABECULAR MICROBYPASS IMPLANTATION IN SEVERE OPEN ANGLE GLAUCOMA

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Purpose
To evaluate the efficacy and outcome of the iStent implantation among patients with advanced open angle glaucoma up to 12 months after surgery.

Methods
Retrospective case series of patients who were implanted with iStent with or without concomitant cataract surgery. The series included 25 eyes with severe glaucoma vs 42 eyes with mild-moderate glaucoma. Primary outcome measures were intraocular pressure (IOP) reduction and number of medications. Safety measures included postoperative IOP spike and the need for additional surgery for IOP control.

Results
The mean preoperative IOP was 17.32 ± 4.40 mmHg and 16.60 ± 3.40 mmHg for advance and mild-moderate glaucoma respectively, p=0.454. Postoperatively, the mean IOP was significantly lower at 13.10 ± 1.51 mmHg(p<0.01) at 6months and 13.25 ± 3.36 mmHg (p<0.05) at 12 months from baseline. This was lower compared to eyes with mild-moderate glaucoma with IOP of 14.55 ± 2.73 mmHg at 6 months and 14.48 ± 3.38 mmHg at 12 months. The percentage of IOP reduction was 19.26% ± 16.85 at 6months and 18.16% ± 21.46 at 12 months, which was greater compared to mild-moderate glaucoma which were 12.23% ± 16.49 at 6 months and 14.74% ± 13.52 at 12 months. However, these IOP reductions were not statistically significant when compared with the mild-moderate group at 6 months (p=0.15) and 1 year (p=0.56).

Preoperatively, the mean number of medications was 2.88 ± 0.97 and it reduced significantly to 1.71 ± 0.96, p<0.01 at 6 months and 1.56 ± 1.09, p<0.05 at 12 months. Percentage of medication reduction was 41.32% at 6 months and 46.25% at 1 year in the severe group, and this reduction was not statistically different than the mild-moderate group which was 33.76% (p=0.39) at 6months and 37.12% (p=0.45) at 1 year. Two patients had IOP spikes due to steroids while one patient required additional surgery 3 months later.

Conclusions
iStent implantation in patients with severe open angle glaucoma is as effective as in mild-moderate glaucoma. It not only effectively reduces IOP, but also medication use among these patients.

P-664

A LOCAL RETROSPECTIVE ANALYSIS AFTER 32 IMPLANTATIONS OF THE NEW XEN63

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Purpose

To evaluate the IOP decrease and rate of complications after the implantation of the new XEN63 in glaucoma patients.

Methods

32 adult glaucoma patients operated from September to December 2022 receiving XEN63 alone or in combination with phacoemulsification (PhacoXEN63). XEN was always injected ab-Interno and augmented with 0.1ml of mitomycin C 0.01%. The Main outcome measures were the average IOP before surgery (preIOP), at the day 1 post-surgery (1dIOP), at 1 week (1wIOP), at 1 month after (1mIOP). Adjunctive hypotensive medication was also evaluated pre-surgically and at the follow up visits as well as the presence of complications.

Results

Mean age of the patients was 73 years, and 19 were men. 20 received combined surgery and 12 XEN63 alone. Preoperative mean deviation (MD) of the visual field (VF) was –6.0 dB and main diagnosis was primary open angle glaucoma. Mean Pre IOP was 21.50 mmHg (SD 3.730) with a mean number of hypotensive drugs of 2.86 (SD 0.88). The stratified analysis showed significant statistical differences in preIOP between XEN63 (23.33 mmHg) and PhacoXEN63 (20.47 mmHg). Mean postoperative IOP was: 1dIOP 8.58 (SD 5.46), 1wIOP 10.17 (SD5.10), 1mIOP 12.00 (SD 3.41) and 3mIOP 15.18 mmHg, without significant differences in the stratified analysis. No hypotony cases were present at the 1-month visit. Instead, three patients presented IOP over 18 mmHg in which Needling was required. At the 3-month visit were no change in the MD of the VF, and the mean number of hypotensive drugs was 0.25.

Conclusions

Minimally invasive surgeries are gaining ground in glaucoma surgery as they allow a proactive surgical attitude, minimizing the risk of complications. The new Xen63 implant seems to have an adequate hypotensive effectiveness and does not seem to present important complications such as clinically significant hypotony.

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P-665

LONG-TERM STRUCTURAL CHANGES OBSERVED ON GONIOSCOPY AND ANTERIOR-SEGMENT OCT FOLLOWING GONIOSCOPY-ASSISTED TRANSLUMINAL TRABECULOTOMY (GATT)

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Purpose

To evaluate the long-term structural changes of the anterior chamber (AC) angle following gonioscopy-assisted transluminal trabeculotomy (GATT).

Methods

The AC angle of 10 eyes that underwent GATT at least six years previously were assessed for structural changes. A detailed gonioscopy was performed to determine the state of the cleft and the position of the trabecular flap. An anterior segment OCT (AS-OCT) examination was performed on the corresponding areas on gonioscopy.

Results

The typical finding of the angle following GATT was an open cleft with a visible trabecular flap. However, the gonioscopy of our patients revealed three different cleft appearances: open, closed, and segmentally open cleft. In long-term, the trabecular flap re-approximated the incision site in some areas resulting in the appearance of closed cleft on gonioscopy. On AS-OCT the cleft was identified when the lumen of Schlemm's canal was connected to the AC, while the position of the flap differed. The cleft was observed as open in a mean of 4.4±2.2 clock hours. The cleft was found open mostly in the superior quadrants of the angle (9 eyes). No correlation was found between the extent of open cleft and final IOP/percentage of IOP reduction.

Conclusions

AS-OCT, when used in conjunction to gonioscopy, was found helpful to evaluate the structural changes following GATT. As observed in the study the cleft tended to close in some areas. It was found preserved mostly in the superior half of the angle in the long-term.

P-666

PROSPECTIVE STUDY OF CANALOPLASTY AND TRABECULOTOMY PERFORMED BY TRAINEES – 12 MONTH RESULTS

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Purpose

To evaluate outcomes of combined cataract surgery with canaloplasty and trabeculotomy with the OMNI Surgical System (Sight Sciences, Inc. Menlo Park, CA) performed by supervised trainees (residents and/or fellows) in comparison to published outcomes of cases performed by experienced glaucoma surgeons.

Methods

Prospective, Institutional Review Board approved study of all cases meeting eligibility requirements who underwent cataract extraction and intraocular lens implant combined with canaloplasty and trabeculotomy with the OMNI system. All treated eyes had open-angle glaucoma (including mild, moderate, and advanced stages) or ocular hypertension. Pre- and post-operative intraocular pressures (IOP) were recorded, as well as pre- and post-operative ocular hypotensive medications. Primary success was defined as meeting all three of the following requirements: (1) greater than 20% IOP reduction, (2) post-operative IOP less than 21, and (3) no additional surgical intervention for IOP control.

Results

32 eyes of 24 patients were enrolled. Baseline IOP was 17.41 ± 5.01 mmHg. Mean IOP at post-op month 3 was 12.96 ± 2.07 mmHg (p=0.0005). Mean IOP at post-op month 6 was 13.14 ± 2.44 mmHg (p=0.009). Mean IOP at post-op month 12 was 13.14 ± 2.67 mmHg (p=0.056). Medications were reduced from 2.25 ± 1.24 at baseline to 1.46 ± 1.40 by post-op month 3 (p=0.0003). Primary success as defined above was met in 71.4% of cases. No cases required additional surgery for IOP control. Additionally, 50% of cases had a reduction of at least 1 topical ocular hypotensive medication and none required an increase in medications. There were no vision-threatening complications.

Conclusions

This study demonstrated a significant reduction in IOP and medication use after combined cataract surgery with canaloplasty and trabeculotomy performed by trainee surgeons. The primary success rate of 71.4% in this study is comparable to the 70.8% success rate in the retrospective, multicenter ROMEO study. These results of minimally invasive glaucoma surgery (MIGS) with the OMNI system performed by trainee surgeons are similar to those of experienced glaucoma surgeons, supporting the relative ease of adoption of this particular MIGS device. Additional data is needed to further assess the long-term efficacy of this procedure.

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P-667

LONG-TERM OUTCOMES OF EARLY POSTOPERATIVE HYPOTONY FOLLOWING MITOMYCIN C-AUGMENTED TRABECULECTOMY

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Purpose

To compare the long-term trabeculectomy outcomes between eyes that developed early postoperative hypotony and the controls.

Methods

This retrospective cohort study included patients who underwent primary trabeculectomy and completed 24 months of follow-up. Early hypotony (EH), according to the World Glaucoma Association (WGA), was defined as an eye with an intraocular pressure (IOP) of less than 6 mmHg, measured at 2 consecutive visits within 1 month following surgery. We identified control group as those eyes with IOP not less than 6 mmHg at any visits within 1 month after the surgery. Failure rate, IOP, number of medications, visual acuity (VA) at 24 months post-operation were compared between the EH and control groups. The presence of clinical hypotony and the progression of cataract were also compared.

Results

95 eyes from 90 patients were included, 32 eyes in the EH group and 63 eyes in the control group. Baseline median IOP was 20 (interquartile range (IQR), 17-28) mmHg in the EH group and 21 (IQR 16-32) mmHg) in the control group (p=0.39). At 24 months, the IOPs were significantly lower in the EH group 12 (IQR 7-15) mmHg compared to 14 (IQR 11-17) mmHg in the controls (p=0.006). Using the criteria of IOP > 15 mmHg, 5 mmHg with structural change, VA of no light perception, or the need for re-surgery to define a failure, the failure rate were significantly lower in the EH group (28%) compared to the control group (49%) (p=0.049). Significantly more eyes in the EH group were medication-free (78%) than those in the control group (48%) (p=0.004). No significant difference in VA between groups was observed (p=0.698). Regarding clinical hypotony, shallow anterior chamber (AC) was experienced in 12 (38%) eyes in the EH group and 10 (16%) eyes in the control group (P=0.023), choroidal detachment (CD) was experienced in 7 (22%) eyes in the EH group and none in the control group (P<0.001). There was no case of hypotony maculopathy in either group. There was no statistically significant difference in the rate of cataract progression among phakic eyes between both groups (EH 7/18 (39%) EH group vs control 8/42 (19%), P=0.118).

Conclusions

EH after trabeculectomy can enable better IOP control, lower failure rate with a higher proportion of medication-free patients. Complications occur more frequently in eyes with EH, however, few numerical hypotony individuals experienced clinical hypotony.

P-668

DIRECT VISCODILATION OF THE COLLECTOR CHANNELS FOLLOWING DUAL BLADE GONIOTOMY WITH CATARACT SURGERY: 6 YEAR RESULTS

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Purpose

The purpose is to evaluate hybrid MIGS procedure using Goniotomy and Direct Viscodilation of the collector channels during cataract surgery in all levels of glaucoma. This technique called “clean the gutter and power wash the downspouts”, removes the trabecular meshwork and directly viscodilates the collector channels.

Methods

The Kahook Dual Blade removed 180 degrees of trabecular meshwork after phacoemulsification. Viscoelastic was injected into the exposed ostium of the collector channels as the perpendicular viscoelastic cannula was held firmly against the outer wall and dragged through the gutted canal. Of the 381 total eyes 57% had moderate to severe glaucoma. 68% were African American, 49% diabetic, 48% were on anticoagulants and 30% had previous glaucoma surgery.

Results

Intial IOP was 19.3mmHg(SD±7.2) on 1.6 medications. Throughout the first year the IOP hovered around 16.0mmHg and stayed there until it dropped to 15.6mmHg(SD±4.0) around year 3. It remained this throughout to year 6. Yr 1; 16% reduction in IOP, 77% reduction of drops. Yr 2; 14.5% reduction in IOP, 67% reduction of drops. Yr 3; 17.3% reduction in IOP, 64% reduction in drops. Yr 4; 18.1% reduction in IOP, 72% reduction in drops. Yr 5; 18.1% reduction in IOP, 65% reduction in drops. Yr 6; 13% reduction in IOP, 87% reduction in drops.

Conclusions

The synergy of Goniotomy and Viscodilation reduces IOP and medications even in advanced glaucoma thus improving compliance and reducing the financial burden. This technique addresses both trabecular outflow resistance and salvages the collapsed collector channels.

P-669

DOES CATARACT SURGERY INCREASE THE RISK OF LATE-ONSET GLAUCOMA IN CHILDREN WITH CONGENITAL CATARACTS?

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Purpose

To examine the risk of late-onset secondary glaucoma in patients operated on for congenital cataracts in childhood.

Methods

This cohort study took place from January 2022 until December 2022 and included patients with Marner congenital cataract that had cataract surgery before 18 years of age. Patients underwent an ophthalmologic examination to determine the presence of secondary glaucoma. Prior ophthalmologic examinations were accessed if patients were not able to participate in the ophthalmologic examination. The risk of late-onset secondary glaucoma was determined using survival analysis, and risk factors were assessed using a cox proportional hazards regression model.

Results

We included 66 patients in the study and found that 16 (24%) had secondary glaucoma and two (3%) patients were treated for ocular hypertension but did not have damage of the optic nerve. Forty patients underwent an ophthalmologic examination and 26 were evaluated based on patient charts from prior ophthalmologic examinations. Kaplan-Meier curves showed that 24% of patients at age 60 would develop secondary glaucoma after congenital cataract surgery and nearly 50% would develop secondary glaucoma by the age of 75. Most cases of secondary glaucoma were diagnosed more than 30 years after initial surgery (12 out of 16 cases). The hazard ratio of secondary glaucoma increased by 363% (HR 4.6, 95% CI: 2.2 to 9.8, p-value 5.8 e-05) in patients that had more than 1 additional surgery after cataract surgery. We did not find any association between secondary glaucoma and variables such as sex, family disposition for secondary glaucoma, age at surgery, and prior retinal detachment.

Conclusions

We found that patients surgically treated for congenital cataracts in childhood had a high risk of late-onset glaucoma and that most cases were diagnosed more than 30 years after the cataract surgery. Patients who had congenital cataract surgery should be informed of the importance of maintaining regular ophthalmologic appointments throughout their lives to detect late-onset secondary glaucoma at an early stage.

P-670

1-YEAR OUTCOMES OF PRESERFLO® MICROSHUNT AT A SINGLE TERTIARY CENTRE

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Purpose
PreserFlo® Microshunt is a micro-invasive subconjunctival filtering procedure employing an 8mm MicroShunt with a 70 um lumen to shunt aqueous humor from the anterior chamber to the subconjunctival space. This analysis reports on the efficacy and safety of this device at a single centre of a diverse and complex cohort.

Methods
Retrospective analysis of the surgical outcomes of 76 consecutive cases who received Preserflo® Microshunt with mitomycin C between November 2018 and July 2022. The cohort was mixed consisting of primary open angle glaucoma (POAG), Juvenile Glacuoma (JOAG) and Secondary Glaucomas including uveitic glacuoma, pseudoexfoliation, pigment disersion and neovascular glaucoma. The outcomes were defined as complete success, qualified success, and failure. Failure was defined as an IOP >21, < 20% reduction in IOP, reoperation for glaucoma, or IOP <5 and reduction in VA. Other outcome measures included medications and complications.

Results
76 eyes completed 1 year of follow-up. There was complete success in 57.90% (n=44), with 11.84% (n=9), qualified success, and failure occurring in 30.3 % (n=23). There was a significant reduction in IOP (mmHg) preoperatively (24.7±8.33 SD, n=76) to 12 months (15.0±6.76 SD, n=76) (p<0.001). The number of anti-glaucoma medications was also significantly reduced preoperatively (2.9±1.13 SD, n=76) to 12 months (0.63±1.09 SD, n=76) (p<0.001). Complications included: hyphaema (n=10), shallow choroidals (n=7), Bleb leak (n=6), exposure of shunt (n=1), aqueous misdirection(n=1), hypotonus maculopathy(n=1) and suprachoroidal haemorrhage(n=1).

Conclusions
The Preserflo® Microshunt demonstrates good efficacy and reasonable safety at 1 year with majority of patients achieving IOP control with significant reduction in their medication burden.

P-672

EFFECTS OF TOPICAL GLAUCOMA EYE DROPS ON LONG-TERM TRABECULECTOMY OUTCOMES BASED ON GLAUCOMA MEDICATIONS INTENSITY INDEX

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Purpose

Trabeculectomy is commonly performed when maximal tolerable medical treatment is unlikely to control glaucoma progression. Most eyes undergoing trabeculectomy have had long-erm preoperative exposure to topical intraocular pressure (IOP) lowering eyedrops. However, the effect of the prolonged use of IOP-lowering eyedrops on trabeculectomy outcomes has not yet been quantified on a long-term basis. Therefore, we investigated the association between preoperative use of topical glaucoma eyedrops and trabeculectomy outcomes by quantifying their cumulative exposure.

Methods

We retrospectively analyzed data of 309 patients with primary open angle glaucoma who had undergone an initial trabeculectomy with mitomycin C (MMC) performed by a single surgeon from 1999 onwards and had been followed up for more than 10 years after surgery. To determine the cumulative dose of IOP-owering eyedrops, the glaucoma medication intensity index (GMII) was calculated by multiplying the number of eyedrops per day by the number of years of use. Surgical success was defined as 1) IOP≤15 mmHg, 2) no loss of light perception, and 3) no requirement for additional glaucoma surgery. The GMII and cumulative success rates were analyzed and compared using survival analysis, and risk factors for surgical failure were assessed using Cox regression analysis.

Results

The average follow-up period after the trabeculectomy was 14.3 years (range: 10.0~23.1 years). The Kaplan-Meier survival analysis showed that the cumulative complete success rates were 89.3%, 70.6%, 59.3%, 49.9%, and 46% at 1, 5, 10, 15, and 20 years after the trabeculectomy, respectively. The GMII in eyes with surgical failure (n=167) at 20 years postoperatively was significantly higher than that in eyes with surgical success (n=142) (8.74±0.63 vs. 3.28±0.60, P=0.004). Eyes with GMII ≥ 4.35 exhibited a shorter postoperative survival time (p=0.015) and higher IOP at 20 years postoperatively (p=0.002). Old age, hypertension, high preoperative IOP, subsequent cataract surgery, and high GMII were identified as potential risk factors for surgical failure in univariate regression analysis. In a multivariate analysis, a high GMII was not found to be a significant risk factor for surgical failure.

Conclusions

This study showed that the GMII can be used to predict eyes at higher risk of trabeculectomy failure, although it may not be a major determinant of trabeculectomy failure.

P-673

LONG-TERM INTRAOCULAR PRESSURE STABILITY BY TRABECULECTOMY CAN BE SLOWED DOWN GLAUCOMATOUS VISUAL FIELD LOSS PROGRESSION

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Purpose
To explore relationship between intraocular pressure (IOP) reduction and visual field (VF) loss progression after trabeculectomy with mitomycin C (MMC).

Methods
We retrospectively examined 1286 eyes of 1948 patients with primary open angle glaucoma including normal tension glaucoma and exfoliation glaucoma, who received trabeculectomy with MMC. Inclusion criteria were as follows: postoperative follow-up periods ≥ 10 years, preoperative mean deviation (MD) > -20 dB (Humphrey Field Analyzer program Central 30-2), and reliable postoperative VF results ≥ 10 times. A regression analysis was conducted to assess a relationship between % IOP reduction from baseline value and MD slope.

Results
Finally 128 eyes met the inclusion criteria. The mean age at surgical intervention was 49.9 ± 13.1 years. Men were 70, and women were 58. The mean follow-up period was 17.8 ± 4.9 years. The postoperative IOP reduced significantly from 19.2 ± 5.1 mmHg to 11.1 ± 3.2 mmHg ($P < 0.001$; paired t-test), and % IOP reduction was 40.0 ± 18.5 %. The eyes with a % IOP reduction below 20 and 30% were 38 and 18 eyes, respectively. The postoperative MD slope was -0.12 ± 0.34 dB/year, which was significantly correlated with the % IOP reduction from baseline ($r = 0.341$, $P < 0.001$; Pearson correlation coefficient).

Conclusions
Long-term IOP stability obtained by trabeculectomy can preserve VF in glaucoma.

P-674

PRESERFLO MICROSHUNT IN KERATOPLASTY-INDUCED GLAUCOMA TREATMENT – MEDIUM-TERM OBSERVATION

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Purpose
The aim of the study was to evaluate the efficacy and safety of Preserflo MicroShunt implantation in keratoplasty-induced glaucoma patients.

Methods
In this case series study seven patients with secondary glaucoma to keratoplasty were enrolled to undergo MicroShunt implantation. The primary outcome measures were intraocular pressure (IOP) reduction, success rates, glaucoma medication use, and visual acuity after shunt implantation. An IOP reduction of 20% compared to the baseline value without re-intervention was considered a successful treatment. Complete success was defined as cessation of antiglaucoma medications. Secondary outcome measures included intraoperative and postoperative complications. Measurements were performed preoperatively and at 1 week, and 1, 3, 6, 12, 18 and 24 months postoperatively.

Results
The mean ± SD values of IOP preoperatively and postoperatively, and at 1 week,1; 3; 6; 12 months postoperatively were 40.0±9.8 mmHg, 19.2±13.0 mmHg, 12.8±4.1 mmHg, 15.6±6.7 mmHg, 18.4±12.3 mmHg, 13.6±5.9 mmHg, 17.8±9.5 mmHg and 14.0±0.8 mmHg ($p<0.001$ for all values), respectively. The mean IOP at the last follow-up was reduced by 65.0%. One patient underwent twice bleb needling and finally due to non-achievement of the target intraocular pressure underwent TSCPC surgery. No major intraoperative or postoperative complications occurred after procedure.

Conclusions
MicroShunt implantation seems to be an effective and well-tolerated method to reduce intraocular pressure in patients with keratoplasty-induced glaucoma. Long-term observation on larger group of patient is needed to confirm this results.

P-676

EVALUATING POSTOPERATIVE REFRACTIVE CHANGE IN GLAUCOMA SURGERY: MICROPULSE, HIFU, KAHOOK DUAL BLADE, TRABECULECTOMY AND BAERVELDT TUBE

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Purpose

To investigate and compare postoperative refractive changes amongst different types of glaucoma operations.

Operations studied here include: 1) Transscleral ciliary body ablation surgery: micropulse transscleral cyclophotocoagulation, and high intensity focused ultrasound (HiFu), 2) Ab-interno angle surgery: Kahook dual blade goniotomy (KDB), 3) External filtering surgery: trabeculectomy with Mitomycin-C (MMC), Baerveldt tube surgery (BVT).

Methods

Retrospective refractive data was collected from our unit for the period August 2016 to October 2021.

Only patients who underwent glaucoma operations with baseline and a post-operative refraction between 3-6 months were included in this analysis. The proportion (%) of patients with significant change in spherical equivalent (SE) (≥0.50 dioptres) and dioptres of cylinder (DC) (≥ 0.75 dioptres) are recorded.

Results

A total of 118 eyes of 118 patients were included in this study. 29 had micropulse, 27 HiFu, 13 KDB, 15 trabeculectomy and 34 BVT. The proportion of eyes with significant refractive changes are shown in table 1 below;

Image

Table 1. % of eyes with significant refractive change.

Group	Surgery	% with significant post-operative SE change	% with significant post-operative DC change
Transscleral Procedures	Micropulse (n = 29)	25%	25%
	HiFU (n = 27)	37.5%	16%
Ab-interno angle surgery	KDB (n = 13)	7.7%	15.4%
External filtering surgery	Trabeculectomy (n = 15)	40%	26.7%
	Baerveldt (n = 34)	46.7%	20%

Conclusions

Ab-interno angle surgery such as KDB did not induce much refractive changes. However, both external filtering surgeries and transscleral ciliary body ablation can caused significant refractive changes in large proportion of eyes. It is important that this risk is conveyed to patients during the consent process.

P-677

THE PAUL GLAUCOMA IMPLANT (PGI) DEVICE -ONE YEAR FOLLOW UP ON SAFETY

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Purpose
To describe the corneal changes after PGI surgery.

Methods
A consecutive cohort study was performed in a Danish tertiary center from January 2022 to January 2023 on patients with glaucoma and PGI implantation; 21 patients were operated, 10 patients with one year of follow-up. Data collection is ongoing.

The primary end point was endothelial cell density (ECD), secondary endpoints logMAR visual acuity and central corneal thickness (CCT).

Results
There were no major peroperative or postoperative complications in any of the 21 patients. 18 patients had peroperative swab with MMC 0,4 mg/ml. 19 patients had tube placement in the anterior chamber, 1 in sulcus and 1 in the vitreous space. None of the patients had the PGI removed, and no patients had corneal transplantations done in the follow-up period. The visual acuity remained stable. Preoperative CCT was mean (SD) 553 (32) mm and 12 months postop CCT 530 (23) mm.

The 21 patients had no significant change in mean ECD, preop mean (SD) 2158 (368) cells / mm2and 6 months postop. ECD 2268 (298). However, 2 patients had a higher ECD loss at 6 months: loss of ECD was 293 and 388 respectively. These 2 patients had a good position of the tube entrance in the anterior chamber and a relatively high tube tip to cornea distance (2,2 and 1,4 mm). In the whole group tube to tip distance was in the range 1,1-2,9 mm. The mean intracameral tube length was 3,9 mm.

Conclusions
Preliminary data indicate that PGI has a good safety profile.

P-678

DIRECT VISUALIZATION OF THE AQUEOUS OUTFLOW PATHWAY USING INDOCYANINE GREEN DURING TRABECULAR MICROBYPASS STENT (ISTENT INJECT) IMPLANTATION

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Purpose

We describe a novel use of intracameral Indocyanine green (ICG) to confirm aqueous outflow to collector channels and aqueous veins after trabecular microbypass Schlemm's canal stent insertion (iStent inject® W; Glaukos Corporation, Laguna Hills, CA, USA).

Methods

Case series. We report three cases of glaucoma patients who underwent trabecular microbypass stent to observe aqueous outflow into episcleral veins using intracameral ICG dye injection. 0.5% ICG dye was injected intraoperatively into the anterior chamber near the implanted trabecular microbypass stents. Automated irrigation or manual injection of balanced salt solution was used to pressurize the eye after ICG injection.

Results

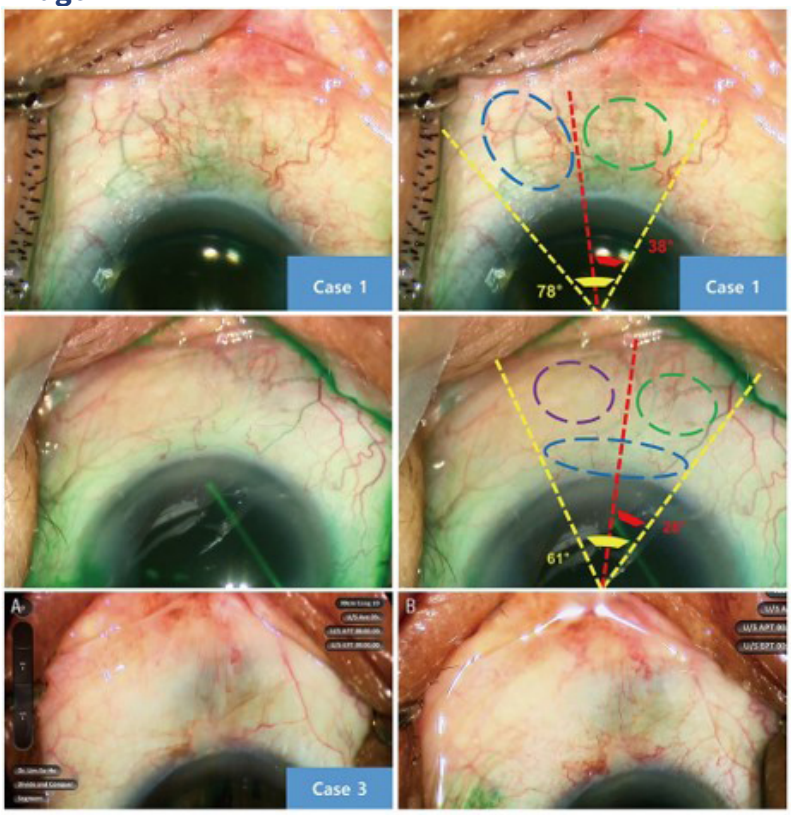
We confirmed the episcleral and intrascleral vein engorgement and aqueous egression with ICG in two of the three cases. Although one case did not demonstrate the ICG egression into episcleral vein, episcleral vein engorgement was observed immediately.

Case 1. Episcleral vessels near limbus with ICG dye are shown within 78 degrees (yellow dot lines). Transient staining to a deep portion of fornix (intrascleral vessels) was observed within 38 degrees (red dot line). The less stained area showed more engorged episcleral veins and denser vasculature at fornix (blue circle). The more highly stained area showed less engorged episcleral veins and sparse vasculature at fornix (green circle).

Case 2. Limbal and superficial episcleral vessels near the limbus with ICG dye were observed within 61 degrees (yellow dot lines, blue circle). Transient staining to the deep portion of the fornix can be seen within 28 degrees (red dot line). The avascular region shows minimal staining with ICG (purple circle) and the vascular region is more stained than avascular region (green circle). Note the lower intensity of ICG staining than that of Case 1.

Case 3. Video capture images of case 3 before (A) and after (B) indocyanine green (ICG) dye injection. Although the photograph did not demonstrate ICG dye stain or egression into the episcleral or intrascleral venous system, engorgement and congestion of episcleral veins are prominent compared to the preoperative photograph.

Image



Conclusions

To the best of our knowledge, this is first report using ICG dye to identify the aqueous outflow, especially trabeculocanalicular outflow during trabecular microbyapss stenting. Intracameral ICG dye injection might be safe and effective to identify aqueous outflow and Schlemm's canal stent patency during trabecular microbypass stents implantation.

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P-679

LONG-TERM EFFICACY AND SAFETY OF XEN45 GEL STENT IN PATIENTS WITH PIGMENTARY GLAUCOMA

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Purpose
The XEN45 gel stent is a microinvasive bleb-forming procedure for glaucoma treatment. Numerous studies have shown that XEN45 is an effective and safe surgical option in various types of glaucoma. However, the majority of studies included only patients with primary open-angle glaucoma or mixed glaucoma types. The goal of the current study was to evaluate the efficacy and safety of the XEN45 gel stent in the treatment of patients with pigmentary glaucoma.

Methods
This retrospective study included 26 eyes of 19 patients with pigmentary glaucoma who underwent XEN45 gel stent implantation between September 2016 and August 2020. Best corrected visual acuity (BCVA), intraocular pressure (IOP) and number of IOP lowering medications were assessed preoperatively, at 1, 2, 14 days, and at 3, 6, 12, and 24 months after surgery. Also, the rate and time points of postoperative bleb revision (needling) and the complication rates were analyzed.

Results
Mean preoperative IOP (27.6 ± 6.7 mmHg) was highly significantly reduced at 3 months (14.4 ± 5.5 mmHg; $p < 0.001$), 6 months (16.5 ± 4.7 mmHg; $p < 0.001$), 12 months (14.3 ± 4.6 mmHg; $p < 0.001$), and 24 months (15.1 ± 2.7 mmHg; $p < 0.001$) after surgery. BCVA decreased significantly from baseline (0.13 ± 0.26 logMAR) to 1 day (0.27 ± 026 logMAR; $p < 0.001$), 2 days (0.25 ± 0.26 logMAR; $p < 0.001$), and 14 days (0.20 ± 022 logMAR; $p = 0.047$) postoperatively. However, after 3, 6, 12, and 24 months BCVA was not significantly different compared to baseline ($p > 0.05$, respectively). The number of IOP lowering medications decreased significantly from 3.8 ± 0.6 preoperatively to 0.1 ± 0.4 after 1 year and 0.6 ± 1.0 after 2 years ($p < 0.001$, respectively). On average, 1.2 bleb revisions were required in 31.8 % of patients with a mean time to first needling of 10.3 ± 10.4 months.

Conclusions
The current study demonstrated that XEN45 gel stent is effective and safe in the treatment of patients with pigmentary glaucoma after two years.

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P-680

RETROSPECTIVE ANALYSIS OF THE SAFETY AND EFFICACY OF THE MINIJECT IMPLANT AT 3 MONTHS

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Purpose

In modern glaucoma treatment, Minimally Invasive Glaucoma Surgery (MIGS) offers an attractive alternative to traditional procedures such as trabeculectomy. With an ever expanding variety of MIGS devices on the market promising increased drop independence and lower intraocular pressures it is important to assess how these products perform in the real world. The MINIject implant is currently the only commercially available device targeting the supraciliary space. This retrospective single surgeon study aims to characterise intra- and post-operative efficacy and safety of the MINIject device to enrich discussion of device selection in MIGS.

Methods

Retrospective analysis of records at Colchester Hospital, UK, was performed to identify all MINIject cases performed by a single surgeon as a stand-alone procedure or combined with phacoemulsification, between March 2022 and November 2022. The primary outcome was measured as a reduction in intraocular pressure (IOP) from baseline. Secondary outcomes included reduction of drop dependence and incidence of adverse events.

Results

28 MINIject cases were identified where 26 were combined with phacoemulsification. The average number of drops reduced at 3 months compared to baseline were 1.67. There was a 23.5% reduction in intraocular pressure at 3 months. All cases were completed without intra-operative complications. Post-operatively microhyphaema was present in 10.7% of cases and gross hyphaema in 7.1% of cases.

Conclusions

The MINIject device safely delivers clinically significant reduction in IOP and drop burden. Varying degrees of hyphaemia may be seen in a minority of patients.

P-683

SHORT TERM OUTCOMES OF KAHOOK DUAL BLADE (KDB GLIDE) EXCISIONAL GONIOTOMY IN MEDICALLY TREATED PRIMARY AND SECONDARY GLAUCOMA-AN INITIAL EXPERIENCE

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Purpose
To evaluate the safety & efficacy of Kahook dual blade (KDB Glide) in reducing IOP & medication burden in glaucomatous patients with cataract surgery in medically treated primary and secondary glaucoma

Methods
Design - Prospective interventional case series conducted at a tertiary care institute in North India. Consecutive patients with glaucoma were enrolled in this study. Indications for glaucoma surgery included reduction of intraocular pressure (IOP) and reduction of medication burden. Clinical data included preoperative and postoperative IOP, number of AGMs, adverse events, and whether additional glaucoma surgery was required during follow-up period. Success was defined as ≥ 20% reduction of IOP from baseline or reduction of at least 1 AGM with no additional glaucoma surgery

Results
The cohort included 29 eyes. 5 patients were excluded due to inadequate follow-up. Post-op 3 months' data available for 13 patients. The average IOP of these 13 patients significantly decreased from 18.00 ± 6.07 mmHg (pre-op) to 13.69 ± 1.97 mmHg at 3 months followup (p-value = 0.025). The number of AGMs reduced from 2.62 ± 1.45 presurgery to 1.08 ± 1.04 (p value 0.005) at 3months followup. The overall rate of success was estimated to be 84.62% (95% CI: 65%-100%). No significant adverse events were noted postoperatively

Conclusions
This study concludes that goniotomy with KDB glide has good efficacy and safety in cases of glaucoma in terms of IOP control, reduction in AGMs, and low incidence of complications in North Indian population

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P-685

NOVEL RNA MODIFICATION SIGNALING AND ITS IMPLICATION IN GLAUCOMA PATHOPHYSIOLOGY

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Purpose

Post-transcriptional RNA modifications are ubiquitous, found in nearly all cellular RNA species. These modifications have multiple key roles in RNA quality control[1], including correct codon-anticodon base-pairing to promote efficient protein translation, although the exact role, especially in wound healing process after glaucoma filtration surgery (GFS), has yet to be discussed. The purpose of this study is to explore the role of RNA modification in the wound healing process after GFS using *in vitro* model.

Methods

Sample preparation for measurement of comprehensive RNA modifications using mass spec analysis was performed as described previously.[2] In vitro experimental wound healing model after GFS was performed as described previously.[3]

Results

Mitochondrial tRNA, but not cytosolic tRNA, is extensively impaired in *in vitro* model of wound healing after GFS both in quality of tRNA themselves and quality of tRNA modifications. In this model, TGF-β2 accelerates OXPHOS defects and rewires cellular metabolism. Finally, we found a compound which inhibits TGF-β2-induced fibrosis by improving both mitochondrial modifications and metabolic remodeling, at least partially.

Conclusions

Our findings illustrated unexpected properties of RNA modifications upon wound healing after GFS. RNA modifications may have therapeutic potential in glaucoma treatment, and therefore should be the subject of future studies.

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P-686

TREATMENT OUTCOMES OF BAERVELDT GLAUCOMA IMPLANTATION IN PATIENTS WITH NEOVASCULAR GLAUCOMA WITH VERSUS WITHOUT A HISTORY OF TRABECULECTOMY

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Purpose
To evaluate whether a history of trabeculectomy (TLE) affected the postoperative outcomes of patients who underwent Baerveldt glaucoma implantation (BGI) to treat neovascular glaucoma (NVG) secondary to proliferative diabetic retinopathy (PDR).

Methods
Patients who underwent BGI to treat NVG secondary to PDR between October 1, 2014 and December 31, 2021, at Kumamoto University Hospital were retrospectively evaluated. The postoperative outcomes were compared between patients with and without a TLE history. Kaplan-Meyer survival curves were used to assess the outcomes. Surgical success was defined as attainment of one of the following postoperative intraocular pressures (IOPs, mmHg): (A) $4 \leq IOP \leq 21$; (B) $4 \leq IOP \leq 18$; or (C) $4 \leq IOP \leq 15$ without loss of light perception or any additional glaucoma surgery.

Results
We enrolled 23 eyes of 23 patients with NVG secondary to PDR who underwent BGI. Ten eyes without a TLE history (Initial BGI group) and 13 eyes with a history of TLE (Secondary BGI group) were included. The preoperative IOPs were 35.6 ± 14.4 and 34.2 ± 10.6 mmHg and the 12-month postoperative IOPs were 14.9 ± 3.3 and 13.2 ± 5.0 mmHg, respectively; thus, they decreased significantly in both groups ($P = 0.005$, $P < 0.005$). The success rates assessed using Kaplan-Meyer survival curves of the Initial and Secondary groups in the first year were 100% vs. 83.3%, 70% vs. 50%, and 40% vs. 33.3% for criteria A, B, and C, respectively; they were 62.5% vs. 63.5%, 23.3% vs. 30%, and 0% vs. 22.2% in the second year. The probability of BGI success did not differ significantly between those with and without a history of TLE.

Conclusions
BGI to treat NVG secondary to PDR afforded postoperative results equivalent to those of initial BGI even with a history of TLE.

P-687

THREE YEAR SUCCESS RATES OF SURGICAL BLEB REVISION FOR EARLY BLEB SCARRING AFTER TRABECULECTOMY AT KOBE UNIVERSITY HOSPITAL

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Purpose

At Kobe University Hospital, we perform surgical bleb revision (SBR) with mitomycin C (MMC) instead of needling for elevated intraocular pressure (IOP) due to bleb scarring in the early postoperative period after trabeculectomy (TLE). The aim of this study is to report the outcomes of SBR.

Methods

We retrospectively reviewed the medical records of glaucoma patients aged > 18 who underwent SBR within 6 months of their first TLE with MMC from 2015 to 2019 at Kobe University Hospital and were able to be followed up for at least 3 years. We excluded SBR for leaking blebs, bleb infections, and SBR augmented with amniotic membrane. Success was defined as (1) IOP reduction of at least 20% from pre-TLE IOP, (2) 5 ≤ IOP ≤ 18 mmHg, (3) no additional glaucoma surgery, and (4) no loss of light perception. A complete success (CS) was considered when all of the above (1) through (4) were met, and a qualified success (QS) when (1), (3), and (4) were met.

Results

Fifty nine eyes of 59 subjects (median age 67 years) were analyzed. The types of glaucoma were primary open-angle glaucoma in 28 patients, secondary glaucoma in 26, infantile glaucoma in 3 and primary angle closure glaucoma in 2. The median interval from initial TLE to SBR was 2 months. Median (interquartile range) IOP and the number of glaucoma medications used decreased significantly after SBR, from 25 (21-34) mmHg to 13 (10.3-16.0) mmHg ($P < 0.01$) and from 4 (2-5) to 3 (1-4) ($P = 0.03$), respectively. The rates of QS were 71%, 70% and 66% at 1, 2 and 3 years after SBR, respectively. The CS rates were 61% at 1,2 and 3 years. Seventeen eyes required additional glaucoma surgeries. None of the eyes lost light perception. Postoperatively, four eyes showed hypotony and one showed temporary

decreased vision due to hemorrhage, but all resolved spontaneously. No significant difference in age, pre-TLE IOP, the number of preoperative medications, or interval from TLE to SBR was found between the success and failure groups. However, the failure group exhibited significant higher pre-SBR IOPs than the success group.

Conclusions

Overall, SBR for early bleb scarring after TLE is safe and effective until three years postoperatively.

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P-688

STEROIDS AND/OR NSAIDS AS POSTOPERATIVE TREATMENT AFTER TRABECULECTOMY – 12 MONTH RESULTS OF A RANDOMIZED CONTROLLED TRIAL

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Purpose
To compare the efficacy and safety of topical preservative-free diclofenac (DICLO) to dexamethasone (DEX) eyedrops and their combination (DEX+DICLO) after trabeculectomy.

Methods
Sixty-nine patients with medically uncontrolled glaucoma were randomized to receive topical postoperative treatment with DICLO (n=23), DEX (n=23), or a combination of DEX and DICLO (n=23) following trabeculectomy. The primary outcome was the intraocular pressure 12 months postoperatively. Secondary outcomes included surgical success, failure, visual field, and visual acuity from baseline to 12 months postoperatively.

Results
IOP reached the lowest point one day after trabeculectomy. At 12 months, IOP remained significantly reduced at 10.0 mmHg (95% CI, 8.4-11.6 mmHg) for DICLO, 10.9 mmHg (95% CI,9.4-12.3 mmHg) for DEX, and 11.2 mmHg (95% CI, 9.1-13.3 mmHg) for DEX+DICLO compared to before the surgical intervention. There were no significant differences in IOP, surgical success, failure, visual field, or visual acuity between DICLO, DEX, or DEX+DICLO groups.

Conclusions
We found that topical diclofenac was not statistically different from topical dexamethasone in controlling IOP 12 months after trabeculectomy. All 3 postoperative treatments were associated with the stabilization of visual field defects. Combining diclofenac and dexamethasone offered no added IOP control compared to dexamethasone alone.

P-689

LONG-TERM EFFICACY OF HIGH-FREQUENCY DEEP SCLERECTOMY AS STAND-ALONE PROCEDURE AND COMBINED WITH CATARACT EXTRACTION IN OPEN ANGLE GLAUCOMA PATIENTS

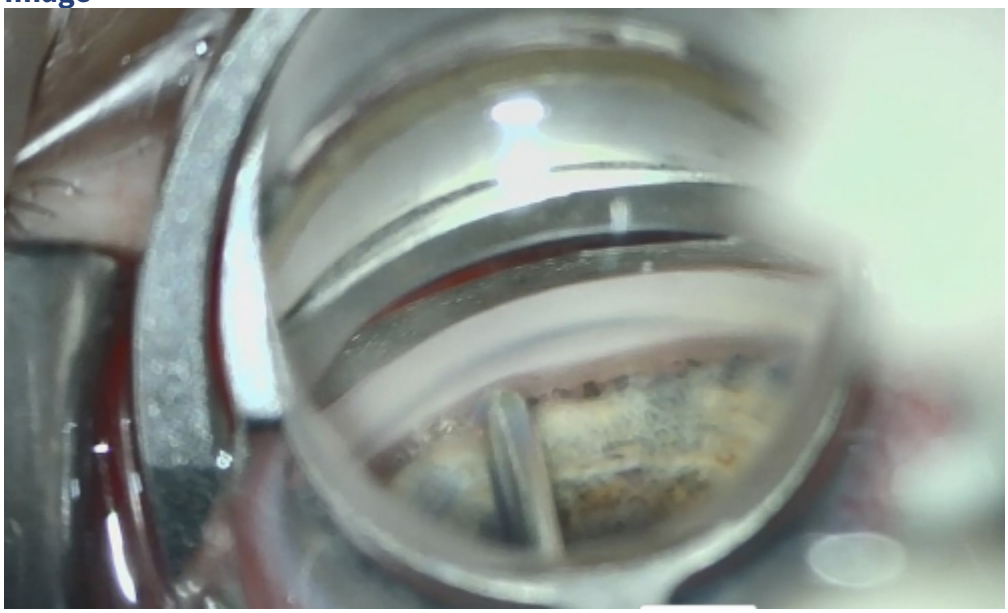
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Purpose
The aim of this study was to evaluate long-term hypotensive efficacy of high frequency deep sclerectomy (HFDS) in patients with open angle glaucoma (OAG). Besides the introaocular pressure (IOP) we also evaluated the number of antiglaucoma medications taken by the studied subjects. The study group was divided into 2 subgroups: with HFDS as a stand-alone procedure and HFDS combined with cataract surgery (Phaco-HFDS)

Methods
49 eyes were included in this study (43 patients, 28 F, 15 M). Main inclusion criteria: previously diagnosed OAG, age>18 y; main exlusion criteria: any previous ocular surgeries, existance of any serious eye diseases apart OAG. HFDS subgroup: 15 eyes (13 subjects); mean age 72,67+/-8,59; mean follow-up: 4,13+/-6,23 mths (1-24 mths). Phaco-HFDS subgroup: 34 eyes (30 subjects): mean age 73,09+/-8,31; mean follow-up: 5,65+/-4,90 mths (1-24 mths). All IOP measurements were performed by GAT at 9.00 am

Results
HFDS subgroup: mean IOP at baseline: 22,93+/-10,13 mmHg (12-44 mmHg) and in the follow-up: 21,47+/-10,03 mmHg (13-44 mmHg). In the observation period values at baseline and during follow-up were not singifically different; p=0,67 (Wilcoxon paired test). Mean number of antiglaucoma meds at baseline: 2,87+/-0,99 (1-4) and in the follow-up:1,80+/-1,15 (0-4). In the follow-up number of antiglaucoma drugs comparing to baseline was significantly lower; p=0,01 (Wilcoxon paired test). Phaco-HFDS subgroup: mean IOP at baseline: 17,91+/-5,53 mmHg (16-31 mmHg) and in the follow-up period: 15,56+/-4,34 mmHg (13-44 mmHg). In the follow-up period IOP values comparing to baseline were singifically lower; p=0,03 (t-test for related samples). Mean number of antiglaucoma meds at baseline:2,41+/-1,13 (1-4) and in the follow-up period:1,06+/-1,10 (0-4). In the follow-up the number of antiglaucoma drugs comparing to baseline was significantly lower; p=0,001 (Wilcoxon paired test).

Image



Conclusions

High frequency deep sclerectomy (HFDS) is a new minimally invasive glaucoma surgery techinique which may be used as an alternative to classic trabeculectomy both as the stand-alone procedure and combined with phacoemulsification cataract surgery in open angle glaucoma patients. In both cases it significantly reduced the number of used antiglaucoma medications and lowered the intraocular pressure. However, in our study the signicficant IOP reduction was found only in subgroup of HFDS combined with phaco. This study is being continued and the further results will by subsequently presented.

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P-690

TWO-YEAR CLINICAL EXPERIENCE OF THE GONIOSCOPY-ASSISTED TRANSLUMINAL TRABECULOTOMY SURGERY IN HISPANIC PATIENTS WITH GLAUCOMA

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Purpose

Retrospectively determine the effect of Gonioscopy-asssisted transluminal trabeculotomy (GATT) on intraocular pressure (IOP) values of patients undergoing this procedure in an ophthalmology national referral center.

Methods

retrospective, longitudinal, observational, and descriptive case series of patients with any type of glaucoma that underwent GATT surgery as a stand alone or combined procedure in the period between 2019 and 2022 with a minimum follow-up of three months. Data about: type of glaucoma, intraocular pressure values, best corrected visual acuity, number of glaucoma medications, visual field values (mean deviation and visual field index) were collected preoperatively and postoperatively at day 1, week 1 and months 3, 6, 9, 12 and 18 months. Trans-surgical values such as: type of surgeon, surgical characteristics (*e.g.* treatment extension) and trans-surgical complications were obtained cross-sectionally. Failure criteria were defined as IOP > 22 mmHg, organ loss as well as reoperation; success was divided into complete and qualified. Kaplan-Meier survival curves were prepared for the analysis.

Results

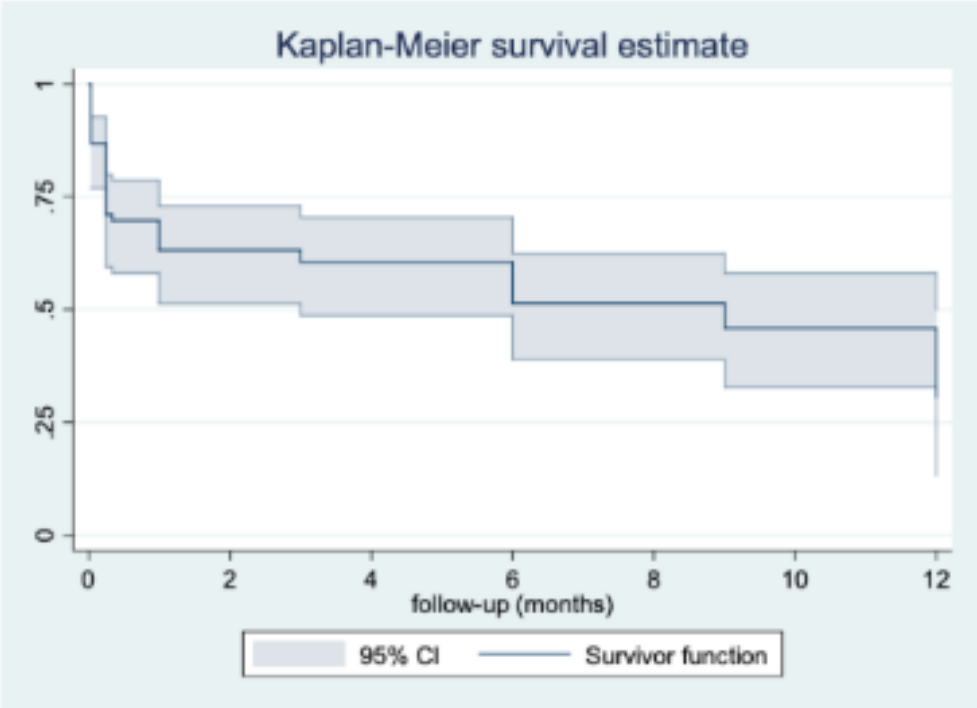
243 eyes of 207 patients were included with a mean follow-up of 8.9 ± 2.5 (range 3-18) months. Most of them were female (n= 112, 54%) and had a mean age of 58.8 ± 24 years (range 5 -90 years). 103 eyes (42.6%) had primary open-angle glaucoma (POAG), 94 (38.9%) had secondary open-angle glaucoma (SOAG) and, 45 (18.5%) had childhood glaucoma (ChG). Pre-surgical IOP was greatest in ChG having 21.8 ± 6.5 mmHg (vs 14.3 ± 2.7 in POAG and 20.3 ± 9.4 in SOAG). GATT was performed as a stand-alone procedure in 109 (45%) eyes, and in combination with phacoemulsification in 120 (49.4%) eyes; 12 (5.2%) eyes underwent a MIGS plus procedure. In 67.1% of the cases >180° were treated. 24 (11%) eyes had transoperative complications. The cumulative complete success rate at 18 months was 31.5% (95% CI: 13.3-49.9%), with a median survival of 8 months. Patients with POAG had a better outcome (48.8%, 95% CI [17.7-74.3%]) but there was no statistical difference among the groups. Qualified success at 18 months was 71% (95% CI: 32.9-90%) with no statistical difference among the groups.

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Image



Conclusions

GATT is relatively safe and effective in treating various forms of open-angle glaucoma. These results in Hispanic patients are equivalent to those previously reported for other ethnicities.

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P-692

AN EVALUATION OF A NOVEL "AB INTERNO BLEB REVISION" TECHNIQUE IN THE MANAGEMENT OF FAILED TRABECULECTOMY BLEB

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Purpose
To study the safety and efficacy of the "Ab Interno Bleb Revision" (AIBR) technique to manage failed trabeculectomy blebs.

Methods
This prospective interventional case series study included primary and secondary glaucoma patients with failed trabeculectomy blebs and patent sclerostomies. 5 days prior to surgery, a subconjunctival injection of the antimetabolite agent Mitomycin C 0.1 mg/ml was given, followed by bleb revision with an ab interno approach using Grover and Fellman sclerostomy spatulas. Intraoperatively, blunt dissection of sub-scleral and sub-conjunctival adhesions was performed, and bleb formation was noted.Patients were evaluated on postoperative days 1, 7, 1 month, 3 months, and 6 months. At every visit, IOP, the number of anti-glaucoma medications, visual acuity, any complications, and interventions were recorded.

Results
A total of 24 eyes from 23 patients were studied. The mean age of failed trabeculectomy blebs was 5.35 ± 5.4 years. The preoperative mean IOP was 23.54 ±10.7 mmHg, and the antiglaucoma medications were 3.72 ± 0.65, respectively, which decreased to 15.52 ±5.05 (p = 0.002) and 1.15 ± 1.08 (p =.00001) at 6 months' follow-up. Complete success was seen in 8 (33%), qualified success in 11 (45%), and failure (IOP > 21 mmHg) in 5 (20%) patients. Hyphaema was the most common complication that occurred in 5 patients (23%). A conjunctival buttonhole and microleak were noted in one patient, which spontaneously sealed within one week. No incidence of hypotony or choroidal detachment was noted.

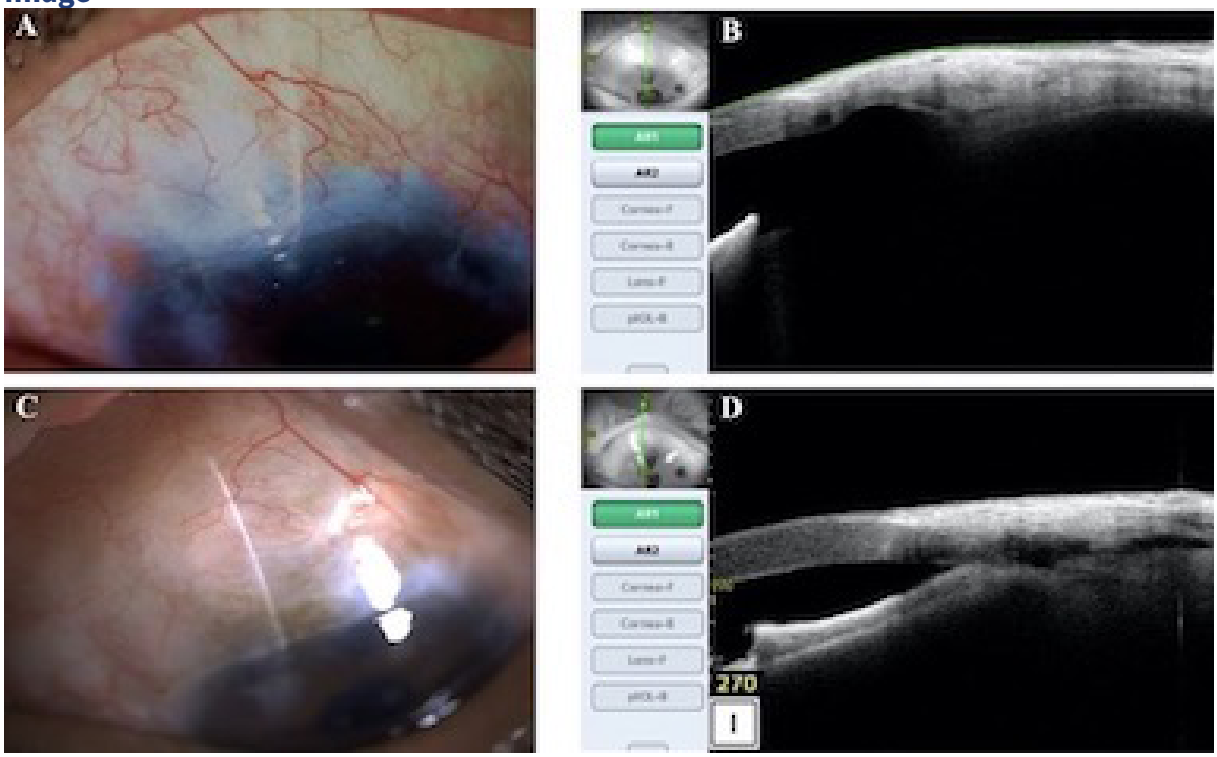
Figure caption: (A) Clinical image of a patient with failed trabeculectomy blebs superiorly and supero-nasally; (B) ASOCT image through the scarred bleb demonstrating no fluid under the flap, indicating sub-scleral flap fibrosis; (C) A well-filtrated superior trabeculectomy bleb post-AIBR and corresponding ASOCT image (D) showing fluid underneath the scleral flap (post-operative 1 year follow-up).

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Image



Conclusions

AIBR technique is found to be a safe, effective and minimally invasive surgery with faster recovery, obviating external reopening of conjunctival and scleral flap.

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P-693

EFFECTS OF THE POSTOPERATIVE RESTRICTIVE MANAGEMENT AND EFFICACY OF THE BAERVELDT 350 IMPLANT AFTER 12 MONTHS FOLLOW-UP

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Purpose

To evaluate the clinical results of Baerveldt 350 drainage device implantation when different restrictive techniques are used to avoid postoperative hypotrophy.

Methods

A retrospective observational study of 71 consecutive eyes that had a Baerveldt 350 implanted between 2009 and 2021 in a clinical setting in Barcelona, Spain. 50 eyes had 6 or 7/0 polyglactin tube ligation (ligature group=LG) and 21 eyes had a 3/0 polypropylene intraluminal tear cord 3/0 added to the ligation (ripcord-ligature group = RLG), which was manually removed at the surgeon's discretion after spontaneous opening of the polyglactin. Fig. 1 Intraocular pressure (IOP) and ocular hypotensive medication (OHM) lowering, failure rate, complete and partial success (CS and PS) and presence of hypertensive phase (HP) were analyzed. Statistical analysis was performed using the Mann-Whitney U test, Pearson's Chi-square test and univariate logistic model using SPSS version 23.0.

Results

The mean preoperative IOP was 26.14(11.34) mmHg with 2.98 OHM for the LG and 28(8.76) mmHg with 3.35 OHM for the RLG (p=0.545 and p=0.397). At the end of the follow-up, the mean postoperative IOP was 13.35(3.87) mmHg for the LG and 10.81(2.66) mmHg for the RLG (p=0.01). The mean reduction of OHM was 2.25(1.38) for the LG and 2.81(1.6) for the RLG (p=0.168). HP was noted in 26 patients (37.14%), 25 of them took place in the LG (50%), however only 1 took place in the RLG (5%) (p=0.00023). 35% of the patients that showed HP, presented with a complete success, compared to a 67.7% of the patients that did not show HP (p=0.022). Fig. 2 The survival analysis for a 12 months follow-up period, showed that the estimate survival time for the LG was 10.97 (±0.521), and 11.64 (±0.342) for the RLG (p=0.216). Fig. 3 Logistic Univariate Analysis identified two predictors of CS: age of the patient before surgery (OR 0.157; 95% CI 0.029–0.865; p=0.033) and the presence of HP (OR 3.90; 95% CI 1.189–12.794; p=0.025).

Image

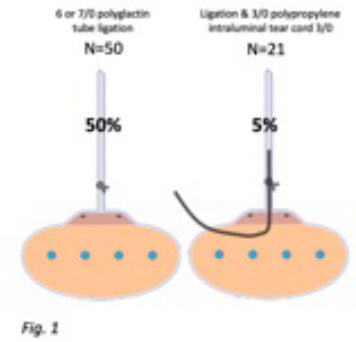


Fig. 1

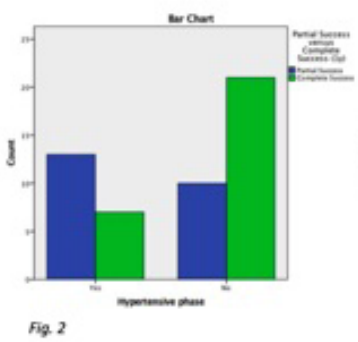


Fig. 2

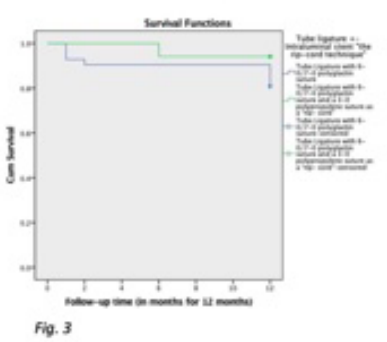


Fig. 3

Conclusions

Baerveldt 350 drainage device implantation has proven to be an effective hypotensive surgery. The use of the ripcord added to the absorbable ligature was associated with less risk of HP, and with better IOP results at the 12-months follow-up. Nevertheless, further research with larger population and larger follow-up is needed to obtain robust results.

P-694

ONE YEAR OUTCOMES OF THE PAUL GLAUCOMA IMPLANT IN COMPARISON TO THE BAERVELDT GLAUCOMA IMPLANT FOR GLAUCOMA

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Purpose
To compare the one year outcomes of the PAUL glaucoma drainage implant (PGI; Advanced Ophthalmic Innovations, Singapore, Republic of Singapore) and the Baerveldt glaucoma drainage implant (BGI; Abbott Medical Optics, Inc, Santa Ana, CA) for patients with uncontrolled glaucoma after one year of follow-up.

Methods
Historical comparison study comparing outcomes of consecutive eyes that underwent BGI or PGI implantations at a single tertiary referral centre (University Eye Clinic Maastricht, the Netherlands). Follow-up took place at day one, week one and one, three, six, and twelve months postoperatively. Primary outcomes were intraocular pressure (IOP) and the number of IOP-lowering medications. Secondary outcomes (visual acuity, reoperation rates, and safety) were also evaluated.

Results
One hundred eighty-one eyes (N=90 in the PGI group, and N=91 in the BGI group) were studied. In both groups, the majority had advanced or severe glaucoma based on the visual field examination. Diagnoses included primary open angle glaucoma, uveitic glaucoma, and other forms of secondary glaucoma. In the PGI group, 23% underwent previous filtration surgery versus 32% in the BGI group (p=0.20). In the BGI group, the baseline IOP was higher (p=0.01), and more eyes with uveitic glaucoma were included in this group (18% in the PGI group and 32% in the BGI group (p=0.03)). At baseline, mean±SD IOP was 23.2±8.5 with 3.5±1.3 medications and 26.6±9.0 mmHg with 3.6±1.3 medications in the PGI and the BGI group, respectively. At day one and week one, IOP was 10.5±8.7 and 11.7±6.2 mmHg in the PGI group and 16.8±12.4 and 13.9±6.8 mmHg in the BGI group (p<0.05). One year after surgery mean IOP was 10.8±2.9 and 10.7±3.2 mmHg in the PGI and the BGI group, respectively (p=0.84). IOP-lowering medication decreased to 1.5±1.3 in the PGI group and 1.7±1.3 in the BGI group at 12 months (p=0.32). Regarding safety, kissing choroidal detachment occurred in one (vitrectomized) eye in the PGI group versus three cases in the BGI group, and in three and four eyes exposure of the implant occurred requiring removal, in the PGI and the BGI group, respectively (p>0.05).

Conclusions
Both PGI and BGI implants were effective in lowering IOP and reducing the need for IOP-lowering medications after one year. Lower IOP with fewer IOP-lowering medications were obtained in the PGI group in the early postoperative period. However, no differences in IOP or IOP-lowering medications were found after one year.

P-696

OUTCOMES OF TRABECTOME AND PHACO-TRABECTOME BY A GLAUCOMA SEVERITY INDEX IN MEXICAN POPULATION

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Purpose
To report the results of phacoemulsification combined with trabectome and trabectome alone in patients with different types and degrees of glaucoma in a reference center in Mexico using a Glaucoma Severity Index.

Methods
An ambispective analysis of glaucoma patients who underwent trabectome or phacoemulsification plus trabectome and who had a follow-up of at least 6 months was carried. The patients were classified into four groups according to a glaucoma severity index (GSI) that considers preoperative intraocular pressure (IOP), number of glaucoma medications and degree of damage according to visual field (VF). The main result after surgery was the degree of IOP reduction and its relation to the GSI.

Results
124 eyes of 197 patients were studied, of which, 22 underwent trabectome surgery alone and 102 phacoemulsification plus trabectome. Mean age of patients was 71.12 ± 13.54 years. Fourty-three patients were male and 64 were female. Mean follow up time was 28.23 ± 18.74 months. Mean preoperative intraocular pressure was 17.11 ± 6.45mmHg. The average number of preoperative medications was 2.37 ± 1.17. Groups were classified as follows: GSI I (mild glaucoma) consisted of 50 eyes, GSI II (moderate) had 30 eyes, GSI III (advanced) 30 eyes and GSI IV (severe) had 14 eyes. IOP was significantly reduced at last follow-up in all groups. IOP reduction in GSI I at up to 60 months post-operative was 15%, in GSI II IOP reduction was 24%, GSI III didn't gather enough data for the 60-month checkpoint, and GSI IV showed a 63% IOP reduction. Comparing IOP among groups at different ponints in time, there were no statistically significant differences, which suggests that all groups remained within a similar range of IOP, this was confirmed by post-hoc analysis.

Conclusions
A significant reduction in IOP was observed all four groups. This data suggests that ab interno ablation of the trabecular meshwork may be indicated for primary and secondary open-angle glaucoma with mild to moderate and even severe damage taking into account GSI, expecting long-term efficacy.

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P-697

OCT ANGIOGRAPHY CHANGES IN THE FOVEAL AVASCULAR ZONE AREA AFTER GLAUCOMA SURGERY

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Purpose

to evaluate quantitative changes in the foveal avascular zone (FAZ) area and its association with intraocular pressure changes after glaucoma surgery using spectral domain optical coherence tomography angiography (SD-OCTA).

Methods

This prospective study was done in subjects diagnosed as Primary open angle glaucoma and primary angle closure glaucoma who underwent trabeculectomy and phacotrabeculectomy in the year 2022- 2023. OCTA of macula was assessed before and after 3 months of trabeculectomy. Two blinded examiners reviewed the image quality. Comparisons of the FAZ area and correlation with age, IOP, central sensitivity and clinical variables were assessed.

Results

Seventeen subjects were included in the study of which 2 had lost follow up. The mean age (± SD) was 67.4±10.2 years. After surgery, IOP significantly decreased from 24.47±7.1 mmHg to 15.25± 1.9 mm Hg ($p<0.001$). The mean values of superficial venous plexuses of the FAZ preoperatively were 0.6±0.1 mm^2 and postoperatively was 0.5±0.1 mm^2 ($p = 0.121$). However, there is a significant difference in the mean values of deep venous plexuses of the FAZ 0.6±0.1 mm^2 and 0.5±0.09 mm^2 ($p=0.005$). Change in the FAZ area significantly correlated with preoperative FAZ area and change in IOP ($p<0.05$).

Conclusions

The FAZ area is decreased and the perifoveal microcirculation is enhanced after trabeculectomy surgery and the change in FAZ area significantly correlated with both preoperative FAZ and change in IOP.

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P-698

RISK FACTORS FOR AHMED VALVE TUBE EXPOSURE: SINGLE-CENTER EXPERIENCE

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Purpose
Glaucoma Drainage Devices (GDD) are a frequent surgical approach to refractory glaucoma. Tube or valve plate exposure constitutes a major late complication due to the potential risk of endophthalmitis (incidence around 2.0±2.6%[1]). This study aimed to describe a tertiary center experience with GDD exposure, evaluating possible risk factors and their subsequent outcome in terms of re-exposure.

Methods
A retrospective analysis of eyes from adult patients diagnosed with GDD exposure during the period 2009–2022 was performed. Demographic data, past ocular history, pre and post-operative information including surgical technique, method of exposure repair and frequency of re-exposure were recorded.

Results
We included 20 eyes from 19 patients with GDD exposure from a total of 634 GDD surgeries performed in the considered period (incidence 3,1%; all surgeries conducted with FP7 Ahmed Glaucoma Valve). Regarding type of glaucoma, 6 eyes had primary open angle glaucoma, 1 primary angle closure glaucoma, 1 congenital, 1 neovascular, 1 inflammatory, 3 pseudoexfoliative, 4 with glaucoma after intraocular silicon oil and 3 had other causes. The average time to exposure after GDD implantation was 33,1±29,5 months. The mean age at exposure was 63±19,6 years old. All patients were Caucasian. Diabetes Mellitus and high blood pressure were the most common systemic comorbidities. No patients had an autoimmune or collagen vascular disorder. Nine eyes had some type of ocular inflammation before GDD implantation (including uveitis, blepharitis, and dry eye syndrome). The number of previous surgeries was 1,95±2,0. The mean time of corticosteroid use post-GDD implant was 13,6±17,9 months. The methods of repair after the first tube exposure were Tutopatch® graft and conjunctival advancement (CA) (n=17); amniotic membrane and CA (n=1); corneal graft and CA (n=2). Eleven eyes had a second re-exposure and 4 eyes had a third re-exposure. Two GDDs were removed after the fourth re-exposure. These 2 cases presented a higher number of previous ocular surgeries (≥4) and ocular inflammation, in the form of chronic endophthalmitis and long-term inflammation after trauma.

Conclusions
The GDD exposure rates at our institution are consistent with other reports. It seems to affect all types of glaucoma. The number of previous surgeries and ocular inflammation are possible risk factors for tube exposure, although bigger cohorts (ideally multicentric) are needed to confirm these findings.

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P-699

VISUAL OUTCOMES OF EXTENDED DEPTH OF FOCUS INTRAOCULAR LENS IN PHACOTRABECULECTOMY IN PATIENTS WITH CATARACT AND PSEUDOEXFOLIATION GLAUCOMA

Y Razhko

Purpose

to evaluate effectiveness extended depth of focus (EDOF) intraocular lens (IOL) LuxSmart (Bausch+Lomb) compared with monofocal IOL Akreos Adapt AO (Bausch+Lomb) in phacotrabeculectomy in patients with pseudoexfoliation glaucoma (PEG).

Methods

Prospective, randomized study with inclusion and exclusion criteria was conducted in 2021-2022. Of the 59 patients (59 eyes) with PEG enrolled, 28 (47.5%) were implanted with the LuxSmart IOL and 31 patients (52.5%) with the Akreos Adapt IOL. Patient demographics, preoperative intraocular pressure (IOP), glaucomatous optic nerve damage, visual field loss, angle anatomy, and anterior chamber depth were similar between the groups.

Uncorrected distance visual acuities (UDVA), uncorrected intermediate visual acuities (UIVA) and uncorrected near visual acuities (UNVA) were tested.

Results

No statistically significant difference for mean of IOP and number of glaucoma medications was found between groups. The median IOP values decreased postoperatively by 2.9 mmHg and 3.1 mmHg.

At the 6-month follow-up, the groups demonstrated similar mean UDVA. Differences UNVA between groups were statistically and clinically significant, with a larger proportion (>50%) of the patients implanted with YSMART IOL. The postoperative UIVA were significantly better for YSMART IOL ($p<0.01$).

No difference was found between groups for mean target spherical equivalent and mean spherical equivalent ($p>0.05$). The median values of contrast sensitivity were not statistically different at 1.5 and 3.0 cycles per degree under either mesopic or mesopic with glare lighting conditions.

Eyeglasses wear was significantly lower for patients receiving the YSMART IOL ($p< 0.01$).

Conclusions

Clinical results at least 6 months after phacotrabeculectomy showed that EDoF IOL LuxSmart provides patients with improved uncorrected intermediate and near visual acuity, comparable distance visual acuity, increased depth of focus and less use of glasses compared to the monofocal control IOL in patients with pseudoexfoliation glaucoma. It was established that the PEG is not an exclusion criterion for the implantation of a new design IOL.

P-700

6 MONTHS OUTCOMES OF AB-EXTERNO OPEN CONJUNCTIVA XEN GEL STENT IN OPEN ANGLE GLAUCOMA PATIENTS

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Purpose

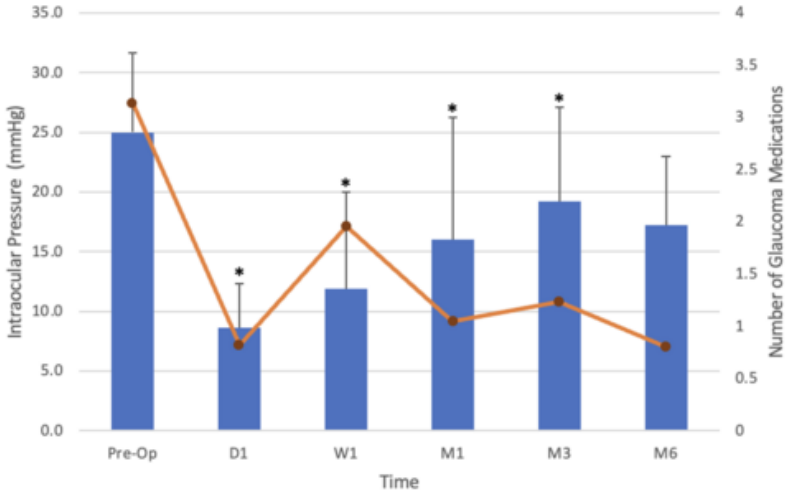
The purpose of this study is to evaluate the safety and efficacy of an open conjunctival approach for ab-externo XEN 45 gel stent implantation at 6 months. Our study utilized higher dose Mitomycin C by sponge (0.5mg x 2 min) decrease early fibrosis, a 30g needle to create a scleral tract to prevent early hypotony, and a double-layer closure of the tenon and conjunctival layer to prevent posterior stent blockage.

Methods

This retrospective, single-arm study evaluated patient demographics, diagnoses, pre- and postoperative data, outcome measures, and complications in 22 eyes (20 patients) who underwent an XEN 45 gel stent implantation in ab-externo open-conjunctival approach between November 2021 and November 2022. Follow-up assessments were conducted at 1 day, 1 week, 1 month, 3 months, and 6 months. Qualified surgical success was defined as an IOP at 6 months less than or equal to the target IOP. Complete surgical success was defined as an IOP at 6 months less than or equal to the target IOP and no glaucoma medications. Treatment with any secondary surgical intervention was regarded as a failure, with the exception of laser and in-clinic needling procedures. Paired t-tests were used to compare baseline and postoperative values. Kaplan–Meier event-free survival curve was used to calculate cumulative probability of success. All calculations were conducted using STATA version 14.1.

Results

The average age of the patients was 68.0 ± 10.3 years, of which 50% (n=10) were female. 72% of the eyes had prior glaucoma surgery. Preoperatively, the mean IOP was 25.0 ± 6.7 mmHg and the mean glaucoma medications was 3.1 ± 1.5. At 6 months postoperatively, IOP was reduced to 17.2 ± 5.8 (31.2% reduction, p=0.013) and the mean number of glaucoma medications was also reduced to 0.8 ± 1.4 (p<0.01). Complete success was achieved in 59.1% and partial success was achieved in 66.7% of the eyes at 6 months. Complications observed included cystoid macular edema (n=2) and hyphema (n=1). No patients had hypotony or related complications. Needling rate within 6 months was 22.7% (n=5), with a mean time to needling of 10.1 weeks. SSI included second XEN (n=2) and Ahmed valve implant (n=1).



Image

Conclusions

An ab-externo open conjunctival approach for XEN 45 gel stent implantation appears to be a safe and efficacious procedure with higher rate of success and lower rate of needling and secondary interventions compared to those reported for ab-interno or ab-externo closed conjunctival approach [3,4].

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P-701

SURGICAL OUTCOMES OF AHMED GLAUCOMA VALVE AND AUROLAB AQUEOUS DRAINAGE IMPLANT IN NEPALESE EYES: COMPARISON IN THE FIRST YEAR

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Purpose

To compare the surgical outcomes of Ahmed glaucoma valve (AGV) and Aurolab aqueous drainage implant (AADI) in cases of refractory glaucoma in Nepalese eyes.

Methods

We retrospectively studied patients with refractory glaucoma who underwent either AGV or AADI implantation. Patients were divided into two groups depending on the implanted glaucoma drainage device (GDD): AGV group and AADI group. The outcome measures of the study were intraocular pressure (IOP), requirement of anti-glaucoma medications (AGMs), surgical success and complications.

Results

There were 24 eyes of 23 patients in AGV group and 31 eyes of 30 patients in AADI group with a median (quartiles) follow-up time of 12 (12,12) months. Final IOP and AGMs were both significantly lower than the baseline in both the groups ($p<0.001$). The final median (quartiles) IOP in mmHg {AGV: 16.5(16,18) vs. AADI: 16(14.0,16.0)} and AGMs {AGV: 2(0,2) vs. AADI: 0(0,1)} were both significantly lower in AADI group compared to AGV group, $p<0.001$ and $p=0.002$, respectively. At the final visit, overall success was similar in both the groups: AGV (91.67%) and AADI (93.55%), $p=1.0$. However, complete success was significantly higher in AADI group (51.61%) compared to AGV group (25%), $p=0.046$. Complications and their rates were comparable between the groups ($p=0.4$).

Conclusions

Both AGV and AADI safely and effectively reduced IOP and the number of AGMs in Nepalese eyes with refractory glaucoma.

P-702

PHACO-XEN45 SURGERY FOR THE TREATMENT OF UNCONTROLLED OPEN-ANGLE GLAUCOMA PATIENTS WITH CONCOMITANT CATARACT: 5-YEAR RESULTS

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Purpose
to assess effectiveness and safety of ab-interno Xen45 gel implant combined with phacoemulsification (phaco-xen45 surgery) in uncontrolled open-angle glaucoma patients with concomitant cataract

Methods
retrospective analysis on consecutive patients operated with Phaco-Xen45 surgery from 2017 to 2022. Eyes with uncontrolled open angle glaucoma and concomitant cataract were included. All surgeries were performed by the same surgeon (RGC). Phacoemulsification was done with standard technique and temporal access. Xen45 gel implant was inserted ab-interno in the supero-nasal quadrant after sub-tenon injection of 1 ml of 0.02% MMC Primary outcome was success defined as IOP equal or below 15 mmHg and considered at target without additional laser or surgery, with (qualified success) or without (complete success) medical therapy. Kaplan Meyer survival analysis was used to calculate success rates.

Results
148 eyes of 139 patients were operated, 25 were excluded (4 were lost at follow-up and 21 had follow-up shorter than 12 months). Analysis was therefore performed on 123 eyes. Follow-up ranged from 12 to 60 months. Mean IOP (SD) decreased from 20.8 (7.2) mmHg to 12.5 (4.5) and mean (SD) number of medications decreased from 3.4 (1.0) to 0.8 (1.2). Both changes from baseline were statistically significant (p<.005). Complete and qualified success at 60 months was 51% and 81% respectively. Eighteen eyes were defined as failures (5 had IOP > 15 mmHg despite mediucal therapy, 11 underwent additional glaucoma surgery, 2 had a surgical bleb revision). Seventy eyes had 1 or more 5-fluorouracil needlings during follow-up. Complications were intraoperative bleeding (39%), stent-iris contact (3.2%), self-resolved peripheral choroidal detachment (3.2%), shunt exposure (1.6%).

Conclusions
ab-interno Xen45 gel implant combined to phacoemulsification is an effective and safe surgical procedure to control IOP in uncontrolled open-angle glaucoma patients with concomitant cataract.

P-703

IMPLANTATION OF EXTENDED DEPTH-OF-FOCUS INTRAOCULAR LENSES IN PRIMARY OPEN-ANGLE GLAUCOMA EYES: LONG-TERM OBSERVATION OF 3 CASES

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Purpose

The presbyopia correcting intraocular lens (IOL) is recommended to be implanted with caution in cases with glaucoma, due to the impact of IOL on contrast sensitivity (CS) and long-term worsening of glaucoma. The recently developed extended depth-of-focus (EDF) IOLs have little effect on CS, and we reviewed the cases of primary open-angle glaucoma (POAG) in which EDF IOLs were implanted and followed up more than 3 years.

Methods

In this case series, we report 3 patients who bilaterally received diffractive EDF IOLs (ZXR00V, ZXW150-375: J&J Vision), and their postoperative uncorrected visual acuities (UCVAs), CS, intraocular pressure (IOP), and visual field (VF).

Results

Case 1 was a 64-year-old female with early stage POAG and treated with IOP-lowering eye drops in both eyes. LogMAR UCVA was -0.18 (5 m) and -0.08 (50cm) at 3 years postoperatively. Epiretinal membrane (ERM) occurred in right eye and CS decreased. Another IOP-lowering eye drop was added at 3 years postoperatively due to decreased MD value. No subjective visual phenomena were reported and spectacle independence was achieved. Case 2 was a 62-year-old male with early-stage POAG in the right eye and severe-stage POAG in the left eye. An IOP-lowering medication was used. At 4 years postoperatively, good UCVAs at 5m and 50cm were maintained. ERM occurred in the left eye and CS decreased. In the VF of left eye, paracentral drifting appeared at 3 months postoperatively, which did not progress thereafter. Spectacles were used to read fine prints. Case 3 was a 67-year-old man with early-stage POAG in the right eye, and moderate-stage POAG and ERM in the left eye. At 3 years postoperatively, UCVAs at 50 cm and CS were decreased. MD value of the right eye decreased to 1.58 dB immediately after the surgery and kept the same level thereafter. He only needed spectacles to read fine prints. Driving at night was avoided due to glare and halos.

Conclusions

Three cases of POAG maintained good distance UCVA and spectacle independency at 3 years after the implantation of EDF IOLs. ERM occurred in 3 eyes, which seemed to influence on CS.

P-704

AHMED CLEARPATH® 250 MM2: A PORTUGUESE TERTIARY CENTER EXPERIENCE

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Purpose

To describe the surgical technique and present the clinical outcomes in efficacy and safety of the Ahmed ClearPath® 250 mm^2.

Methods

Single-center retrospective study of uncontrolled glaucoma eyes undergoing Ahmed ClearPath® 250 mm^2 implant, as a standalone procedure or in combination with cataract phacoemulsification. Intraocular Pressure (IOP) was evaluated prior to surgery and 1 week, 1 month, 3 months, 6 months and 1 year postoperatively. In addition, the number of glaucoma medication use and intra-postoperative complications were assessed. Complete surgical success was defined as IOP of ≥6 mmHg and ≤21 mmHg without IOP-lowering medication, qualified success was defined as IOP ≥6 mmHg and ≤21 mmHg with IOP-lowering medication and failure was defined as IOP >21 mmHg or cases requiring further surgical intervention to control IOP.

Results

A total of 23 eyes from 21 patients were studied. Mean age of patients was 73.5 ± 14.3 years, most of patients were caucasians (71%) and male (52%) and all had severe glaucoma. 43% of the eyes had primary open angle glaucoma, 22% had neovascular glaucoma, 22% had pseudoexfolation glaucoma, 9% had aphakic glaucoma and 4% primary congenital glaucoma. Before surgery mean IOP was 28.1 ± 11.0 mmHg and mean glaucoma medication use was 3.7 ± 0.5. At 1 (n=22), 3 (n=20) and 6 months (n=16) mean IOP was 16.7, 11.3 and 11.1 mmHg respectively and mean glaucoma medication use was 2.0, 1.4 and 0.9 respectively. Eleven eyes reached 1 year follow up with a mean IOP of 8.7 mmHg and a mean glaucoma medication use of 0.3. At 6 months, complete surgical success was found in 56% patients, qualified success in 44% and no case of treatment failure was found. At 1 year follow up complete surgical success was found in all cases. There were no intraoperative complications. Postoperative complications include choroidal effusion (n=4), hyphema (n=2), late hemorrhagic choroidal detachment (n=1), early hypotony (n=1).

At the moment there are only two published articles about the use of Ahmed ClearPath® in adults in USA and none in Europe. Comparing our 6 months results to the results of the most similar study published we have achieved a greater mean IOP decrease -17.0 mmHg (-60.5%) vs. -13.0 mmHg (-43.0%) with the use of less glaucoma medication comparing with baseline -2.8 (-75.7%) vs. -2.1 (-53.3%).

Conclusions

The Ahmed ClearPath® device appears to be a good surgical option for treating refractory glaucoma, achieving good IOP control and decreasing medication burden.

P-705

AHMED GLAUCOMA VALVE IMPLANT VS TRABECULECTOMY IN THE SURGICAL TREATMENT OF GLAUCOMA: A RETROSPECTIVE STUDY

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Purpose
To compare 1-year outcomes of Ahmed glaucoma valve (AGV) and trabeculectomy.

Methods
A retrospective cohort study involving 47 eyes of 46 patients receiving glaucoma surgery at a tertiary hospital between years 2016-2021. The primary outcomes included intraocular pressure, number of medications used, and complications.

Results
There were 27 patients in the AGV group and 20 patients in the trabeculectomy group. The mean age of the patients was 57.5±14.2 and 56.8±15.9 years in the AGV and trabeculectomy groups, respectively. Preoperative mean IOP was 32.6 ±4.1 mmHg for AGV group and 28.7 ±4.5 for the trabeculectomy group (p= 0.116). Mean IOP reduction from baseline was 54.2±15.3% and 45.7±21.9% respectively for AGV and trabeculectomy group at 1 year postoperatively. Mean number of medications used decreased from 3.6±0.5 to 2.3±1.6 for the AGV group and 3.7±0.7 to 1.8±1.8 for the trabeculectomy group at 1 year postoperatively (p=0.502). Hyphema was the most common complication and occured in 12 eyes with AGV postoperatively and in 1 eye with trabeculectomy. Succes was defined as final intraocular pressure between 6 mmHg and 18 mmHg with or without medication and ≥20% reduction from the baseline IOP. Succes rates at 1 year postoperatively was 85.0% and 71.4% for AGV and trabeculectomy groups respectively (p=0.335).

Conclusions
Lower mean postoperative IOP values and number of medication values were found for the trabeculectomy groups, however these results were statistically insignificant. In glaucoma patients, both AGV and trabeculectomy are effective methods to achieve adequate IOP reduction. Hyphema is a frequent complication that is more common after AGV implantation and resolves in a short time. High incidence of hyphema after AGV implantation is thought to be associated with majority of patients receiving AGV implantation had neovascular glaucoma as etiology.

P-708

EFFECT OF CATARACT SURGERY ON THE RATE OF VISUAL FIELD PROGRESSION IN PRIMARY ANGLE CLOSURE GLAUCOMA

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Purpose

To test the effect of cataract surgery on the rate of visual field (VF) damage progression in eyes with primary angle closure glaucoma (PACG) in a clinical setting.

Methods

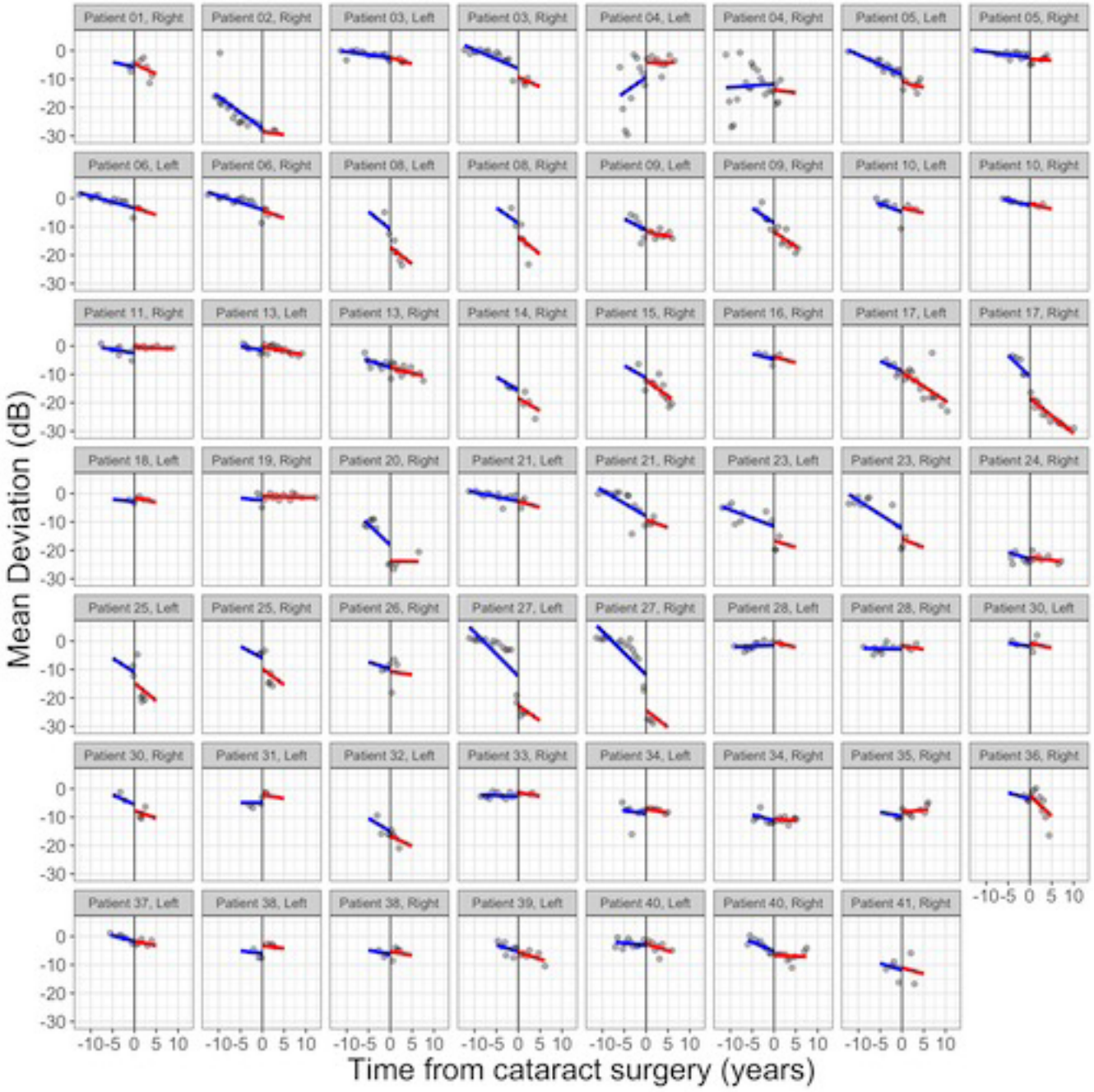
An electronic medical record was used to extract data for eyes with PACG which received cataract surgery. We analysed eyes with at least 2 reliable VF tests (false positive errors ≤ 15%) before and after surgery. We analysed the rate of progression (RoP) of the Mean Deviation (MD) using a linear mixed effect model of MD change over time, with random intercepts and slopes. A discrete effect indicated the pre and post-operative period and its interaction with the time from surgery modelled the change in RoP after cataract surgery. We also analysed the change in Best Corrected Visual Acuity (BCVA) and in the average Intraocular Pressure (IOP). A logistic regression tested the effect of IOP change and axial length (AL) on the probability of reducing the RoP with cataract surgery. Estimates are reported as Mean [95%-confidence intervals].

Results

Fifty-five eyes of 37 patients met the inclusion criteria. At surgery the sample had (Average ± Standard deviation): MD: -9.61 ± 7.94 dB; Age: 75 ± 7.23; AL: 22.9 ± 0.91 mm; IOP: 17.6 ± 5 mmHg. The estimated pre-operative average RoP was -0.54 [-0.31, -0.76] dB/year ($p < 0.001$). There was no significant average change in the RoP after cataract surgery (RoP difference: 0.03 [-0.35, 0.40] dB/year, $p = 0.866$), with 27/55 eyes showing a positive RoP difference (reduced RoP). There was no significant effect of AL and IOP change on the probability of RoP reduction. Results from the model fit are shown in Figure 1.

The average IOP was significantly reduced after cataract surgery by 4.45 [3.52, 5.36] mmHg ($p < 0.001$, 23% average IOP reduction). BCVA improved by 0.07 [0.03, 0.12] logMAR ($p = 0.002$). The change in IOP was larger for shorter ALs ($p = 0.004$) but was not influenced by the anterior chamber depth.

Image



Conclusions

We could not find a significant effect of cataract surgery on the RoP of VF loss in PACG.

P-709

COMPARISON OF KAHOOK DUAL BLADE AB-INTERNO TRABECULECTOMY COMBINED WITH PHACOEMULSIFICATION VERSUS TRABECULECTOMY: 6 MONTH RESULTS

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Purpose
To compare the surgical outcomes between Kahook dual blade ab-interno trabeculectomy combined with phacoemulsification (KDB-phaco) and trabeculectomy.

Methods
In this comparative study the medical records of 11 eyes that underwent KDB-phaco and 15 eyes that underwent trabeculectomy during the past year and with a follow-up period of 6 month were retrospectively reviewed. Our outcome variables include intraocular pressure (IOP) and number of IOP-lowering medications. Surgical success rate was defined as IOP ≤ 18 mmHg, IOP reduction of ≥ 20%, and reduction of ≥ 1 medication.

Results
The mean ages of the included KDB-phaco and trabeculectomy eyes were 62.9±12.3 and 65.6±14.9 years old, respectively. A 33.8±14.5% mean reduction in IOP was detected in the KDB-phaco group from a baseline value of 19.8±3.5 mmHg on 2.8±0.8 IOP-reducing medications to 13.7±2.3 mmHg (p=.007) on 1.2±1.2 (p=.022) IOP-reducing medications, at 6 months. The trabeculectomy group saw a mean IOP reduction of 42.1±24.3% from a baseline value of 28.9±13.1 mmHg on 3.5±0.9 IOP-reducing medications to 12.0±1.7 mmHg (p=.016) on 0.3±0.9 (p=.002) IOP-reducing medications, at 6 months. The difference in success rate did not reach statistical significance between the KDB-phaco group (81.8%) and the trabeculectomy group (93.3%) (p=.364).

The baseline IOP for the trabeculectomy cohort was significantly greater than that of the KDB-phaco cohort (p=.038) and so was the baseline number of medication (p=.025). At 6 months, there was no significant difference in IOP (p=.182) and mean IOP reduction (p=.450) between both groups, however, the KDB-phaco group was on more IOP-reducing medications (p=.021).

Conclusions
The differences between the KDB-phaco and the trabeculectomy groups regarding IOP reduction and success rates did not reach statistical significance. However, trabeculectomy has been observed to yield better results when a greater decrease in IOP is required. Nevertheless, for patients who require less IOP reduction, the KDB-phaco procedure may be considered as an appropriate option.

P-710

LONG-TERM EFFECTS OF PHACOEMULSIFICATION ON INTRAOCULAR PRESSURE IN PATIENTS WITH PRIMARY OPEN-ANGLE GLAUCOMA AND PSEUDOEXFOLIATION GLAUCOMA

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Purpose

To report long-term effects of phacoemulsification on intraocular pressure (IOP) in patients with primary open-angle glaucoma (POAG) and pseudoexfoliation glaucoma (PXG) in Hispanic patients.

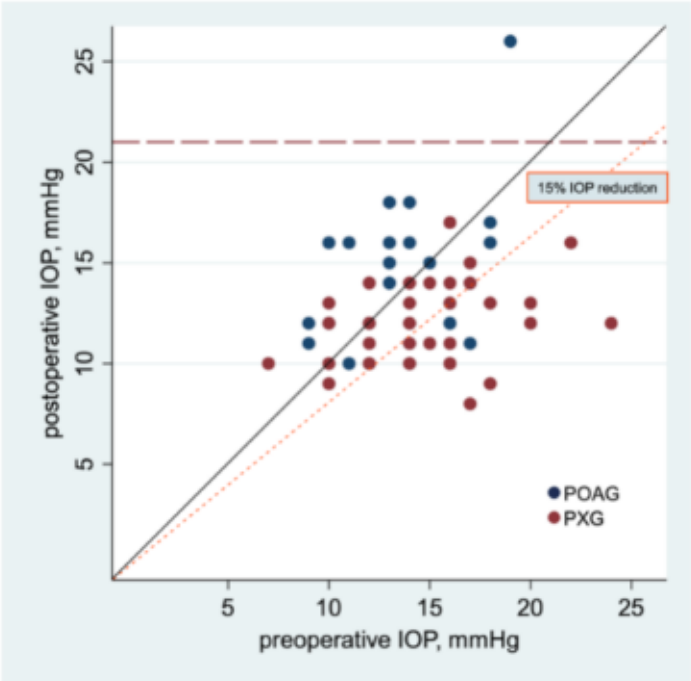
Methods

The study enrolled patients having phacoemulsification with IOL implantation and a diagnosis of POAG or PXG. Data on IOP values, corrected distance visual acuity (CDVA), number of glaucoma medications, and Visual fields (mean deviation and visual field index) were collected pre-operatively and at months 1, 3, 6 and 12 post-operatively.

Results

102 patients underwent phacoemulsification surgery; 51 (50%) of these had POAG. The majority were females (n= 35, 69% vs. n= 27, 53% in the PXG group). Patients with POAG were younger, (mean age of 72.92 ± 8.2 years vs. 78.82 ± 7.3 years) (p= 0.002), had a lower baseline IOP (mean of 17.5 ± 3.8 mmHg vs. 20.8± 5.6 mmHg) (p= 0.003), and had lesser extent of glaucoma damage (mean Mean Deviation [MD] of -6.2 ± 4.8 deciBels [dB] vs. -11.6 ± 9.9 dB) (p= 0.036). Statistically significant changes in CDVA (p= 0.001) were observed 12 months after phacoemulsification in both groups. A significant reduction in IOP values was found in the PXG group (p= 0.001), and a reduction in glaucoma medication in the POAG group (p= 0.001).

Image



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Conclusions

Hispanic patients with PXG behaved in a similar manner to that reported for other ethnic groups with this condition. Patient selection is of the utmost importance, and cataract surgery may be an additional benefit in glaucoma control in POAG patients desiring a lower number of glaucoma medications.

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P-711

EARLY CATARACT SURGERY AND SINSKEY HOOK GONIOTOMY IN BLACK AND AFRO LATINO PATIENTS: 1-YEAR RETROSPECTIVE STUDY

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Purpose

The purpose of this study was to determine the real-world efficacy of early phacoemulsification cataract surgery and affordable goniotomy with a Sinskey hook in patients with primary open-angle glaucoma. The enlargement of the lens is the most identifiable cause of glaucoma in persons over age 50. Early cataract surgery/lens extraction combined with trabecular bypass should be considered an initial approach to most people with glaucoma over the age of 50.[1,2]

Methods

This was a single-center, retrospective study of Black and Afro – Latino patients with primary open-angle glaucoma. These patients have undergone phacoemulsification early cataract surgery and goniotomy using an affordable and reusable straight Sinskey hook (Ambler 200um tip). Patients who underwent the above procedure with twelve months of follow-up were included in this study. Investigated parameters were intraocular pressure, number of medications, mean deviation on visual field test, visual acuity, and adverse events.

Results

Among all 57 eyes enrolled in the study undergoing surgery, goniotomy using a Sinskey hook with phacoemulsification, mean intraocular pressure was reduced from 16 mmHg at baseline to 14.19 mmHg after one year, a 11.3% reduction. The mean number of topical intraocular pressure-lowering medications was reduced from 1.71 at baseline to 0.38 after one year (78% reduction of topical medications). 84% of patients no longer need eye drops. Postoperative adverse events were mild and included transient hyphema. Visual field improved from -8.19 MD to -7.32 MD.

Image

Timepoint	Intraocular Pressure (IOP) mmHg	Ocular Hypertensive Medication	Visual Field Test
	Mean ± SD	Mean ± SD	Mean Deviation ± SD
Baseline	**16 ± 4.7**	**1.72 ± 1.3**	**-8.19 ± 8.6 db**
12 Months	**14.19 ± 3.3**	**0.39 ± 1.0**	**-7.32± 7.7 db**

Conclusions

This study demonstrates the effectiveness of excisional goniotomy using a Sinskey hook and phacoemulsification surgery in improving vision, reducing intraocular pressure, and decreasing the number of ocular hypertensive medications needed at twelve months. The Sinskey hook is a very cost-effective device to perform excisional goniotomy when compared

with other minimally invasive glaucoma surgery devices. There were no complications from cataract surgery and hyphemas were self-limited and resolved. We believe that a more affordable and reusable option in the Sinskey hook for excisional goniotomy allows surgeons globally to perform these surgeries with much less of a financial burden on patients and institutions. Patients will benefit from the reduction of medications and the potential for additional surgery.

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P-712

IS THE TRANSFER OF SAFE TRABECULECTOMY SKILLS TO THE DEVELOPING WORLD ADEQUATE ? - AN OUTCOME OF PAKISTAN'S NATIONAL SURVEY OF TRABECULECTOMY

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Purpose

To assess if the national practices reflect advances in surgical concepts to perform safer and more predictable trabeculectomy.

Methods

A cross-sectional survey-based study was conducted between the period of 12th August 2021 and 9th September 2021. The survey was carried out for service improvement and guidance. Therefore, ethical approval was not required for this study. A 20 item survey was designed following literature review and various observations of clinical practices in Pakistan. Questions were devised to ascertain national clinical perceptions and various clinical approaches while performing trabeculectomy. Completion rate was 100% amongst the 142 respondents . Typical time spent to complete the survey was 5 minutes and 59 seconds.

To the 142 responses collected, filters were applied to assess the perceptions of the experienced surgeons only and those who perform trabeculectomy regularly . Following the application of filters, we collected 82 responses across the 25 most populated cities of Pakistan as per 2017 population consensus.

Results

a) 87.04% of sugeons offered trabeculectomy too late in the disease process with 46.3% offering it when the maximum medical treatment fails.

b) 75.58% of surgeons still use superior rectus traction suture.

c) 67.2% of surgeons only do limited anterior conjunctival disection and 55.77% apply antifibrotic limited to the anterior sclera avoiding wide scleral application posteriorly thus encouraging anterior cystic blebs.

d) Only 47.17% create a rectangular flap encouraging posterior aqueous flow .

e) Only 7.41% of surgeons consider central and small sclerostomy (0.5mm to 2mm). Majority of the surgeons do not consider the size and location of sclerostomy as an important determinant of the surgical outcome. f) Only 26.92% use adjustable or releasbale sutures. Disturbingly 48.15% encourge excessive per op aqueous flow with fixed loose sutures.

g) Only 51.85% ensure water tight wound closure.

Conclusions

In light of the above findings , we conclude that transfer of skills and knowldge to perform safe and predictable trabeculectomy with lesser complications in Pakistan has been lacking and this may be a reflection of trends in other developing countries too. This may be an important factor contributing to blindess due to advance glaucoma in developing countries.

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P-713

COMPARISON OF EARLY AND LONG-TERM OUTCOMES OF AHMED DRAINAGE DEVICE SURGERY ALONE AND COMBINED WITH PHACOEMULSIFICATION: A RETROSPECTIVE 10-YEAR STUDY

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Purpose
It is known that compared with trabeculectomy alone, combined trabeculectomy-phacoemulsification is associated with greater inflammatory and scarring response as well as a reduction in long-term hypotensive efficacy. Our study aims to verify whether the same is true for the Ahmed Drainage Device alone versus combined with phacoemulsification regarding the effects on hypertensive phase and long-term hypotensive response.

Methods
We conducted 10-year retrospective study, reviewing medical records of all patients undergoing Ahmed device surgery alone and with associated phacoemulsification and evaluated both intraocular pressure (IOP) and number of IOP-lowering medications at baseline,at 1 week, at 1,3,6,12 months and the last recorded; as well as the need for needling or trepanation, need of other surgical procedures, and time to these events.

Results
A total of 51 eyes from 48 patients were included, of which 25 were female(49%) with a mean age of 69.02±13.39 years. Primary open-angle glaucoma was the main type with 34 eyes(67%). Mean preoperative IOP was 29.39±7.50mmHg, and mean number of IOP-lowering drugs was 3.72±0.58 drops. Mean IOP 1 week after surgery was 8.78± 2.54 mmHg; after 1 month 13.96±6.04mmHg; after 3 months 16.18±6,28mmHg; after 1 year 13.86±5.01mmHg and last IOP recorded was 14.02 ±4.60mmHg with mean follow-up time of 5.78 years. Mean number of IOP-lowering drugs after 1 month was 2.48±0.93, after 3 months was 2.3±1.1 and final number was 2.44±1.12. 9 eyes underwent post-surgical needling(17.65%), 8 underwent trepanation(15.70%), and 10(19.61%) required a new other procedure. 11(21.57%) eyes underwent PhacoAhmed, and we found no statistically significant association between combined surgery and IOP after 1 (p-value=0.27) and 3 months (p-value = 0.83); final IOP (p-value=0.99); number of IOP-lowering medications used at 1 month (p-value=0.53),3 months (p-value=0.59) and final (p-value=0.52); as well as in needling (p-value = 0.093), trepanation (p-value=0.35) and need for other surgical procedures(p-value=0.32). We obtained an absolute success of 5.9%(n=3), relative success of 88,2%(n=45) and a surgical failure of 11.8%(n=5).

Conclusions
We conclude that unlike PhacoTrab, PhacoAhmed doesn´t seem to influence either the hypertensive phase, final IOP and number of drugs used, ensuring greater safety and a good profile of efficacy(94,1%total success). However, our study has some limitations in terms of sample size requiring further research to confirm these results.

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P-714

HIGH FREQUENCY DEEP SCLEROTOMY COMBINED WITH PHACOEMULSIFICATION, IN THE TREATMENT OF OPEN ANGLE GLAUCOMA. 4-YEAR FOLLOW-UP

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Purpose

Glaucoma is the leading cause of irreversible blindness in developing countries, and open-angle glaucoma is the most common diagnosis of all types of glaucoma (1).

The management of glaucoma consists of pharmacological treatment, and if the disease continues its progression, trabeculectomy surgeries or device implantation should be used, with relatively high rates of complications(2,3).

High-frequency deep sclerotomy is a surgical technique performed with the Abee Glaucoma Tip, developed by the company Oertli (Oertli Instrumente AG, Berneck, Switzerland). This probe is connected to the equipment, and by means of high frequency, allows pockets of ablated tissue to be made in the angle of the anterior chamber, without damaging the adjacent tissues (4).

Methods

A retrospective study is carried out analyzing the patients who underwent phacoemulsification surgery combined with high-frequency deep sclerotomy in the Glaucoma and Cataract service of the Clínica de Ojos Norte. 36 eyes were operated with diagnosis of open-angle glaucoma (primary open-angle glaucoma and glaucoma secondary to pseudoexfoliation sindrom), the patients were between 55 and 80 years old.

Results

In the postoperative control at 6 months, the patients presented a reduction in IOP to 15.1 mmHg on average (33.77%) in relation to the 22.8 average basal IOP. In the following controls, the IOP decreased to 14.3 mmHg (37.28%) at one year, 14 mmHg (38.59%) at two years, and 14.4 at 3 years of control. At 4 years, they maintain acceptable intraocular pressure values with an average of 14.66 mmHg (36.84%).

Drug use was reduced from 1.38% to 0.22%, with 8 patients using one drug to maintain their pressure at the target pressure value set in their respective case.

Conclusions

High-frequency Deep Sclerotomy (HFDS) is an effective, safe, and reproducible technology in patients operated on for cataracts with phacoemulsification combined with the diagnosis of open-angle glaucoma. Its long-term effectiveness is being considered in studies with longer follow-up, and the possibility of using it in patients with angle-closure glaucoma and cataracts is under discussion, in whom cataract surgery alone allows opening the angle and obtaining a reduction in intraocular pressure (5).

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P-716

COMBINED PHACOEMULSIFICATION, INTRAOCULAR LENS IMPLANTATION AND ISTENT INJECT IN THE MANAGEMENT OF ADVANCED GLAUCOMA

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Purpose
Phacoemulsification with intraocular lens (IOL) implantation plus iStent insertion may be effective for selected patients with advanced glaucoma who otherwise would be considered for augmented trabeculectomy.

Methods
Patients with advanced glaucoma who underwent phacoemulsification with IOL implantation plus iStent insertion between 08/02/19–10/08/20 were included. Advanced glaucoma was defined as ≥1 of the following: visual field defect close to fixation; mean deviation (MD) ≤-12dB; mean retinal nerve fibre layer thickness (RNFLT) ≤75µm; patients with only one functional eye who were considered at high risk of progressive damage. Outcomes were proportion of visits with IOP within target range (6-18mmHg), change in mean number of pressure-lowering medications, change in MD, change in mean RNFLT, and proportion requiring further intervention.

Results
In total, 32 eyes (29 patients) were included; 23 (71.9%) had POAG, 5 (15.6%) had PACG, and 4 (12.5%) had other glaucoma diagnoses. Mean age was 72.5±9.6 years (range:49.1-88.8). 17 eyes (54.1%) had received previous argon laser trabeculoplasty and/or selective laser trabeculoplasty (SLT) and 2 eyes (6.3%) had undergone previous augmented trabeculectomy. Mean follow-up duration was 1.6±0.8 years (range:0.1–3.2 years). Mean pre-operative IOP was 19±5mmHg (range:11–33mmHg) and mean IOP at most recent follow-up was 14±3mmHg (range:9-24mmHg). Mean proportion of post-operative clinic visits with IOP within range was 83±27% (range:0–100%) over an average of 5.6±3.6 visits (range:1–16). Mean number of pre-operative pressure-lowering medications was 2.5±1.0 (range:0–4) with a mean change post-operatively of 0±0.4 medications (range:-1–+2). Mean pre-operative MD was -11.7±7.1dB (range:-27.21–+0.66dB). Mean change in MD post-operatively was 0.3±3.6dB (range:-6.62–+5.77dB). Mean pre-operative RNFLT was 61±14µm (range:24–94µm) with a mean change post-operatively of +5±7µm (range:-11–+18µm). 40.6% (13/32) eyes received post-operative SLT and 1 eye (3.1%) required subsequent augmented trabeculectomy.

Conclusions
Phacoemulsification with IOL implantation plus iStent insertion was effective in controlling IOP and limiting short-term progression of advanced glaucoma. Adjuvant SLT provides a low-risk option for further IOP control. The requirement for subsequent trabeculectomy was rare. This strategy may be preferred for elderly or infirm patients who may be unable to attend frequent post-operative visits or tolerate long and higher-risk glaucoma procedures.

P-717

SURGICAL OUTCOMES OF GLAUCOMA DRAINAGE DEVICE IMPLANTATION IN REFRACTORY GLAUCOMA PATIENTS IN THAILAND

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Purpose

To investigate the surgical outcomes of glaucoma drainage device (GDD) implantation in refractory glaucoma patients.

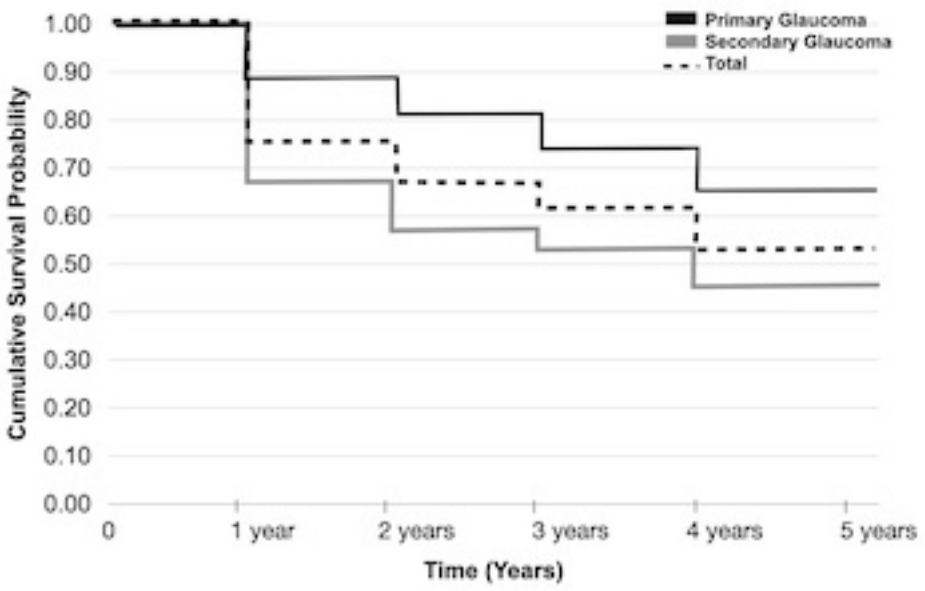
Methods

Retrospective chart review of glaucoma patients undergoing GDD implantation (Ahmed glaucoma valve (AGV), Baerveldt glaucoma implants (BGI), or Aurolab aqueous drainage implantation (AADI)) between January 2012 and June 2021. Glaucoma patients were classified into two groups: primary glaucoma (including primary open angle glaucoma (POAG), primary angle closure glaucoma (PACG) and juvenile open angle glaucoma (JOAG)) and secondary glaucoma (including neovascular glaucoma (NVG), ocular surgery (vitreoretinal surgery, scleral buckling procedure, post-operative extra capsular cataract extraction, scleral fixation intraocular lens, penetrating keratoplasty), intraocular trauma, uveitis glaucoma, lens-induced glaucoma, pseudoexfoliation glaucoma (PXG), iridocorneal endothelial (ICE) syndromes and Axenfeld Rieger Syndrome). Surgical outcomes including success and failure rate, adverse events, postoperative complications, and predictors for failure were studied.

Results

The primary glaucoma group included 57 eyes from 49 patients and the secondary glaucoma group included 87 eyes from 85 patients. Cumulative probability of complete or qualified success at five years was 53.4% (95% CI: 38.4%, 66.3%) overall, and was significantly higher (p=0.003) in primary glaucoma (65.8%; 95% CI: 38.4%, 83.3%) than secondary glaucoma (45.2%, 95% CI: 26.9%, 61.9%). Surgical outcomes including surgical success rate, adverse events and complications were similar in eyes implanted with the AGV and the non-valve GDDs (BGI or AADI). Multivariable analysis showed that predictors for failure were neovascular glaucoma with unadjusted hazard ratio (HR) 3.62 (95% CI: 1.45, 9.04; p=0.006), and lens-induced glaucoma with adjusted HR 4.19 (95% CI: 1.10, 15.86; p=0.035). Tube malposition and occlusion were the most frequent adverse events at 11.11%, corneal decompensation at 5.5%, hypotony at 2% (occurring only with the non-valve GDDs), and endophthalmitis at 0.69%.

Image



Conclusions

The present results show higher surgical success in refractory primary glaucoma than in secondary glaucoma and no difference between non-valved and valved GDD implantation. Lens-induced glaucoma was a strong predictor for failure in GDD implantation.

P-718
SAFE PAUL TUBE PLACEMENT IN DEVELOPING WORLD AND VITREORETINAL SETTINGS

S Cook

Purpose
To report: a safe technique for Paul tube shunt placement, effect in different pre-operative intraocular pressure (IOP) settings, post-operative safety and performance in combination other procedures.

Methods
Retrospective single surgeon audit of all patients undergoing Paul tube implantation from 05/10/2020 to 16 /11/2021. Tubes were placed under a “belt-strap” scleral tunnel with a 6/0 Prolene stent. Intraocular insertion under a trabeculectomy and deep scleral flap achieved graduated tube curvature.

Results
71 procedures: Tube alone (13) or combined with: cataract extraction alone (19), Ahmed or Baerveldt revision (3) or vitreoretinal procedures (36). Adjuvant anti-VEGF was used for VR indications. No MMC was used. Average IOP (mmHg) was: Pre-op: 26 (n=71); Day: D1: 10(n=69); D7-30:13 (n=59): D31-60: 15 (n=42): D61-90: 15 (n=13): D91-180: 17 (n=18): D181-340: 13 (n= 5); D341-520: 17 (n=3). Characteristic behavior in three subgroups of preoperative IOP (low, medium, high) are described. Complications were: Flat anterior chamber: (0); Hypotony requiring intervention (0); unrelated VR complications (16).

Conclusions
Immediate IOP control, low incidence of early complications and durable effect are particularly valuable to comprehensive Ophthalmologists in the developing world who manage retinal and glaucoma conditions in a setting of poor glycaemic control, advanced disease and where transport is an obstacle. Gonioscopy is highly relevant,but often neglected in VR settings. Safety and efficacy enable wider use of Glaucoma drainage devices in general and in particular in high risk, normotensive cases to prevent glaucoma undoing the good of successful VR surgery.

P-720

SURGICAL OUTCOMES OF GONIOSCOPY-ASSISTED TRANSLUMINAL TRABECULOTOMY WITH POLYPROPYLENE SUTURE IN PSEUDOEXFOLIATIVE GLAUCOMA AND OPEN ANGLE GLAUCOMA

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Purpose
To assess the efficacy and safety of gonioscopy-assited transluminal trabeculotomy (GATT) with 5.0 polypropylene suture in pseudoexfoliative (PXG) and primary open angle glaucoma (POAG).

Methods
A retrospective chart review of glaucoma patients who underwent 360 degree GATT with thermally blunted polypropylene suture 5.0 by a single surgeon between December 2020 and June 2022. Patients were followed up for at least 6 months. Visual acuity, visual fields, intraocular pressure (IOP), count of used glaucoma medication groups, and ocular adverse events were analyzed. The postoperative outcomes between the two groups were compared.

Results
In total 53 eyes (52 patients) were included. There were 41 eyes (77.4%) with PXG and 12 eyes (22.6%) with POAG. Mean age of subjects were 69.0 (63.0-75.0), for PXG patients 70.0 (65.0-75.0) and 61.0 (51.8-70.5) for POAG. The mean preoperative IOP was 25.0 (20.0-29.0) mmHg, 25.0 (22.0-28.0) mmHg in PXG patients, 21.5 (16.8-30.8) mmHg in POAG group. Postoperative IOP significantly decreased to 12.0 (10.0-15.0) mmHg in all patients after 6 months ($p<0.05$). Relatively greater pressure reduction were observed in patients with PXG 11.0 (9.0-15.0) mmHg than POAG group 15.0 (12.8-16.3) mmHg ($p<0.05$). The average count of medications (Q1-Q3) used before operation was 3.0 (3.0-3.0). Six months after the surgery, the number of medications used decreased significantly from 3.0 (3.0-3.0) to 0.0 (0.0-0.0)($p<0.01$). 5 patients (9.4%), two with PXG and three with POAG, were on medication 6 months after surgery. Two patients with POAG underwent trabeculectomy due to uncompensated IOP three months after GATT. In 28 (54.5%) of patients, a hyphema was observed on the first post-operative day, which was absorbed within two weeks. No statistically significant differences in the frequency and degree of hyphema were observed between patients with PXG and POAG. The number of medications administered and the IOP value did not influence the frequency of hyphema. Two patients (one with PXG and one with POAG) underwent anterior chamber lavage after three weeks due to persistent hyphema.

Conclusions
GATT in PXG and POAG effectively reduces intraocular pressure and number of medications with low complication rates. This conjunctival sparing operation is effective as a primary treatment option in PXG, which is a relatively aggressive glaucoma subtype.

P-721

THE NEW TREATMENT PARADIGM FOR AQUEOUS MISDIRECTION SYNDROME IN ANGLE CLOSURE GLAUCOMA ASSOCIATED WITH INHERITED RETINAL DYSTROPHIES

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Purpose
To propose a new pathogenesis mechanism for aqueous misdirection syndrome (AMS) in eyes with angle closure glaucoma (ACG) associated with inherited retinal dystrophies (IRDs) and suggest appropriate treatment for this condition.

Methods
This is a case series of 20 eyes of 11 young patients with ACG associated with IRD.

Results
The median age at presentation of the 11 patients was 26 years [Interquartile range, IQR;22,39]. There were 9 males and 2 females. The phenotypical diagnosis of IRD was Autosomal recessive Bestrophinopathy (ARB) in 6 patients, Retinitis Pigmentosa in 3 patients, Best Vitelliform Macular Dystrophy (BVMD), and X-linked retinoschisis in 1 patient each.

Twelve eyes of 7 patients had undergone surgery. Initial 8 eyes had glaucoma surgery. This was trabeculectomy in 6 eyes (only trabeculectomy in 5 eyes; along with irido-zonulo-hyaloido-vitrectomy (IZHV) in one eye) and Ahmed Glaucoma Valve in two eyes. All these 8 eyes developed AMS and resolved with IZHV in one eye and pars plana vitrectomy (PPV) with IZHV in the remaining 6 eyes. The subsequent 4 eyes underwent PPV with IZHV as a primary procedure in isolation in one eye and combined with trabeculectomy in one eye, and phacoemulsification with an intraocular lens in 2 eyes. None of these 4 eyes developed AMS and the IOP was well controlled. The median duration of follow-up in these 4 eyes was 13.6 months.

Conclusions
ACG associated with IRDs occurs at a young age, the most common IRD associated was Bestrephinopathy, others being RP and X-linked Retinoschisis. Conventional glaucoma surgery for ACG resulted in AMS in all eyes and needed PPV with IZHV for resolution. However, when only PPV and IZHV were performed or were combined with glaucoma or cataract surgery, it not only prevented AMS but resulted in a deep anterior chamber with well-controlled IOP. These findings suggest a secondary angle closure associated with IRDs and possibly needs addressing the vitreous rather than the conventional glaucoma surgery.

P-722

A RETROSPECTIVE COMPARISON BETWEEN NON-PENETRATING DEEP SCLERECTOMY VERSUS PENETRATING DEEP SCLERECTOMY IN PRIMARY GLAUCOMA

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Purpose

Comparison between non-penetrating deep sclerectomy (NPDS) to penetrating deep sclerectomy (PDS), the same procedure to which a trabecular surgical penetration and a peripheral iridectomy were added. The study monitored patients attending a single clinical center in Switzerland for 1 year.

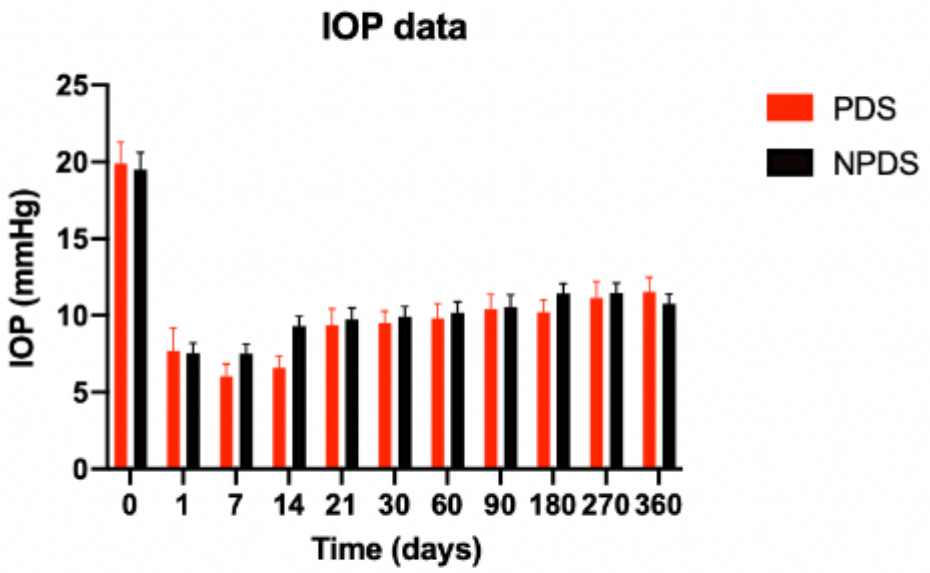
Methods

This was a longitudinal, retrospective, comparative, interventional study. Sixty-six eyes of fifty-four patients aged 69 ± 9, with medically uncontrolled primary open-angle glaucoma were included in the two treatment groups (NPDS and PDS). Intraocular pressure (IOP), best-corrected visual acuity (BCVA), as well as frequency of complications, minor surgical interventions and medical treatments were determined preoperatively at days 0 (baseline), and postoperatively at 1, 7, 14, 21, 60, 90, 120, 180 and 360 days. Considering the retrospective nature of the study, an exploratory mixed-effects model (MMRM) was used to assess the intergroup differences among endpoints for IOP and BCVA. Contingency tables were used to profile the frequency of complications and related post-operative interventions.

Results

No significant differences were noted between NPDS and PDS when IOP and BCVA were assessed at 1 year, showing significant improvement for both parameters. NPDS and PDS resulted in a significant reduction of IOP (10,8 mmHg ± 0,9 vs. 11,5 mmHg ± 0,6 respectively) (Image 1) and post-op BCVA recovery (0,9 ± 0,04 vs. 0,8 ± 0,05) at 1 year. A significant reduction of IOP lowering medications for NPDS and PDS was reported at 1 year (baseline: 2.74 ± 0,19 vs. 2.71 ± 0,25; at 1 year: 0,07 ± 0,07 vs. 0,04 ± 0,04). Following NPDS, we reported 30 adverse events (AE) that necessitated 34 minor surgical or laser interventions, while we described 80 AE that led to 48 interventions after PDS.

Image



Conclusions

In conclusion, NPDS and PDS techniques showed similar efficacy at lowering IOP and providing comparable post-op BCVA recovery at 1 year. A trend for a better BCVA was observed in NPDS patients in the early postoperative period. NPDS displayed fewer AE and postoperative interventions, supporting previous observations that non-penetrating interventions carry a better safety profile.

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P-723 THE MOORFIELDS SAFER SURGERY SYSTEM TRABECULECTOMY: FUNCTIONAL RESULTS OF A 10-YEAR RETROSPECTIVE STUDY

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Purpose

Conventional trabeculectomy is widely performed to treat glaucoma and provides great efficacy overall. However, it can be associated with some complications, including the increase in incidence of cataracts, that can reach up to 60% of the eyes with prior trabeculectomy.To reduce some of its complications, Moorfields Safer Surgery System(MSS)was introduced in 2005 and included extensive dissection of the conjunctiva, wide area of application of MMC, an anterior chamber maintainer, standardized sclerostomy and combination of fixed and adjustable/removable scleral sutures. We aim to investigate the functional results of MSS Trabeculectomy evaluating BCVA results and visual field progression; and to determine if this technique is associated with a reduction in the incidence or progression of cataracts.

Methods

We conducted a single-center 10-year retrospective study, reviewing medical records of all patients that underwent MMS trabeculectomy between January 2011 and December 2020. We evaluated subjective BCVA with Snellen Chart at baseline, after 1,6 and 12 months, last recorded BCVA; the development or worsening of cataracts and visual field analysis regarding Mean Deviation(MD), square root of Loss Variance(sLV) and cluster progression analysis with Haag-Streit Octopus EyeSuite software®.

Results

We included 153 eyes from 120 patients(55 female(45.9%)) with a mean age of 71.74±14.50years. Mean preoperative BCVA was 7/10, 1 month after MSS it was 6/10; 6 months after 7/10, 1 year after 6/10 and final BCVA was 7/10 with mean time of follow-up of 8.15 years. Whitin the phakic eyes undergoing MSS(n=102), 36(35.29%) ended up developing or worsening preexisting cataract. Regarding visual field analysis 61 eyes(41.8%)had valid results. From this sample we obtained a mean baseline MD of 4,53±7.5dB and a final mean MD of 17.68±6.7dB. Mean baseline sLV obtained was 5.99±1.92dB and final sLV was 6.26±1.64dB. Furthermore, progression analysis showed a mean MD total difference(final MD–baseline MD) of 3.09 dB(Rate of Progression(RoP)+0.35dB/year), a mean sLV (final sLV–baseline sLV) difference of 0.27dB (RoP+0.033dB/year), and a mean 0.37 dB total progression in corrected cluster analysis (RoP +0.045dB/year).

Conclusions

With this study we conclude that the MSS trabeculectomy provides good functional results with stable BCVA and visual fields over time. Moreover, it seems to be associated with smaller incidence of cataract or its progression reinforcing confidence and safety with this practice.

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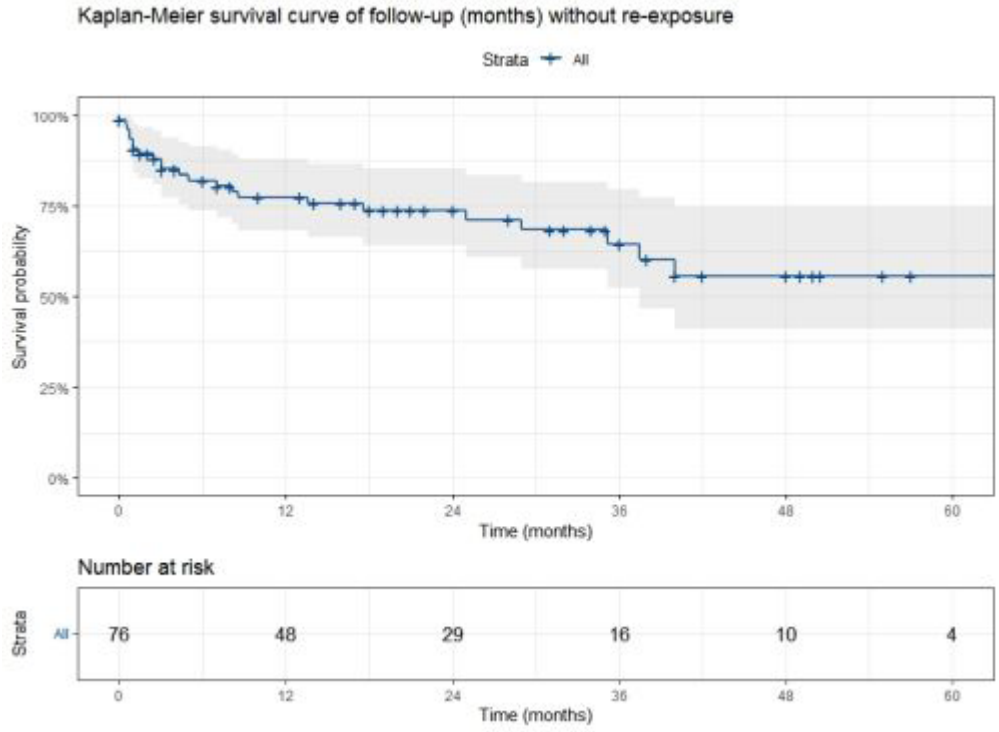
P-725
AQUEOUS SHUNT EXPOSURE REPAIR: OUTCOMES AND RISK FACTORS FOR RECURRENCE

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Purpose
To investigate the outcomes of aqueous shunt exposure repair and to identify risk factors for recurrent exposure after surgical repair.

Methods
Eligible patients presented with an exposed aqueous shunt that was repaired in one tertiary referral subspecialist glaucoma service between 2010 and 2018. Demographic and clinical data were extracted from the patients' records and survival analysis was employed to determine the probability of survival of the repair without further exposure. Cox proportional regression analysis was utilised to identify potential risk factors for failure of the repair surgery.

Results
Seventy-six eyes of 76 patients were included in the study. The probability of survival without further exposure was 76.2%, 72.7% and 54.7% at 1,2 and 4 years, respectively (Fig. 1). No eye in which the tube was repositioned in the anterior chamber or in the sulcus (n = 9; 11.8%) developed a recurrence of the exposure during the time of observation. In the regression analysis a shorter interval from the time of tube insertion to the repair surgery, a history of previous surgical revision and the use of a human pericardial donor patch at the time of revision increased the risk of exposure recurrence. Three serious adverse events were observed: one endophthalmitis, one suspected endophthalmitis and one severe keratitis.

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Conclusions

Aqueous shunt exposure revision is associated with reasonable mid and long term success.

A shorter interval from tube insertion to exposure revision, previous surgical revisions and the use of a human pericardium patch at the time of repair were associated with increased risk of repair failure.

P-726
RISK FACTORS FOR AHMED GLAUCOMA VALVE FAILURE

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Purpose
Ahmed glaucoma valve (AGV) is one of the most commonly used glaucoma drainage devices (1). AGV implantation is mostly indicated in advanced glaucomatous eyes or refractory glaucomas or the eyes likely to fail with classic filtrating surgeries (2,3). We aimed to analyze risk factors for AGV failures

Methods
This retrospective review includes 268 eyes with AGV implantation. The mean age was 56.6±20.4 years, 181(67.5%) of patients were male, and the mean follow-up time was 25.5±21.3 months. Surgical success is defined as IOP<21 mmHg or a 30% decrease in IOP without any additional IOP-reducing surgery, light sensation loss, and phthisis bulbi. Patients recordings are analyzed for glaucoma type, a number of past surgical history, preoperative and postoperative intraocular pressure, glaucoma medication change, presence of hypertensive phase which is defined as postoperative IOP≥21 mmHg within the first 6 postoperative months, antiglaucomatous usage within the first month (termed as early glaucoma drug), needling procedure within the first month and any needling procedure. Factors thought to be effective on last surgical success analyzed and p-value of <0.25 included in Multiple Binary Logistic Regression Analysis and using Backward Wald exclusion parameters with p>0.05 excluded from the model.

Results
Mean IOP reduced from 37.1 mmHg to 14.7 mmHg (p<0.001). Median glaucoma medication reduces from 4 to 2 (p<0.001). At the last visit, 53 (19.8%) eyes had a surgical failure. Patients without HP showed an 85.1% success ratio whereas those with HP showed a 74.8% success rate at the last visit (p:0.045). The surgical success ratio was higher in pseudoexfoliative glaucoma than in neovascular glaucoma. With Multiple Binary Logistic Regression Analyses, the HP was ultimately found to be effective the success. The success rate in eyes without HP is 1.925 times higher than in eyes with HP.

Conclusions
HP is an important indicator for AGV failure and active treatment of HP like early aqueous suppressants and needling procedures may improve final success.

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P-727

COMBINED PHACOEMULSIFICATION AND HYDRUS MICROSTENT IMPLANTATION IN ASIAN EYES WITH MODERATE-TO-SEVERE NORMAL TENSION GLAUCOMA – 12-MONTH OUTCOMES

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Purpose
To evaluate the safety and efficacy of combined phacoemulsification and Hydrus Microstent implantation in Asian eyes with moderate to severe normal tension glaucoma (NTG).

Methods
Retrospective study of consecutive surgeries performed from August 2019 to August 2021 in a single tertiary eye centre. Data was collected from post-operative day (POD) 1, post-operative week 1, post-operative month (POM) 1, POM3, POM6 and POM12 visits. Outcome measures included reduction in intraocular pressure (IOP), number of glaucoma medications and peri-operative complications.

Results
Data from 22 eyes of 22 subjects was analysed. All subjects were Chinese and majority were male (15, 68.2%). At baseline, mean IOP was 13.3 (2.3) mmHg, all eyes had a HVF mean deviation (MD) of ≥-6 dB [mean -13.6(4.4) dB] and all eyes were on at least one glaucoma medication. There was no statistically significant reduction in IOP at all timepoints compared to baseline (all $p>0.05$). However, median number of medications reduced from 2 (IQR 1) to 0 (IQR 1) at all timepoints, up to POM12 (all $p<0.001$). Pre-operatively, 13 (59.0%) eyes were on 2 or more glaucoma medications. By POM12, only 1 (4.5%) eye was on 2 medications, with 15 (68.2%) eyes remaining medication-free. There were no intraoperative complications. No eyes underwent secondary glaucoma procedures nor lost any Snellen's line of visual acuity by POM12. One (4.5%) eye experienced numerical hypotony at POD1, which resolved on conservative management. Two (9.1%) eyes underwent laser iridoplasty for stent occlusion by iris. There was no deterioration in HVF MD at POM12 compared to baseline ($n=21$, $p>0.05$).

Conclusions
Combined phacoemulsification and Hydrus Microstent implantation is effective in reducing medication burden in Asian eyes with moderate to severe NTG, up to 12 months after surgery.

P-728

EVALUATING THE EARLY POST-TRABECULECTOMY BLEB MORPHOLOGY USING ANTERIOR SEGMENT OPTICAL COHERENCE TOMOGRAPHY AS PREDICTORS FOR BLEB FUNCTION

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Purpose

To correlate the morphological features of trabeculectomy blebs using anterior segment optical coherence tomography (AS-OCT) during the first postoperative month with bleb function at the end of the follow-up period.

Methods

This prospective observational study included 20 eyes of 18 patients who underwent trabeculectomy or phaco-trabeculectomy for different types of glaucoma. AS-OCT imaging of the bleb was performed on the first postoperative day, after two weeks, and at the end of the first month or until an additional surgical intervention was needed. The blebs were classified as successful if the patient had an intraocular pressure (IOP) < 18 mmHg with no hypotensive medication (complete success) or with hypotensive medication (relative success). Failure was defined as the need for surgical intervention or uncontrolled IOP with hypotensive medication. Different intrableb patterns of reflectivity including microcysts, multiple layers, and subconjunctival separations were analyzed. Total bleb height (TBH), maximum bleb wall thickness (MBWT), the height of the fluid-filled cavity (HFFC), and the height of the hyporeflective area (HHRA) were measured. The HHFC to TBH and the HHRA to TBH ratios TBH were calculated.

Results

The mean follow-up period was 9,05 months. Out of 20 blebs, 7 were completely successful (35%), 7 were relatively successful (35%), and 6 failed (30%). No differences were found in the intrableb structures on the first postoperative day between the groups. In the second week, successful blebs were found to be superior in terms of TBH, HFFC, HHRA, and the number of coexisting intrableb patterns but without any statistically significant differences. MBWT and the HHRA to TBH ratio were higher in the successful group with a statistically significant difference. By the end of the first month, 4/7 patients in the failure group have required surgical intervention. The comparison was made between the complete success group and the relative success group. Completely successful blebs had superior TBH, HFFC, HHRA, and a higher number of coexisting intrableb patterns. But the only statistically significant difference was found in the HFFC to TBH ratio which was higher in completely successful blebs.

Conclusions

Early bleb morphologic features on AS-OCT are correlated with bleb function. Successful blebs tend to have from an early stage a higher liquid/tissue ratio, thicker walls, and coexisting intrableb reflective patterns.

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P-729

TREATMENT OUTCOMES USING THE PAUL® GLAUCOMA IMPLANT IN A POPULATION OF SEVERE GLAUCOMA

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Purpose

The aim of this study is to determine the effectiveness of a new drainage system, the Paul® Glaucoma Implant (PGI), one year after its implantation in the management of refractory glaucoma in patients who no longer responding to any drug treatment or any glaucoma procedures.

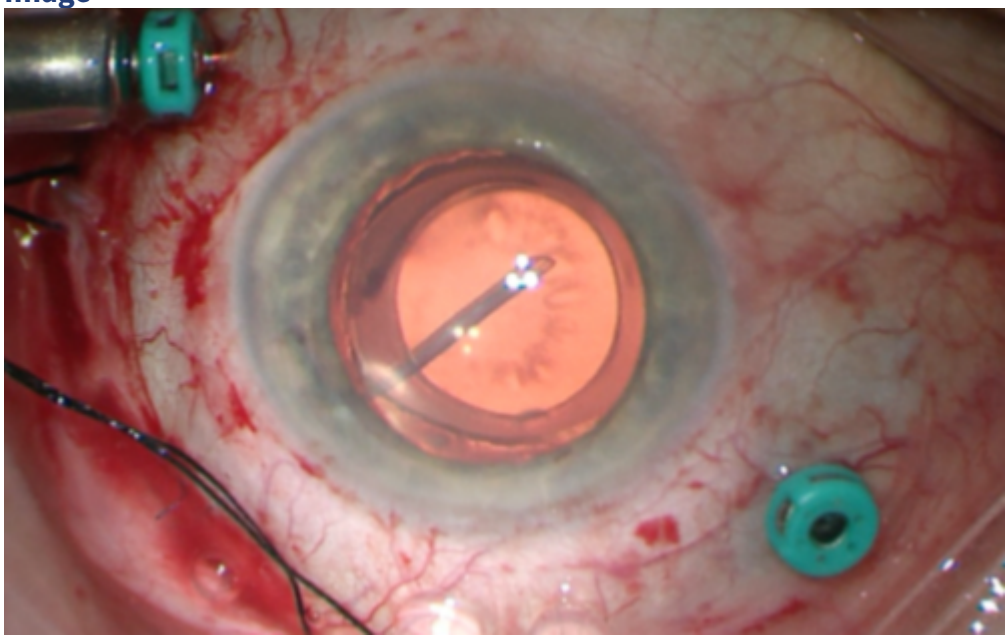
Methods

Retrospective cohort study was performed between October 2019 and February 2022 in the University Hospital of Liege, Belgium . All participants were implanted with the PGI, in the posterior chamber and were followed up at least 6 months after their surgery. Surgical success has been defined as an intraocular pressure (IOP) < 18 mmHg and/or > 5 mmHg, a reduction in IOP of more than 20% compared to initial values, no occurrence of a new glaucoma surgery, no removal of the implant or no loss of light perception after the 12 month follow-up. Absolute success was achieved if no IOP-lowering medication was required and qualified success otherwise. A standardized protocol was followed in all cases, which included placement of a 6.0 prolene in the lumen of the tube and placement of the tube in the posterior chamber associated with a complete vitrectomy.

Results

Among the 30 patients included, all reached the 6-months follow up (FU) and 25 (25 eyes) reached the 12-months FU. The median age of the study group was 66.5 years with a majority of men (56%) and most of whom had primary chronic open-angle glaucoma (38.77%). The median intraocular pressure was 27.50 mmHg pre-operatively and 12.00 mmHg at 12 months. The median number of medications decreased from 3.00 preoperatively to 1.00 at 12 months. 24 patients met the criteria for qualified success (96%) while 4 of 25 patients met the criteria for complete success (16%) at 12 month FU. The most common postoperative complication was the occurrence of spontaneous resolved choroidal detachment.

Image



Conclusions

The PGI have shown its effectiveness in the management of refractory glaucoma and posterior chamber placement provides an increased safety profile.

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P-730
DELAYED XEN FRAGMENTATION AND DEGRADATION AFTER XEN IMPLANTATION

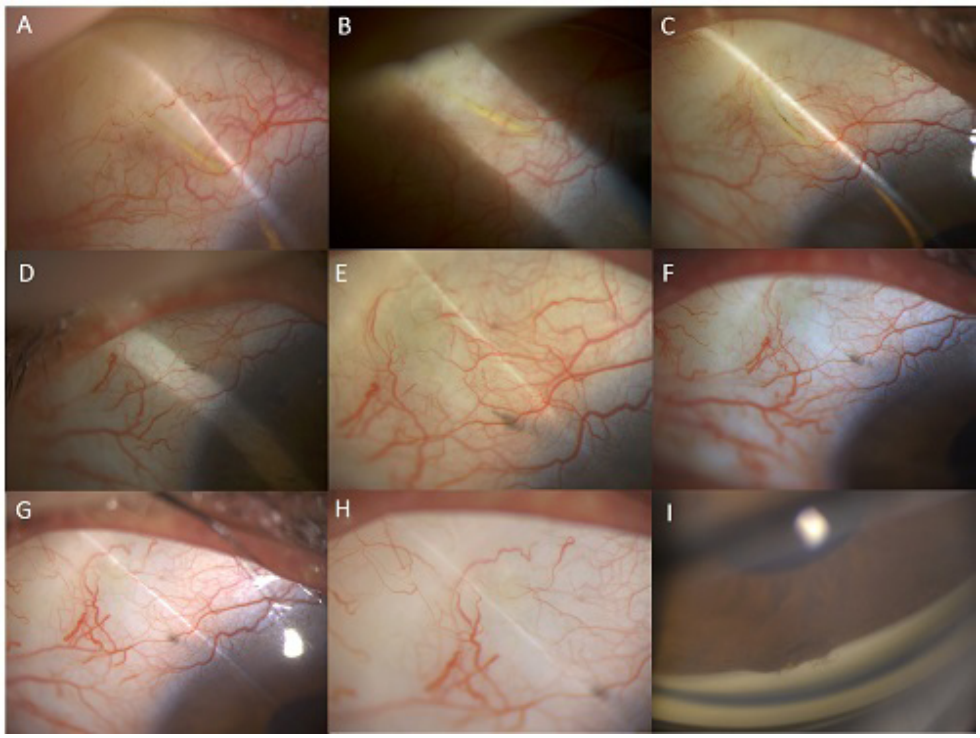
H Lin

Purpose
XEN fragmentation usually occurred during needling. XEN degradation was never been reported [1-3]. We report two cases of delayed XEN fragmentation and one of the cases had XEN degradation months after XEN implantation, not during the time of needling.

Methods
The purpose of this study was to describe the clinical presentation and outcomes in 2 cases of delayed XEN fragmentation and degradation after XEN implantation.

Results
Two patients had received postoperative needling and XEN position adjustment to enhance XEN function(Fig. 1A-D, Fig. 2A-B). The first patient had delayed fragmentation of the subconjunctival portion at 29 months after XEN implantation (Fig. 1E). The broken XEN maintained a 270- to 360-degree well-functioned bleb (Fig. 1F-I). The IOP was 14~17mmHg and the visual field remained stable till the last follow-up (4.5 years post-XEN implantation). The second patient had pigment in the XEN lumen and thinning of the XEN body found at 3.5 months after XEN implantation (Fig. 2C). The XEN broke into two parts noted at month 18 (Fig. 2D). The central part of the XEN was finally completely absorbed 6 months later (Fig. 2E). The posterior bleb functioned well with a good IOP (Fig. 2F-I). Both patients recalled previous rubbing eyes and ocular massage.

Image



Conclusions

These two cases highlight the potential complication of delayed XEN fragmentation, even degradation of XEN. Previous manipulation of XEN and the periorbital region, placing laser lens on the eyeball, post-laser inflammation or pigment deposit may be the risk of XEN breaking down. The IOP could remain stable and the outflow pathway of aqueous humor drainage may well function after XEN fragmentation and degradation of the subconjunctival portion.

References

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P-731

INVERTED AUTOCONJUNCTIVAL GRAFT AS A NOVEL TECHNIQUE FOR PREVENTING BLEB FIBROSIS AROUND THE XEN45 GEL IMPLANT

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Purpose

To evaluate the effectiveness of a novel surgery technique named Palomino-Barrio to prevent bleb fibrosis using an autoconjunctival inverted graft during ab interno XEN45 implant surgery.

Methods

A total of 5 patients between july 2022 until december 2022 underwent surgery at a tertiary hospital with an ab interno XEN45 implant in the superior nasal conjunctival quadrant with and opened conjunctiva at the limbus. The new technique consists of taking a base limbar conjunctival graft that measures 10×10 mm from the inferior quadrants of bulbar conjunctiva. Afterwards the conjunctiva graft is cut, it is put in an inverted orientation contacting the epithelial conjunctival side with the corneal epithelium side. Then the autoconjunctival inverted graft slides over the XEN45 implant. Finally the conjunctiva base fornix is sutured at the limbus with sutures as usual without needed of anti-mitotic drugs or spacers.

Evaluation included preoperative intraocular pressure (IOP), IOP post-surgery at 1 day, 1 week and 3 months afterwards, number of ocular hypotensive agents used pre and postoperative, and presence of bleb fibrosis around the XEN45 implant

Results

A total of 5 patients with moderate open angle glaucoma were included and the average age was 71,8 years (range 52-86). 3 patients were operated of combined surgery with cataract surgery and 2 patients were operated with XEN45 implant alone.

These 5 patients were having from 1 to 4 hypotensors active principles depending on each case and in the follow-up, 3 patients no require further topical hypotensive treatment and 2 patients reduced from 4 to 2 hypotensors active principles. The median of preoperative IOP with medication was 22,5 mmHg, at 1 week the IOP postoperative was 14,2 mmHg and at 3 months the median IOP was 16mmHg. No cases of bleb fibrosis were present in the follow up.

Conclusions

Although are few cases and short follow up time, the use of inverted autoconjunctival graft would be a reliable alternative for preventing the bleb fibrosis that develops around the XEN45 implant.

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P-732

5 YEARS RESULTS OF ISTENT COMBINED WITH PHACOEMULSIFICATION IN PATIENTS WITH OPEN-ANGLE GLAUCOMA

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Purpose
To evaluate the long term efficacy of iStent® combined with phacoemulsification in patients with open-angle glaucoma.

Methods
We conducted a monocentric, retrospective study on 92 eyes of 58 patients that underwent phacoemulsification combined with the injection of two iStents®. Patient characteristics were evaluated, including IOP and the number of glaucoma medications, before surgery and 1 months, 6 months, 1, 3 and 5 years after surgery. The need for an additional intervention such as laser or glaucoma surgery was also evaluated.

Results
The preoperative mean IOP was 16.8 ± 3.57 mmHg with a mean of 2.33 ± 0.89 medications. After 6 months, the mean IOP was reduced by 13% (14.6 ± 3.02 mmHg, p<0.001) with a 29% reduction in the number of antiglaucoma medications (1.64 ± 1.42 antiglaucoma medications, p<0.001). After five years, the mean IOP was still significantly lowered as compared to preoperative levels (-8%, with a mean IOP of 15.46 ± 2.95 mmHg, p<0.001) with a 24.5% decrease in the number of antiglaucoma medications (1.75 ± 1.03, p<0.001). Seven eyes (7.6%) required an additional glaucoma surgery and 5 eyes (5.4%) had laser trabeculoplasty during their follow-up.

Conclusions
The iStent® implanted during phacoemulsification in patients with open-angle glaucoma effectively reduced IOP and antiglaucoma medication at 5 years.

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P-734

INCIDENCE OF HYPERTENSIVE PHASE IN PAUL GLAUCOMA IMPLANT IN A TERTIARY HOSPITAL

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Purpose
To report the incidence of hypertensive phase (HP) in patients that underwent Paul Glaucoma Implant (PGI) surgery in a tertiary hospital in Malaysia.

Methods
Retrospective analysis on all the patients that underwent PGI and completed at least 6 months of follow up in a tertiary hospital in Malaysia. HP was defined as IOP >21 mmHg during the first 3 months after surgery with or without medications or IOP >21 mmHg after reaching 2 consecutive weeks of functional post-operative period, in which IOP was noticeably lower than 22 mmHg. All elevated IOP must not be caused by tube obstruction or retraction.

Results
A total of 22 cases of PGI that implanted from 1st April 2021 to 30th April 2022, with 3 cases were excluded due to missing data. Among our cases, 31.6% (n=6) had hypertensive phase after PGI implantation, which occurred at a median of 8 +/- 2.82 weeks postoperative. Failure rate at 6 months for our patients was 10.5%, while complete success was 36.8% and qualified success was 52.6%. All the patients that experienced hypertensive phase after surgery achieved qualified success at month 6. Four of our patients had complications (21.1%), which were aqueous misdirection, hyphema, and tube blockage by vitreous and iris. Due to the limitation of the small sample size, there was no correlation found with cases with hypertensive phase that was significant, using Spearman's correlation test.

Conclusions
Hypertensive phase in PGI for our case series was found to be lower than reported incidence of Ahmed valve glaucoma drainage device. HP in our series occurred at median 8 weeks after surgery. Closer monitoring during that period will be crucial to prevent further optic nerve damage in this group of patients.

P-735
LONG TERM RESULTS OF MINIMALLY INVASIVE MICRO SCLEROSTOMY (MIMS®)

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Purpose
To provide three years follow-up data on superonasal MIMS® (minimally invasive micro sclerostomy) in open angle glaucoma Caucasian patients.

Methods
The MIMS® device (Sanoculis, Israel) automatically creates by an ab-interno approach, a circa 1 mm long drainage channel of circa 100 microns diameter at the superonasal (SN) sclera-corneal junction. It connects the anterior chamber with the subconjunctival space to perform a filtering operation.

All patients who were termed successful at one year after MIMS® procedure or were termed a failure because of higher than target IOP however were not given a chance to add medication were invited to participate in a long term success evaluation study.

Results
37 Patients with more than 36 months follow up got reduction from preoperative IOP ±STD [mmHg] 27,3±3.7 to postoperative IOP ±STD [mmHg] 16.9±5.3. % reduction in IOP-38,1%. Duration of surgery ±STD (min:sec) is 2:01±0:41.Medications pre ±STD was 1.84±0.8.Meds post ±STD- 0.5±0.95.% reduction in meds- 72,8%. % adverse events-13. Success 62,2%. Success no meds-48,6%

Success rate (FDA definition): at least 20% IOP reduction on same or less medications.

Conclusions
Minimally invasive anti-glaucoma surgical procedures done with the new MIMS® device was found satisfactory in open angle glaucoma patients at 3 years follow up. The efficacy and safety results were found similar to other filtration procedures. However, the MIMS® procedure is simpler and faster than most other filtering procedures.

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P-736

MINIMALLY INVASIVE NASAL TRABECULOSTOMY (MINT™) FOR THE SURGICAL TREATMENT OF OPEN ANGLE GLAUCOMA – REPORT OF SHORT-TERM RESULTS

L Voskanyan, H Miroyan, V Papoyan, H Babayan

Purpose

To report short-term (6 months) results of MINT™ operation in open angle Glaucoma Caucasian patients.

Methods

The MINT™ device (Sanoculis, Israel) automatically creates round openings in the functional trabecular meshwork by an ab-interno approach. Sixty six operations were done, of which 25 cases have completed a 6 months follow-up period.

Results

25 Patients at 6 months follow up in duration of each surgery in min:sec 3:00 ± 1:33 with preoperative IOP ± STDEV 22.8 ± 1.6[mmHg] reduction to postoperative IOP ± STDEV-14.8 ± 3.1 [mmHg]. The % of reduction of IOP 35,1. The preoperative medication ± STDEV is 0,8± 0.8. Postoperative Meds ± STDEV-0.3 ± 0.6. The reduction of meds 62,5%. No adverse events success rate with medication 80% (20/25). Success rate with no medication 68%(17/25).

Success rate (FDA definition): at least 20% IOP reduction on same or less medications.

Conclusions

The minimally invasive anti-glaucoma surgical procedure done with the new MINT™ surgical device was found satisfactory in open angle mild and moderate glaucoma . The efficacy and safety results were found similar to other trabecular by-pass procedures. However, the MINT™ procedure is simpler and faster than most other procedures .

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P-737

TWELVE-MONTHS RESULTS OF AB INTERNO TRABECULECTOMY BY MEANS OF KAHOOK DUAL BLADE IN PATIENTS WITH MEDICALLY UNCONTROLLED OPEN-ANGLE GLAUCOMA

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Purpose

The minimally invasive ab-interno excision of trabecular meshwork allows to lower the intraocular pressure (IOP) by improving the outflow of aqueous humor and is bleb-free. In this prospective study, we investigated the pressure-lowering effect, the number of preoperative and postoperative antiglaucomatous drugs, and adverse events in patients with medically uncontrolled open-angle glaucoma (OAG) treated with Kahook Dual Blade. Follow-up was 12 months.

Methods

Between May and February 2021, 14 patients with medically uncontrolled OAG, five of them with previous laser treatment or filtration surgery, underwent glaucoma surgery by means of trabeculectomy ab interno with Kahook Dual Blade.

The operations were carried out by two surgeons according to the Kahook operation protocol.

Results

The average pre-operative IOP was 22.4 ± 10.0 mmHg on an average of 3.1 ± 1.1 topical medications. One patient also needed oral acetazolamide. At six months, the average IOP-reduction was 41% to 13.3 ± 5.0 mmHg on 1.7 ± 1.3 topical medications. After 12 months, the average IOP was 11.0 ± 3.5 mmHg on 1.3 ± 1.5 topical medications. Intraoperative bleedings were not registered as complications. Despite of mild post-operative hyphemata within two weeks after surgery in six patients, who were treated with a wash-out of the anterior chamber, no significant complications related to surgery were observed.

Conclusions

The ab-interno trabeculectomy by means of Kahook Dual Blade results in a marked IOP reduction in medically uncontrolled OAG with good safety profile. The number of medications could be reduced; however, all patients needed additional IOP-lowering medications, which must be further assessed.

P-738
GLAUCOMA DRAINAGE DEVICE EXPOSURE: FREQUENCY, MANAGEMENT AND RISK FACTORS

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Purpose
To assess the frequency, effectiveness of repair and risk factors for exposure of glaucoma drainage devices (GDD).

Methods
Retrospective study. Patients undergoing GDD who had their clinical information contained in the electronic record of our institution were included (From 2015 to the present).

Patients were excluded:

-Follow-up from the implantation of the GDD < 11 months

-Tube removal for diagnosis other than exposure

The statistical analysis was carried out in R.

Results
343 GDD-operated patients presented their clinical information contained in the electronic record of our institution, of which 257 eyes of 227 patients could be included. They presented a mean age of 57 years old (standard deviation (SD) 18), 48.9% were female, and a mean follow-up of 41 months (SD 25). Within the types of glaucoma, 126 (49.4%) were neovascular glaucoma, followed by uveitic and chronic open-angle glaucoma (with 31 cases (12.1%) each), glaucoma secondary to silicone (22 cases (8.6%)) and other diagnoses in the remaining 47 cases.

Of the 257 eyes in which a GDD was implanted, 25 (9,7%) presented exposure during follow-up. The average time to exposure in this group was 20 months. For its repair, in 22 cases scleral patch plus conjunctival closure was performed and in 3 cases the GDD was removed. Of the 22 repaired cases, eight (36,4%) were reexposed.

Among the risk factors that were evaluated, we found that lower position (Odd Ratio (OR) 3.84 (95% confidence interval (95%CI) 1.64 - 8.96)), number of hypotensives drugs (OR 1.47 (95%CI 1.03 - 2.13) per each additional hipotensive drug), use of topical glucocorticoids (OR 2.85 (95%CI 1.17 - 6.71), amount of glucocorticoids daily drops (OR 1.55 (95%CI 1.19 - 2) per each additional daily drop), amount of daily drops (OR 1.23 (95%CI 1.08 - 1.4) per each additional daily drop) and number of month of follow-up (OR 1.02 (95%CI 1.001 - 1.03) per each additional month) were statistically significant risk factors. The type of device used, the presence of comorbidities such as systemic rheumatic diseases, high myopia, diabetes mellitus, severe ocular surface disease, hypotensive drug used, total number of surgeries and previous, simultaneous or subsequent surgeries to GDD implant were not associated with an increased risk of exposition.

Conclusions
The exposure of the GDD is a relatively frequent complication, its management is usually complex with a high re-exposition rate. Statistically significant risk factors are described.

P-739

DOES STEROID RESPONSE EXIST AFTER A TRABECULECTOMY? A PROSPECTIVE RANDOMIZED CONTROLLED TRIAL

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Purpose
To compare the changes in intraocular pressure in three different anti-inflammatory regimens following trabeculectomy and to investigate if a steroid induced increase in intraocular pressure occurs after a trabeculectomy.

Methods
Sixty-nine patients were randomized to receive either postoperative prophylaxis with topical preservative-free dexamethasone (DEX), diclofenac (DICLO), or their combination (DEX+DICLO) after trabeculectomy. The patients were monitored closely in 3 months with IOP measurements – the last control being 4 weeks after cessation of eye drops. Steroid response was defined as a decrease in intraocular pressure of ≥4 mmHg after cessation of steroid eye drops

Results
Intraocular pressure decreased ≥4 mmHg in 18.6% of eyes after cessation of topical steroid eye drops, DEX (n= 3/22), DEX+DICLO (n= 5/21), whereas a decrease in IOP was not observed in the DICLO group.

Conclusions
We found that IOP decreased in nearly 1/5 of patients after cessation of topical steroidal anti-inflammatory prophylaxis after trabeculectomy. This points toward a steroid-induced increased intraocular pressure even after trabeculectomy. Thus, increased postoperative IOP may be related to steroid use, and the success or failure of a trabeculectomy cannot be fully evaluated before anti-inflammatory prophylaxis with steroid is stopped or changed to non-steroidal eye drops.

P-740

OBJECTIVELY MEASURED CHANGES IN AQUEOUS FLARE AFTER CATARACT SURGERY WITH AND WITHOUT ENDOSCOPIC CYCLOPHOTOCOAGULATION (ECP) IN GLAUCOMA PATIENTS

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Purpose

Laser treatment to the ciliary body (ECP) has long been suspected of inducing inflammation beyond that seen in cataract surgery alone. This is the first investigation to objectively quantify postoperative inflammation in glaucoma patients following cataract surgery with or without ECP using a laser flare photometer (FM-600, Kowa, Nagoya, Japan).

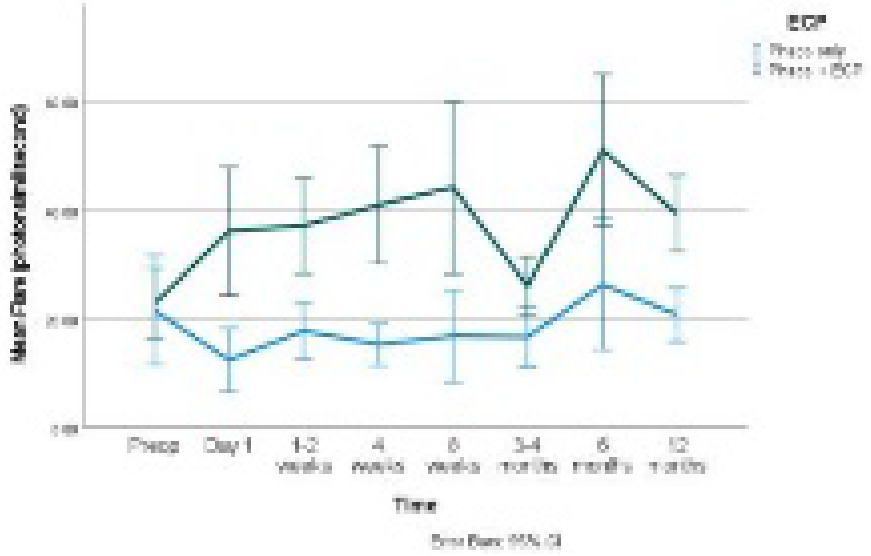
Methods

The FM-600 was used to assess glaucoma patients visiting postop clinics following their surgery, as part of their standard care. An average of 5-6 flare readings were taken on each patient prior to any drop instillation. Only patients who had cataract surgery (with or without ECP) with no prior surgery were included. Scans were taken from July 2019 to September 2022.

Results

110 eyes from individual patients with 3 or more postop scans were measured. Of these 66 eyes had phaco and 47 eyes had phaco with ECP. The average flare reading was higher for patients having combined phaco ECP compared to phaco alone at all timepoints, though this did sharply decrease for ECP at 3 months. When flare readings at 3-4 months were examined, we found a statistically significant difference in median flare in the phaco compared to the phaco ECP group which reached statistical significance following Mann Whitney U testing (11.20 photons/milisecond vs 22.90 photons/milisecond p=<0.001), which was also evident at 12 months postop (17.10 photons/milisecond vs 35.60 photons/milisecond p=<0.001). These time points were chosen as they represent follow-up intervals where inflammation from both standalone cataract surgery and cataract surgery with ECP would be expected to have resolved. Additionally, we scanned 482 eyes from 348 patients in which two eyes per patient may have been included but still found a preserved relationship of ECP patients having higher aqueous flare levels than standalone phaco.

Image



Conclusions

Cataract surgery with ECP shows higher levels of aqueous flare compared to cataract surgery alone, particularly during the first 8 weeks postop. This is the first study to objectively confirm ECP's additional inflammatory burden beyond standalone cataract surgery.

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P-741

ONE-YEAR OUTCOMES OF XEN GEL STENT OPEN CONJUNCTIVA REVISION SURGERY

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Purpose

To describe outcomes of Xen Gel Stent (XGS) open conjunctiva (OC) revision surgery in a retrospective case series.

Methods

A total of 16 eyes of 16 patients were reviewed following XGS OC revision surgery from 2019-2022. Visual acuity, intraocular pressure (IOP) and medication burden reduction were assessed using a paired t-test. Two Kaplan-Meier (KM) curves assessed survival with ≤ baseline medications while maintaining (1) [GIC – goal IOP-criteria] IOP ≤ goal IOP or (2) [PRC – percent reduction criteria] IOP reduction ≥ 20% from original XGS baseline with 5 mmHg ≤ IOP ≤ 18 mmHg for at least two consecutive visits, provided there was no further glaucoma-related reoperations and no clinical manifestations of hypotony.

Results

The mean follow-up from revision to last examination was 488.5±272 days. Four out of 16 eyes underwent revision for bleb leaks, 2/16 for exposure, and 10/16 for uncontrolled IOP. The mean time in days between original surgery and revision was significantly longer for eyes undergoing revision for uncontrolled IOP (17.5 for bleb leak vs. 19.5 for exposure vs. 246.9 for uncontrolled IOP, P=0.028). A new XGS was inserted in 70% of eyes undergoing revision for uncontrolled IOP but not in eyes undergoing revision for other reasons. The overall KM survival at 1 year was 48% under GIC and 60% under PRC. The KM survival among eyes undergoing revision for uncontrolled IOP at 1 year was 54% under GIC and 77% under PRC. IOP and medication burden were significantly reduced from the original surgery baseline up to one year beyond revision surgery (P<0.001). Overall average IOP decreased from 19.62 mmHg on 3.44 meds to 12.25 mmHg on 2.49 meds at 1 year post revision (both P<0.001). Among eyes undergoing revision for uncontrolled IOP, average IOP decreased from 19.62 mmHg on 3.40 meds to 12.00 mmHg on 0.88 meds at 1 year post revision (both P<0.001). No significant differences in visual acuity were observed at any time point. No long-term sight-threatening complications were observed. Additional IOP-lowering procedures were required in 75% of eyes that underwent revision for bleb leak but only in 20% of eyes that underwent revision for uncontrolled IOP.

Image

Figure 1. Kaplan-Meier survival after revision using GIC Criteria

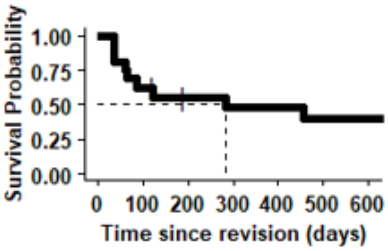


Figure 2. Kaplan-Meier survival after revision using PRC Criteria

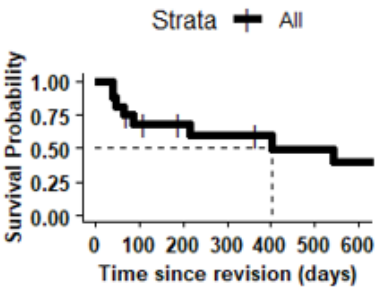


Figure 3. Kaplan-Meier survival after revision for Uncontrolled IOP using GIC Criteria

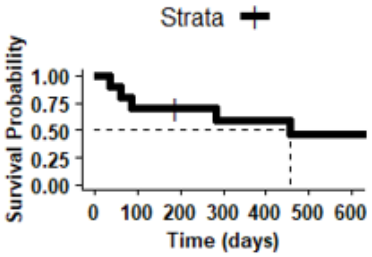
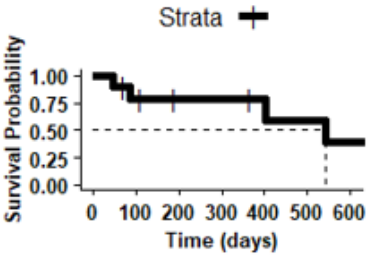


Figure 4. Kaplan-Meier survival after revision for Uncontrolled IOP using PRC Criteria



Conclusions

XGS OC revision provided successful resolution of complications associated with XGS surgery in many cases while decreasing IOP and medication burden.

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P-742

SURGICAL OUTCOMES OF ADDITIONAL AB INTERNO 240° TRABECULOTOMY AS THE SECOND SURGERY USING A SUTURE IN PATIENTS WITH PRIMARY OPEN-ANGLE GLAUCOMA

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Purpose

Trabeculectomy (TLE) has been commonly performed as a second operation if patients with primary open-angle glaucoma (POAG) who were treated at the first surgery by ab externo 120° trabeculotomy (TLO) using a metal probe required additional glaucoma surgery. However, TLE represents a severe surgery regarding postoperative management difficulties and complications including reduced visual acuity and endophthalmitis. In this retrospective 12-month follow-up study, we investigated the surgical outcomes of additional ab interno 240° TLO using a suture in patients with POAG who had previously undergone ab externo 120° TLO using a metal probe as the first surgery.

Methods

This retrospective study enrolled 22 eyes of 19 patients with POAG who underwent 240° LOT ab interno with a suture at Kansai Medical University Hospital between January 2015 and December 2022. We investigated the following parameters: the period from the first ab externo 120° metal probe LOT to the second ab interno 240° suture LOT, intraocular pressure (IOP), the number of IOP-lowering medications, the incidence rate of early postoperative complications including hyphema with niveau formation (> 1 mm) and transient IOP spikes (IOP increased > 30 mmHg) within 1 month, and the success rate by Kaplan–Meier survival analysis. The postoperative IOP and number of IOP- lowering medications were obtained at 1 week and 1, 3, 6, 9, and 12 months post-surgery. All statistical analyses were conducted using JMP software version 15 (SAS Inc., Cary, NC, USA).

Results

The mean period was 78.1 months from the first ab externo 120° metal probe LOT to the second ab interno 240° suture LOT. The median IOP was significantly reduced from baseline (18.8, 14, 14, 15, 14, 14, and 14 mmHg at baseline, 1 week, and 1, 3, 6, 9, and 12 months post-surgery, respectively: $p < 0.05$). The mean number of IOP-lowering medications was 4.3 at baseline and 1.6, 2.7, 3.5, 3.8, 3.8, and 3.9 at 1 week and 1, 3, 6, 9, and 12 months post-surgery, respectively. The number of IOP-lowering medications was significantly lower at 1 week and at 1 and 3 months compared with baseline ($p < 0.05$). Kaplan–Meier cumulative survival analyses showed a 50% success rate. Incidences of both hyphema with niveau formation and transient IOP spikes were confirmed in three eyes (13.6%).

Conclusions

The results of this study suggested that 240° ab interno suture LOT as a second surgery could be a useful operation to avoid TLE.

P-743
CO2 LASER-ASSISTED SCLERECTOMY SURGERY (CLASS) - INDICATIONS, RESULTS AND POSSIBLE COMPLICATIONS

M Atanassov

Purpose
To assess the efficacy and possible intra- and postoperative complications of CO2 Laser-Assisted sclerectomy (CLASS) surgery in patients with open-angle glaucoma.

Methods
The study includes 21 eyes of 18 consecutive patients with mild to moderate open-angle glaucoma with IOP > 21 mmHg under maximum tolerated topical therapy. Their mean age was 67.9 ± 8.2 years [range 52-80] and the mean baseline Intraocular pressure (IOP) was 30.57 ± 4.93 mmHg [range 21 – 40]. After the CLASS procedure, IOP, complications and need for additional therapy or procedures were assessed on the first, 21st, and 180th-day post-op. Results were classified as a success if untreated IOP was ≤ 18 mmHg, a qualified success if IOP with or without topical treatment was ≤ 18 mmHg and a failure if IOP was >18 mmHg on day 180.

Results
The mean IOP on the first-day post-op was 12.00 ± 4,51 mmHg [2-18], on day 21 – 14.05 ± 5,99 [2-22], and on day 180 - 15,80 ± 4,94 mmHg [6-26] ($p<0.001$). There was complete success in 12 of the patients (57.14 %), qualified success in 18 patients (85.72%), and failure in 3 of the 21 (14.28%) patients. In 4 patients a penetration into the anterior chamber occurred during the laser application, 3 needed goniopuncture and 3 – needle revision in the postoperative period. Two of the eyes with failure had trabeculectomies. One eye developed severe herpetic keratitis 4 months post-op which was considered a failure, not directly related to the anti-glaucoma procedure. The mean number of medications pre-op was 3.48±0.68 [2-4] and post-op – 0.90±1.18 [0-4].

Conclusions
Given the relatively good efficacy and low rate of intra- and postoperative complications, the CLASS procedure may be considered an alternative to the standard anti-glaucoma surgical techniques.

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P-744

SAFETY AND EFFECTIVENESS OF THE PRESERFLO MICROSHUNT DEVICE IN ASIAN PATIENTS WITH PRIMARY OPEN ANGLE GLAUCOMA

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Purpose
This study aims to gather safety and effectiveness data of the Preserflo MicroShunt device in Asian patients with primary open angle glaucoma (POAG).

Methods
This was a prospective, single arm study of subjects receiving the Preserflo MicroShunt from November 2020 to July 2022 at a tertiary eye center in Singapore. Thirteen eyes were included. Surgical success for patients with baseline IOP ≥18 to ≤21 mmHg, was defined as an intraocular pressure (IOP) reduction of 20% or greater. For patients with baseline IOP >21 mmHg, success was measured as IOP<21 mmHg and IOP reduction of 20% or greater. Complete success was defined as achieving the desired IOP target without supplemental medications and qualified success refers to that which requires medications.

Results
At 6 and 12 months, the complete success rate was 84.6% (11 out of 13 eyes) and 75% (6 out of 8 eyes) respectively. Qualified success at 6 and 12 months was 7.7% (1 out of 13 eyes) and 0% respectively. The reduction in median IOP was from 19mmHg to 13mmHg (11.0 to 14.0) (p=0.002) at 6 months; 12mmHg (12.0 to 13.5) (p=0.176) at 12 months. The reduction in median number of medication was from 3 to none at 6 and 12 months (p<0.05). There were no intra-operative complications reported. The failure rate at 12 months was 25% (2 out of 8 eyes required either trabeculectomy or bleb revision).

Conclusions
The Preserflo MicroShunt is a safe and effective surgical procedure that reduces IOP and burden of glaucoma medications in subjects with POAG.

P-746

LONG-TERM COURSE OF SURGICALLY INDUCED ASTIGMATISM FOLLOWING TRABECULECTOMY WITH MITOMYCIN C

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Purpose

To objectively evaluate long-term course of surgically induced astigmatism (SIA) after trabeculectomy with mitomycin C.

Methods

This retrospective study included the right eyes of 65 consecutive patients who underwent standard trabeculectomy performed in the superior temporal quadrant for the first time by a single surgeon. Keratometry recordings made before surgery and 1-, 3-, and 6-months, and 1-, 2-, and 3-years after surgery were collected to calculate the SIA at different time points in each patient. Keratometry was recorded by an autorefractor keratometer (Nidek, TONOREF II, Japan). The arithmetic mean of SIA (M-SIA), which is the mean of only the magnitude of SIA, and the centroid of SIA (C-SIA), which is the mean SIA vector considering not only magnitude, but also direction, were determined. This study did not include cases of simultaneous cataract surgery. If any additional surgery other than laser suture lyses and bleb needling was performed, subsequent data were excluded from the analysis.

Results

The mean (± standard deviation) M-SIA was 1.11 ± 0.77 D at 1 month, 0.96 ± 0.79 D at 3 months, 0.98 ± 0.91 D at 6 months, 1.11 ± 0.91 D at 1 year, 1.11 ± 0.89 D at 2 years, 0.96 ± 0.64 D at 3 years. M-SIA did not change significantly during follow-up. The mean C-SIA was 0.49 ± 1.27 D at 115° at 1 month, 0.32 ± 1.21 D at 108° at 3 months, 0.34 ± 1.30 D at 97° at 6 months, 0.15 ± 1.44 D at 112° at 1 year, 0.07 ± 1.43 D at 177° at 2 years, 0.10 ± 1.16 D at 35° at 3 years. In the early postoperative period, the direction of C-SIA showed a trend of corneal steepening to the superior temporal location, in the direction of the scleral flap location. However, the magnitude of C-SIA gradually decreased, and almost stabilized from 1 year after surgery.

Conclusions

Trabeculectomy induced a large amount of astigmatic shift in the direction of the scleral flap in the early postoperative period. Although M-SIA remained virtually unchanged over the long-term postoperative course, C-SIA moved gradually and almost stabilized after the first year postoperatively.

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P-748

FIVE YEAR OUTCOMES OF THE CYPASS SUPRACILIARY MICROSTENT IN A TERTIARY GLAUCOMA CENTRE IN THE UNITED KINGDOM

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Purpose

The Cypass microstent was withdrawn from the market due to concerns involving corneal decompensation and endothelial cell loss. However, there are few long-term studies. Here we report a retrospective observational, longitudinal cohort study, in a tertiary referral glaucoma unit in the United Kingdom with a multi-ethnic diverse population, and evaluate the safety and efficacy of the Cypass microstent over a 5 year follow up period.

Methods

Retrospective review of electronic medical records (EMR) database for all patients who had Cypass inserted with or without combined cataract surgery at a single centre. The primary safety outcome was incidence of corneal oedema post Cypass insertion. Secondary efficacy outcomes were mean IOP and medication reduction over 5 years.

Results

We report data of 219 eyes from 190 patients. Overall 74% of eyes had Primary Open Angle Glaucoma but other indications included Angle closure glaucoma, Pseudoexfoliation, Uveitic, Neovascular, Pigmentary and Ocular Hypertension. 151 eyes had Cypass insertion combined with phacoemulsification cataract surgery (69%), 68 eyes had Cypass insertion alone (31%). Complete surgical failure rate; defined as need for further glaucoma surgery, laser or loss of PL vision, at 5 years was 18%. Relative to baseline, mean IOP was reduced from 19.4 mmHg ±6.3 to 13.3±4.2 mmHg (year 1), 14.1±4.3 mm Hg (year 2), 14.0±4.5 mm Hg (year 3), 13.4±4.1 mm Hg (year 4) and 14.4±5.2 mm Hg (year 5) ($P<0.001$). The mean number of medications reduced from 2.3±1.3 at baseline to 1.7±1.5 (year 4) ($P<0.001$). 22.3% of eyes remained on no medications post Cypass insertion for the entire follow up period.

Overall the incidence of corneal oedema was 1.8% but incidence attributable to Cypass insertion was 0.45% (1 eye). There were three other eyes where corneal oedema could be attributed to multiple factors. One eye had a pre-existing corneal graft which failed 3 years post Cypass, one had Baerveldt tube (BVT) insertion 2 years post Cypass and corneal oedema at 5 years, another had pre-existing trabeculectomy and BVT prior to Cypass and developed corneal oedema at year 4.

Conclusions

The rate of corneal oedema post Cypass insertion was very low after 5 years follow up and IOP and medication use was effectively lowered. This data supports ongoing informed patient counselling and clinical vigilance.

P-749

CURRENT TREATMENT OPTIONS FOR RESTORING A FAILING FILTERING BLEB: A SYSTEMATIC REVIEW AND NETWORK META-ANALYSIS

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Purpose
This study aims to systematically review the current evidence concerning the different therapeutic options for a failing filtering bleb and to perform a network meta-analysis on the available data.

Methods
This network meta-analysis and systematic review was performed using the methods described by the Cochrane Collaboration for systematic reviews of interventions and in accordance with the PRISMA guidelines. Literature search for review was conducted using electronic databases such as Cochrane, PMC, and PubMed open access. The outcomes being measured for each treatment option are the mean IOP, mean change in IOP, and the overall success rate.

Results
Nine papers were read and met our eligibility criteria supplementing records of 352 eyes, which were allocated among the following interventions: needling only, placebo, MMC, 5-FU, Bevacizumab, and anti-glaucoma medications. For the mean IOP at 12 months, analysis of the pooled mean difference of the different interventions indicates that most comparisons were not statistically different. But comparing needling alone with 5-FU, the latter had a significantly higher mean IOP at 12 months. SUCRA is a graphical representation of the percent treatment to be the best among all the treatment analyzed. Needling ranks first with probability of 95.00%, followed by Bevacizumab and MMC, with a second-best probability of 34.60%. For the mean IOP percent change at 12 months, results show that mean IOP changes were not statistically different. SUCRA curve showed that needling ranked first among the interventions, with a best probability of 34.80%, followed by 5-FU with a best probability of 30.30%. For overall complete success, results indicated that the pooled odds ratio for the pairwise analyses of the different interventions were not statistically significant ($p>0.05$). Among the interventions, the SUCRA curve indicated that medical management had the first rank probability of being the best treatment, with cumulative probability of 31.90%.

Conclusions
We found that needling with or without antimetabolites or anti-VEGFs to be equally effective in controlling IOP and equally successful. We did not find any sufficient evidence to favor one intervention over the other. Thus, it remains difficult to draw out recommendations for clinical practice. We believe that change in IOP that a specific intervention can achieve may be the best criteria in deciding which option to consider although the surgeon's preference may take precedence.

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P-750

ANATOMOPATHOLOGICAL CHANGES AND VESICLE FORMATION AT THREE MONTHS IN RABBITS' TRABECULOTOMIES USING TRANSURGICAL 20% THEALOSE VS SHAM

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Purpose
To report the proportion of vesicle formation and anatomopathological characteristics of subconjuntival use of 20% trehalose in the scleral bed of rabbits undergoing trabeculectomy compared to control at 3 months post-surgery.

Methods
A experimental, prospective, longitudinal, and descriptive study in which trabeculectomy was performed in a total of 10 New Zealand white rabbits divided in two groups using subconjunctival trans-surgical application of 20% trehalose (n=5) against a control group of balanced saline solution (n=5). Endothelial cell count was performed preoperatively and postoperatively. The percentage of vesicle formation after the procedure was evaluated and recorded with slit lamp photographs. An anatomopathological study using hematoxylin/ eosin and Masson's trichrome stain was performed at 3 months post-surgical and analyzed by an expert ocular pathologist . The results are reported in descriptive statistics with interquartile ranges.

Results
Vesicle formation was found in 90% of the rabbits (9/10). The pre-surgical endothelial cell count for the trehalose group was 2468.5 (RI 1413 - 3524) and in the post-surgical group an average of 2529.75 (RI 1387-3324) cells. The control group presented a pre-surgical count of 2842.667 (RI 2635-3064) cells; in the post-surgical group it presented 2410 (RI 1781-2663) cells. In the histopathological study the control groups had a greater response of granulomatous type and multinucleated giant cells. None of the groups presented serious complications during follow-up, there were no surgical site infections, vesiculitis or endophthalmitis.

Image

Specimen	BSS or Trehalose	Vesicle formation	H&E and Masson's trichrome stain	Surgical complications
#1	Trehalose	YES	Not processed due to complication in surgical technique	Ciclectomy
#2	BSS	No	Enhanced fibroblast proliferation with multinucleated giant cells	Injection of trehalose in anterior chamber
#3	Trehalosa	YES	Little granulation reaction, only some lymphocyte infiltration	Bubble in anterior chamber on first day of PO
#4	BSS	YES	Inadequate sample. No scar tissue or suture visualized	PO corneal edema
#5	Trehalosa	YES	Subconjunctival suture is superficial, scanty response, epithelioid cells are more predominant than giant cells. Loose scleral stroma. No fibroblastic reaction is seen. No collagen formation.	N/a
#6	BSS	YES	Inadequate sample. No scar tissue or suture visualized	N/a
#7	Trehalosa	YES	Longitudinal suture is appreciated, without significant foreign body reaction. No granulomatous reaction is seen.	N/a
#8	BSS	YES	Granulomatous response with multinucleated giant cells.	N/a
#9	Trehalosa	YES	Few epithelioid cells and little fibrous reaction are seen.	N/a
#10	BSS	YES	There is interrupted collagen, without suture. There is an area that simulates cyclodialysis, edematous epithelial cells. A large subconjunctival space is seen, but collagen formation is not seen.	N/a

TABLE 1. SURGICAL CHARACTERISTICS OF THE RABBITS. TREHALOSA USED AT A CONCENTRATION OF 20%. BSS= BALANCED SALINE SOLUTION. H&E= HEMATOXYLIN AND EOSIN STAIN. N/A= NOT APPLICABLE, PO= POSTOPERATIVE

Conclusions

Subconjunctival application of 20% trehalose during trabeculectomy in New Zealand type rabbits may be an alternative in modulating surgical post-traumatic anti-inflammatory activity. This study demonstrates the use of this molecule as safe in animal tissues.

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P-751

PRESERFLO MICROSHUNT FOR THE TREATMENT OF UNCONTROLLED OPEN-ANGLE GLAUCOMA: 3-YEAR RESULTS

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Purpose
to report efficacy and safety of Preserflo MicroShunt (PMS) implant in uncontrolled open-angle glaucoma patients

Methods
retrospective review of consecutive patients who underwent PMS implant from 2019 to 2022. Eyes with uncontrolled open-angle glaucoma despite maximum tolerated medical treatment and/or previous selective laser trabeculoplasty were included. All surgeries were performed by the same surgeon (RGC). PMS implant was done in the supero-temporal quadrant. After dissection of the conjunctival fornix-based flap, sponges soaked with 0.04% MMC were applied on the scleral bed for 2 to 3 minutes depending on the conjunctival inflammatory status. After thorough irrigation with BSS, a 1-mm deep scleral pocket is made 3-mm posterior to the limbus. A 25G needle is then introduced into the pocket and a scleral track is created into the anterior chamber (AC). The PMS is inserted through the pocket and track, beavel-up, into the AC. Tenon and conjunctiva are finally watertight sutured at the limbus. Primary outcome was surgical success defined as IOP equal or below 15 mmHg, with or without medical therapy (qualified or complete success, respectively), and considered at target without additional laser or surgery. Kaplan Meyer survival analysis was used to calculate success rates

Results
142 eyes of 121 patients were operated, 20 eyes were excluded (8 were lost at follow-up, 1 died and 11 had follow-up shorter than 12 months). Analysis was conducted on 122 eyes. Follow-up ranged from 12 to 39 months. Mean IOP (SD) decreased from 24.6 (7.8) mmHg to 11.3 (3.6) and mean (SD) number of medications decreased from 3.7 (0.8) to 0.4 (0.9). Both changes from baseline were statistically significant (p<.005). Complete and qualified success at 36 months were 65% and 81%, respectively. Nineteen eyes were defined as failures (5 had IOP > 15 mmHg despite medical therapy, 12 underwent surgical bleb revision, 2 had additional surgery). Twenty-six eyes had 1 or more 5-fluorouracil needlings during follow-up. Complications were intraoperative bleeding (24.6%), stent-iris contact (1.7%), hypotony with choroidal detachment (2.5%), shunt exposure (0.8%). One eye developed an endophthalmitis from an inferior corneal ulcer that was not related to the PMS implant.

Conclusions
PMS implant is an effective and safe surgical procedure to control IOP in uncontrolled open-angle glaucoma patients.

P-752

TWO YEAR OUTCOMES OF KAHOOK DUAL BLADE COMBINED WITH CATARACT SURGERY IN PATIENTS WITH ANGLE CLOSURE DISEASE

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Purpose
The aim of this study was to present the 24 month outcomes of the Kahook Dual Blade combined with cataracts surgery (KDB-CS) in patients with angle closure diseae (ACD)

Methods
Retrospective review of 90 eyes of PACD who underwent combined cataract surgery and KDB was analysed. Inclusion criteria included patients with : Primary angle closure (PAC) with uncontrolled intraocular pressure, Primary angle closure glaucoma with either uncontrolled intraocular pressures or progression on maximal therapy. Preoperative, intraoperative, and postoperative data were collected through the 24-month follow-up period.

Primary outcomes were mean IOP reduction, proportion of patients achieving ≥20% IOP reduction and mean reduction in medication requirements compared to baseline.

Secondary outcomes were need for additional glaucoma surgery and adverse events.

Results
Preoperative baseline mean IOP was 20.2 ± 6.0mmHg on a mean number of 0.98 ± 1.291 medications. Three patients were also on oral acetazolamide at the time of surgery.

Sixty six (73.3%) at 12 months and 75 eyes (72.2%) at 24 months achieved achieved ≥20% reduction in IOP compared to baseline (P<0.05).

At 24 months followup, 43 (47.8%) patients achieved a reduction in 1 or more drops. The proportion of patient that were drop free was 28 (31.1%) patients at 12 months and 18 (20%) patients at 24 months.

In terms of post-operative adverse events, 6 (6.7%) of patients had a hyphaema within the first 48 hours which resolved at the 1 week follow-up in all patients. IOP spike (defined as >10mmHg increase of IOP from baseline) within the first six week following surgery occurred in 18 (29%) of eyes. 2(2.22%) patients needed further surgery (Trabeculectomy) in order to meet target IOP requirements.

Conclusions
Patients with angle closure disease achieved significant IOP and medication reductions following cataract surgery combined with KDB at 24 months follow-up.

P-753

GLAUCOMA SEVERITY AND POST-TRABECULECTOMY REVIEW ADHERENCE AT A RURAL TERTIARY REFERRAL OPHTHALMIC CLINIC IN BURUNDI

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Purpose
To evaluate the severity of glaucoma and patients' adherence to post trabeculectomy follow up review in Burundi.

Methods
Retrospective chart review of patients undergoing trabeculectomy surgery from July 2021 to September 2022 at Kibuye Hopital Espoir de Kibuye (HEK) in central Burundi. Data included demographics, visual acuity (VA), intraocular pressure (IOP), cup disc ratio (CDR), at baseline and at review attendance on day one (D1), week one (W1), month one (M1) and month three (M3). Glaucoma severity was defined based on CDR due to lack of available visual field testing (there are limited number of visual field machines in Burundi).

Results
Trabeculectomy surgery was performed in forty-five eyes of 45 patients of which 31 males (69%) with mean (±SD) age of 54.48 (± 18.76) years old. The mean pre-operative IOP was 34 (±12) mmHg. Mean (±SD) number of glaucoma agents was 1.02 (±0.36) with 22 (49%) patients taking acetazolamide at the time of surgery. Most patients were subsistence farmers (n=33, 73%), had no health insurance (n= 37, 82%), and presented with advanced optic neuropathy (n=33, 73%), with mean (±SD) CDR of 0.91 (±0.1). Baseline VA was worse or equal to count fingers (CF) in 14 (31%) of operated eyes. At D1, W1, M1 and M3, post-operative review attendance rate was 100%, 48%, 13% and 4%; mean (±SD) IOP was 17.93 (±11.89) ,12.56 (±5.25), 15.33 (±8.43), 11.00 (±4.24) mm Hg, and number of operated eyes with VA ≤CF was 14/45 (31%), 8/22 (6%), 3/6 (50%) and 0/2 (0%), respectively. Patients living in central Burundi and with insurance were more likely to attend their postoperative follow up review compared to other groups, although there was no significant statistical difference.

Conclusions
Patients receiving trabeculectomy presented with advanced glaucomatous neuropathy with reduced vision. Post-operative follow-up attendance was poor. Interventions are required, and are underway to raise awareness of glaucoma, filtration surgery and the benefit of postoperative review with all the stakeholders including the health ministry, eye professionals and patient interest groups.

P-754

ENDOCYCLOPHOTOCOAGULATION VS. BANG: OUTCOMES IN MILD-TO-MODERATE PRIMARY OPEN ANGLE GLAUCOMA

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Purpose
To investigate the comparative efficacy and safety of ocular surface independent minimally invasive glaucoma surgery (MIGS) endocyclophotocoagulation (ECP) and ocular surface dependent bent ab-interno needle goniectomy (BANG) in mild-to-moderate Primary Open Angle Glaucoma (POAG) with chronic usage of anti-glaucoma medication.

Methods
Design: Retrospective, interventional, comparing 2 minimally invasive procedures – ECP (independent of angle status and collector channels and) and BANG (dependent on collector channels and aqueous veins).

Participants: Retrospective review of consecutive subjects with POAG, aged 30 years or more, who underwent ECP or BANG, with or without phaco.

Primary outcome measure was intraocular pressure (IOP). Secondary outcome measures were best-corrected visual acuity (BCVA), number of antiglaucoma medications (AGMs), complications, and complete success.

Results
37 eyes were included; 21 eyes underwent ECP, and 16 eyes underwent BANG; it was combined with phaco in 29 eyes whilst the rest were pseudophakic. Each eye was on 2 or more AGM for at least 1 year. Follow-up in ECP group was 6.0±2.8 months and that in the BANG group was 6.1±3.0 months. Pre-operatively both groups were well matched in age, IOP, AGM and BCVA. In each group there was significant reduction in IOP and AGM, and improvement in VA. Post-operatively at final visit there was no difference between groups for IOP (p=1), AGM (p=.2187) and BCVA (p=.0784). No serious sight threatening complication occurred in either group and there was no significant difference in the complete success between the groups.

Conclusions
Both types of MIGS, ECP and BANG, are effective and safe procedures in controlling IOP with significant reduction in AGM in POAG in mild-to-moderate glaucoma with chronic usage of topical medications. Long-term follow-up is recommended to check for validity of the results.

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P-755

EFFICACY AND SAFETY OF COMBINED BENT ANGLE NEEDLE GONIOTOMY (BANG) AND PHACOEMULSIFICATION IN EYES WITH GLAUCOMA AND CATARACT

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Purpose

Glaucoma and cataract usually coexist in older patients, the approach could be variable and will depend on the glaucoma control and severity; one of the therapeutic options is a combined cataract and glaucoma surgery.

On the other hand, minimally invasive glaucoma surgery (MIGS) is being adopted by more ophthalmologists due to their effectiveness and lower risk of complications; one of its limitations is the high cost of used devices; an inexpensive alternative is the Bent Angle Needle Goniotomy (BANG) which requires very little investment and has good results. Our study evaluates the efficacy and safety of combined BANG surgery plus phacoemulsification.

Methods

This is a prospective case series study of 15 enrolled eyes with cataract and glaucoma undergoing combined surgery, 4 with open-angle glaucoma, 10 with angle-closure glaucoma, and one with pseudoexfoliative glaucoma. All of them with maximum tolerated medical therapy.

The procedure consisted of performing a 60-degree ab interno goniotomy with a #25 needle at the end of phacoemulsification, intracameral carbachol was injected and an air bubble was left for haemostasia.

The value of IOP reduction, reduction in the number of drops, and the frequency and severity of complications were studied, during a 6-month follow-up.

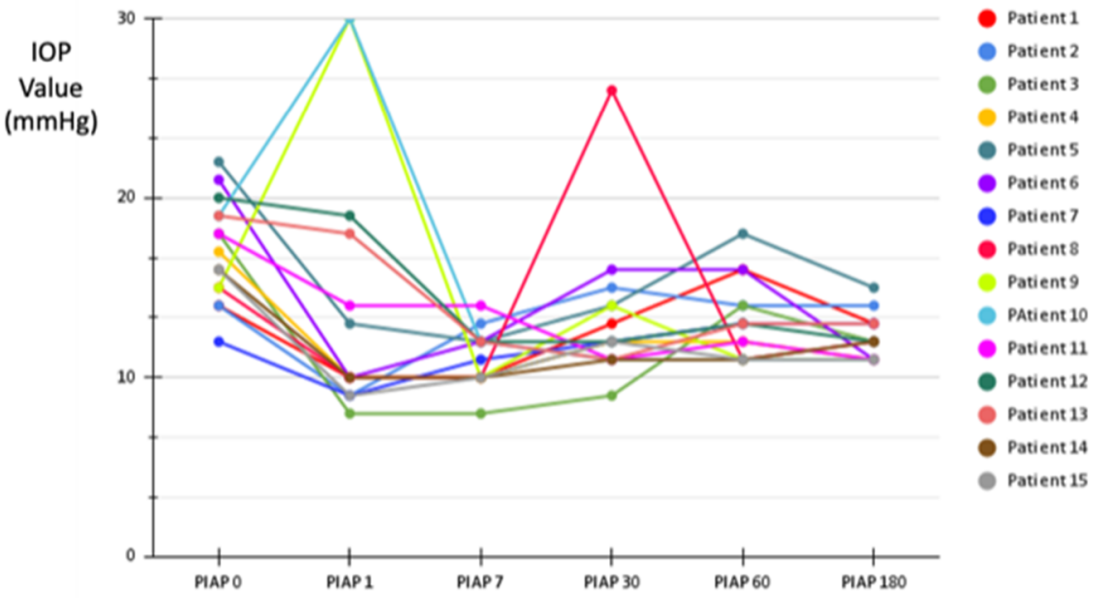
Results

13 eyes were male, 2 females, and the mean age was 66.26 ± 5.18 years. Medicated baseline IOP average was 17.06 ± 2.84 mmHg. At post operative month six, the mean IOP was 12.13 ± 1.24 mmHg ($p< 0.001$), a 28.89% reduction in IOP was achieved. There was also a statistically significant reduction in the number of antiglaucoma drops, from a mean of 2.93 ± 0.88 to 1.6 ± 1.4 drops ($p<0.001$), and 6 eyes (40%) did not require medication at the end of the study.

All complications were transient (less than a week in duration) and infrequent: cells in the anterior chamber, corneal edema, conjunctival hyperemia, and air bubble in the posterior chamber

Image

Internal use



Conclusions

BANG Surgery is a low-cost MIGS technique available to surgeons, and combined with phacoemulsification offers a safe and effective alternative for IOP reduction in patients with cataract and glaucoma, either with open angle and angle closure. This preliminary study needs to expand and a longer follow-up.

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P-756
OUTCOMES OF ITRACK AB INTERNO CANALOPLASTY (ABIC) IN ONE YEAR FOLLOW UP

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Purpose
Canaloplasty is a surgical glaucoma treatment method that improves the physiological outflow of aqueous humor through the Schlemm's canal. There are many modifications of this method, both with the ab interno and ab externo access. The aim of the study is to evaluate the efficacy and safety of ABiC for the treatment of open angle glaucoma in various patients in one year observation period.

Methods
Patients with glaucoma and uncontrolled intraocular pressure despite maximally tolerable antiglaucoma medications were selected to the study. We included 26 adult patients with various open angle glaucoma subtypes. All of them underwent ABiC procedure between 2017 to 2021 and had at least 12-months of follow-up period. Patients were treated with the ab-interno surgical technique using the iTrack canaloplasty microcatheter (Nova Eye Medical). Only patients with 360-degree successful catheterization were included. After the procedure we assessed the post-operative intraocular pressure, best corrected visual acuity, the number of adverse events and complications and the number of antiglaucoma medications.

Results
After the procedure the mean intraocular pressure reduction was observed. The mean IOP was 27,71±9,05 mmHg, 17,05±7,37 mmHg, 17,18±2,79 mmHg, 17,57±1,71 mmHg, 16,5±1,69 mmHg and 14,5±5,05 mmHg before, 1 day, 1, 3, 6, 12 months after the surgery, respectively. The mean usage of the anti-glaucoma topical medications was 2,9±1,02, 1,55±1,39, 2,1±0,74, 2,17±0,75, 2,0±1,2 and 2,14±1,07, before, 1 day, 1, 3, 6, 12 months after the surgery, respectively. No decrease in BCVA and no severe complications were observed. Some of the patients after the surgery were qualified for another antiglaucoma surgery due to insufficient intraocular pressure reduction.

Conclusions
Ab-interno canaloplasty appears to be a safe and effective treatment for glaucoma in all stages of the disease, although further studies are required to assess the long-term effect and late postoperative complication rate.

P-757

INTRODUCTION OF OUTPATIENT TRABECTOME AND PRESERFLO SURGERY TO A HIGH-VOLUME REFRACTIVE AND CATARACT SURGERY CENTER

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Purpose

The increasing glaucoma burden in Germany has caused high-volume surgery centers specialized in refractive and cataract surgery to also offer outpatient glaucoma surgeries. Although an outpatient setting has been an international standard for glaucoma surgery for at least two decades, they had been traditionally performed as inpatient surgeries in Germany despite more than 10-fold higher costs to the healthcare system. In this study, we describe our results for patients with at least six months follow-up since the introduction of Trabectome and Preserflo surgery at the Artemis Eye Centers of Frankfurt.

Methods

Out of 352 surgeries since the introduction of Trabectome (T) and Preserflo (P) at our center in February 2022, 64 eyes (T: n= 28; P: n= 36) qualified as having complete six months data sets available. T had a 120-degree ablation of the nasal trabecular meshwork. P was performed only with 0.2 mg/ml MMC to reduce the chances of hypotony-related complications during the introduction of this filtering surgery. 5FU was given three times. We assessed IOP, visual acuity, medications (meds). Visits occurred on postoperative days 1, 7, 30, 90, and 180.

Results

We observed a paradigm shift in patient expectations who much desired outpatient over inpatient care. The referring non-surgical ophthalmologists embraced being trained in and performing postoperative care.

The IOP in T was reduced from 27.7±6.5 mmHg at baseline to 16.8±3.7 mmHg at 6 months and in P from 23.2±8.0 mmHg to a trough of 12.0±3.7 mmHg at 1 week that increased to 16.8±5.0 mmHg at 6 months (p=0.5). For criteria “IOP lower by 20% and IOP < 21 mmHg”, 64.3% of T and 47.2% of P were considered a qualified success (p=0.17). For “IOP lower by 20% or IOP < 21 mmHg”, 75% of T and 69.4% of P were considered a qualified success (p=0.62). Meds declined in T from 2.3±1.2 to 0.4±0.9 and in P from 2.3±1.0 to 0.3±0.7 (T vs. P: p=0.76)

The absolute success rates for advanced glaucoma (IOP lower by 30% and < 14 mmHg) were 21.4% in T and 30.6% in P (p=0.41). 8 P had to undergo a revision. 3 T needed a Preserflo. No complications occurred.

Conclusions

T and P lowered IOP with the same efficacy and safety. IOP continued to climb in P highlighting the importance to use at least 0.4 mg/ml MMC instead of 0.2 mg/ml and to intensify 5FU if needed. Because most T were combined with phaco, a reduction of meds instead of IOP was an acceptable outcome.

P-758

TACKLING THE TUBE IN A CASE OF REFRACTORY STURGE WEBER SYNDROME WITH SECONDARY GLAUCOMA – A SURGEONS NIGHTMARE!

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Purpose

Case of Sturge Weber Syndrome (SWS) with refractory secondary glaucoma post multiple failed trabeculectomy, who underwent an uneventful Ahmed Glaucoma Valve (AGV) implantation with inadvertent Anterior Chamber (AC) shallowing in immediate post-op due to valve malfunction

Methods

20 year old male of SWS with secondary glaucoma, twice operated failed trabeculectomy and twice DLCP within last 2 years yet refractory to maximal tolerable medications. This was an indication for AGV implantation. He underwent uncomplicated AGV implantation (FP7) in right eye. Tube was covered with scleral patch graft and peritomy closed. Intraop AC was formed with no leak around conjunctiva. On POD1, flat AC was observed with no leak (IOP-10mmHg). AC was filled with viscoelastic agent (Healon) in OR. On POD2, AC seemed flattened (IOP-34mmHg). AC reformation was done with Healon but AC was shallowing again with no leak (IOP-30 mmHg). USG gave no evidence of Choroidal effusion or detachment. Probable aetiology for persistent shallowing of AC (Grade 3) was attributed to valve malfunction. We decided to reform AC with Healon GV and ligate the tube. After localised peritomy, tube ligated with 6-0 vicryl (single suture) 3-4mm away from limbus and conjunctiva sutured back with 8-0 vicryl.

Results

On POD1 following tube ligation with vicryl, AC seemed deep (IOP-40 mmHg). 6 tsp Glycerol TDS was started. On POD5 AC decompression was done for persistent high IOP to partially remove Healon. AC was well formed (IOP-30mmHg) on POD6. Patient was discharged on POD9 (IOP-28mmHg) on syrup glycerol. After 3 weeks, patient was started on Timolol 0.5% BD and stopped glycerol (IOP-22mmHg). After 8 weeks, AC was well formed with VA of 6/9p aided (IOP-22mmHg) on Timolol 0.5%.

Image

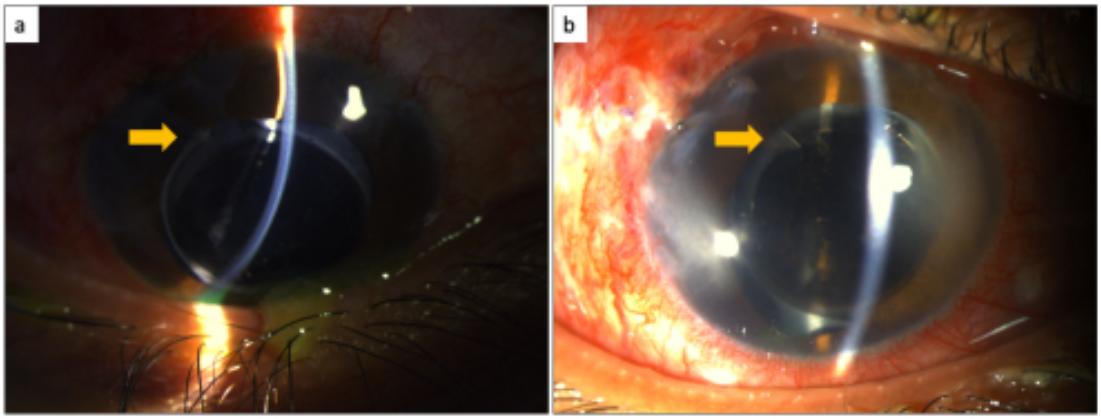


Figure: Slit lamp clinical photographs of patient with SWS with AGV implanted and tube(yellow arrow) visualized in situ. Image (a) shows shallow AC in immediate postoperative period of AGV implantation and (b) shows AC deep and formed post tube ligation with 6-0 Vicryl suture

Conclusions

Choroidal effusion after glaucoma surgery in SWS causing shallow AC isnt uncommon. Provisional diagnosis of Valve malfunction was made after excluding active leak, overfiltering bleb and choroidal effusion. Tube ligation with vicryl is a simple and effective eye saving procedure to prevent disastrous complications like corneal decompensation, tube occlusion and subsequent failure of the tube. This highlights importance of tube suturing to restrict aqueous flow during early post-op (3-4wks). Fibrosis around the valve will restrict aqueous outflow in late post op. 6-0 vicryl is an ideal suture as it is easily absorbable with its fibres loosening within 3-4 weeks avoiding any need for separate procedure to remove them.

P-759

THE INFLUENCE OF THE SURGEON'S EXPERIENCE ON THE OUTCOME OF TRABECULECTOMY

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Purpose
The aim of the study was to assess the outcome of trabeculectomy with respect to the surgeon's experience.

Methods
A retrospective study of all glaucoma patients was conducted, who underwent a trabeculectomy with mitomycin C between December 2019 and May 2022 of one learning surgeon starting from the first self-conducted trabeculectomy. Patients were followed for one year and were divided into 5 groups according to the number of already performed trabeculectomies (G1: 1-50, G2: 51-100, G3: 101-150, G4: 151-200, G5: 201-300). Eyes with previous filtrating or other ocular surgeries were included, no eye was excluded. Complete success was defined as intraocular pressure (IOP) < 18mmHg and 20% IOP reduction without any glaucoma eye drops and any revisions (needling was defined as failure as well).

Results
300 consecutive eyes were included in this study. Mean patient age was 69±13 years. 58% were female. The initial MD for the baseline visual field was 9.5±6.7 dB. The mean baseline IOP was 23.5±8.6 mmHg. Complete success was achieved in 82% for the total cohort. 83% at 12-month follow-up for G1, 86% for G2, 87% for G3, 75% for G4, 79% for G5. 83% complete success was achieved in previously untreated eyes, showing almost no difference in success after an experience of 50 trabeculectomies.

Conclusions
Good surgical results can also be achieved by a young surgeon within the first 50 trabeculectomies if taught by an experienced surgeon. However, the success rate decreased with the surgeon's experience as more difficult cases were treated and no preselection of cases was conducted after the first 150 trabeculectomies anymore.

P-760
GONIOTOMY FOR NON-INFECTIOUS UVEITIC GLAUCOMA IN CHILDREN

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Purpose
To evaluate the efficacy and safety of a goniotomy procedure in pediatric non-infectious uveitis.

Methods
Retrospective, multicenter case series. Fifteen eyes of 10 children with non-infectious uveitis and medically insufficiently controlled intraocular pressure (IOP), who underwent a goniotomy as the first surgical intervention for glaucoma before the age of 18 years and had a follow-up of at least 1 year, were included. The primary outcomes were IOP, number of IOP-lowering medications, and success rate. Success was defined as 6 ≤ IOP ≤ 21 mmHg, without major complications or re-interventions. Secondary outcomes included complications, uveitis activity, and visual acuity.

Results
Median age at goniotomy was 7 years; median follow-up 59 months. Median (interquartile range) IOP before surgery was 30 (26-34) mmHg with 4 (3-4) IOP-lowering medications. At 1, 2, and 5 years after goniotomy, median IOP was 15, 14, and 15 mmHg with 2 (0-2), 1 (0-2), and 0 (0-2) medications, respectively (P<0.001 postoperatively versus preoperatively for all timepoints). Success rate was 100%, 93%, and 80% after 1, 2, and 5 years, respectively. Two eyes failed and underwent another IOP-lowering procedure, after 16 and 28 months. There were no significant changes in visual acuity and uveitis activity or its treatment, and there were no major complications.

Conclusions
Goniotomy is an effective and safe surgery for children with uveitic glaucoma.

P-761

LONG-TERM OUTCOMES OF CILIARY SULCUS PLACED AGV TUBE IN REFRACTORY GLAUCOMA'S OF INDIAN EYES

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Purpose

To evaluate the long-term efficacy of ciliary sulcus placed AGV tube in refractory glaucoma's and endothelial cell density changes in refractory glaucoma's in a tertiary set up in India.

Methods

A prospective interventional study was conducted in 20 eyes of 20 patients with refractory glaucoma treated with Ahmed glaucoma valve implantation in Dr Rajendra Prasad centre for Ophthalmic Sciences, New Delhi. The main outcome measure success at the last follow up. Success was defined as an IOP >5 and ≤ 21 mmHg and/or 20% reduction from baseline with or without medication; with no loss of light perception or vision-threatening severe complications and no requirement for additional filtering or aqueous drainage surgery; further subclassified as complete success with usage of no medications and qualified success with usage of less than ≤ 2 medications. Success, using Kaplan-Meier analysis was determined at 6 month, 12 month and 36 month (3years). Specular microscopy at baseline and post operatively at 3, 6 and 12 months (wherever possible) was performed and evaluated for corneal endothelial cell density (CECD) changes.

Results

The mean follow-up after AGV implantation was 40.28 ± 43.79 months (median: 30 months, range: 1–144 months). The mean pre-operative IOP was reduced from a mean of 36.68 ± 8.36 mmHg to 18.04 ± 5.24 mmHg at the final follow up($p<0.0001$). The number of anti-glaucoma medications were reduced from 4.68 ± 1.1 at baseline to 2.20 ± 1.19 at final follow up. ($p=0.0001$). The cumulative probability of success was 82% at 6 months, 75% at 1 year and 69% at 3 years. A total of 60% eyes had complications noted of which 52% are minor complications and only 8% eyes had severe vision threatening complications. The most common complication was bleb encapsulation, which occurred in 6 (24%) eyes. A median endothelial cell loss of 10% was noted at the end of 6 months post operative period.

Conclusions

Ciliary sulcus placed Ahmed Glaucoma Valve in refractory glaucoma's seem to have relatively good long-term outcomes.

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P-762

THE ROLE OF INFERIOR ANGLE COLLECTOR CHANNELS – IS INFERIOR HYDRUS MICRO-STENT PLACEMENT AS EFFECTIVE?

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Purpose

Despite trabecular meshwork bypass and Schlemm's canal stenting being a relatively new technology, the Hydrus microstent has more high quality evidence than any other minimally invasive glaucoma surgery (MIGS) procedure. Most surgeons operate temporally and hence with a nasal placement of the device. As well as being surgically convenient to combine with phacoemulsification, there is some histological data suggesting collector channels are more numerous in the nasal quadrant. We studied the post-operative results of one surgeon's technique using a superior approach with inferior stent placement.

Methods

The data was collected retrospectively, using Medisight, for 32 patients with open angle glaucoma of different subtypes attending the Ophthalmology department at the James Cook University Hospital in Middlesbrough between December 2019 and June 2022.

Results

32 eyes were studied. The mean pre-operative intraocular pressure was 21.3mm/Hg (15-36) and mean number of medications was 2.88. At the end of the study period, the post-operative mean IOP was 15.3 (10-29) and mean number of medications was 1.1. 50% (n=16) of eyes had between 25-35% reduction in IOP while 35% (n=11) had a 20-24.9% IOP reduction. The remaining 15% (n=5) had an IOP reduction of less than 20%. The mean follow-up period was 9 months (4-16).

Conclusions

Our latest post-operative data compares favourably with the Horizon Study. Despite relatively few numbers, our patient group had a higher starting IOP and were on more ocular hypertensives. We also included a few advanced cases and eyes with normal tension glaucoma which can both skew the data unfavourably. In spite of these limitations, our study suggests that stent placement may not be as crucial as previously thought. This study demonstrates that inferior angle placement of the Hydrus micro-stent reduces the intraocular pressure to levels similar to those found in the Horizon trial.

P-763

EARLY OUTCOME OF BANG (BENT ANGLE NEEDLE GONIECTOMY) IN COMBINATION WITH CATARACT SURGERY OVER THE SPECTRUM OF GLAUCOMA

A Singh, F Thattaruthody, S Choudhary, S Raj, S Pandav, S Kaushik

Purpose

To study the early outcome of BANG (Bent Angle Needle Goniectomy) in combination with cataract surgery over the spectrum of glaucoma

Methods

It was a retrospective, non-comparative, interventional study. The study included patients who underwent combined Phacoemulsification and BANG between January 2022 and July 2022. All glaucoma subtypes with visually significant cataract and with intraocular pressure (IOP) less than 30mmHg were included. Patients with IOP higher than 30mmHg and those with any other ocular abnormalities were excluded from the study.

Data were collected on IOP and the number of medications at baseline and postoperatively on day 1, one week, one month, three months and six months. Postoperative complications, including IOP spikes, the presence or absence of hyphema, the time of presentation, and the time to resolution were also studied. Outcome measures were the requirement of anti-glaucoma medications and IOP control.

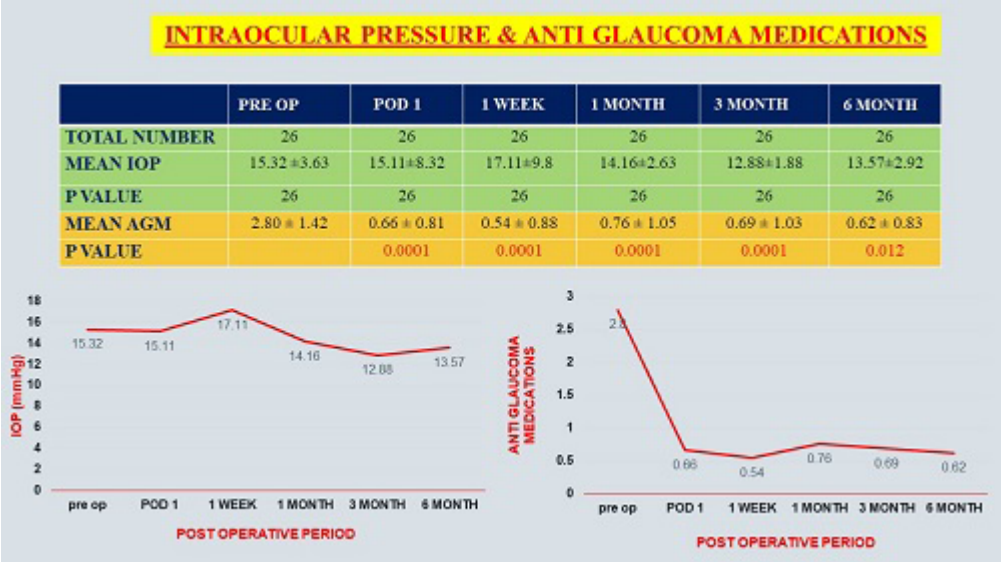
Results

A total of 26 eyes of 25 patients were studied. The mean pre-intervention IOP was 15.52 ±3.56 mmHg which decreased postoperatively at all visits except at one week when there was a slight spike in IOP; at the last follow-up at six-month follow-up, was 13.57±2.92mmHg.

There was a significant decrease in the number of AGM in the post-operative period at all follow-up visits ($p<0.005$). The number of anti-glaucoma medications decreased from the pre-intervention level to the six-month follow-up (2.80 ± 1.42 vs 0.62 ± 0.83) with $p=0.012$.

Six (23.3%) patients had an IOP spike, mainly around the first week, and all of them were managed conservatively. Only two patients had hyphema, which resolved with conservative management without surgical intervention.

Image



Conclusions

Phacoemulsification with BANG (Bent Angle Needle Goniectomy) is an effective procedure for reducing IOP and medication burden across the spectrum of glaucoma patients. Phacoemulsification with BANG also has a favourable safety profile.

RF

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P-764

SAFETY AND EFFICACY OF KAHOOK DUAL BLADE GONIOTOMY. OUR EXPERIENCE

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Purpose

To evaluate the efficacy and safety of Kahook dual blade goniotomy in patients with uncontrolled glaucoma.

Methods

98 eyes (90 patients - 46 men and 44 women) with uncontrolled primary and secondary glaucoma, underwent Kahook dual blade (KDB) goniotomy of 90-120 degrees, alone (27 cases) or in combination with phacoemulsification (64 cases) or intraocular lens exchange with anterior vitrectomy (7 cases). In combined operations, KDB was performed at the beginning of the surgery. Mean preoperative IOP was 21.09±8.13 mmHg with 2.58±1.18 meds.

Results

All patients had minor bleeding at the end of the procedure. There were no other intraoperative or postoperative complications. Mean age of patients was 73.65±11.97 years. In the first month, mean postoperative IOP was 15.45±6.64 mmHg with 2.28±1.10 meds, while final mean postoperative IOP was 13.60±3.86 mmHg with 2.04±0.99 meds and a mean follow-up of 6 months (3-32 months). Patients who underwent KDB surgery alone received 1 more antiglaucoma medication preoperatively, compared to those who underwent a combined procedure ($p<0.001$) and the statistical difference was maintained until the 6th postoperative month. In addition, significantly ($p=0.001$) lower final IOP was observed in patients undergoing combined surgery (12.70±2.73 mmHg) compared to the other group (15.37±4.94 mmHg). Pearson's correlation coefficient indicated an association of higher preoperative IOP with higher postoperative IOP, with a strong index at the 3rd postoperative month ($p<0.01$) and the same was true for the number of antiglaucoma meds.

Conclusions

Kahook dual blade goniotomy appears to be a safe and effective technique, with a reduction in IOP by 26.74% and number of medications by 20.93%. IOP and number of medications at the third postoperative month appear to be an indicator of the trend for the following months. More patients and a longer follow-up period are needed to confirm our initial results.

P-765

LONG-TERM EFFICACY AND SAFETY OF XEN45 GEL STENT IMPLANTATION IN PATIENTS WITH NORMAL TENSION GLAUCOMA

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Purpose
The XEN45 gel stent has been demonstrated to be a feasible option in the treatment of glaucoma. However little is known about its role in the treatment of normal tension glaucoma (NTG). The aim of this study was to evaluate the long-term treatment efficacy and safety of XEN45 gel stent implantation specifically in patients with NTG.

Methods
This was a retrospective analysis of patients with NTG who underwent XEN45 gel stent implantation at a single tertiary centre. Complete success was defined as intraocular pressure (IOP) lowering of ≥ 20% and cutoff IOP ≤15 mmHg after three years. Success was qualified if additional topical glaucoma medication was necessary to achieve the IOP goals. Additional glaucoma surgery except for needling was regarded as failure. Secondary outcome measures included change of mean IOP at final follow up compared to preoperative levels, median change of antiglaucoma medication, as well as needling and complication rates.

Results
Twenty-seven eyes of 22 patients were included. Complete and qualified success rates were 59.3 % and 74.1 % after 3 years (n=21). Mean postoperative IOP decreased significantly from 19.5 ± 2.2 mmHg at baseline to 13.5 ± 4.3 mmHg; $p < 0.0001$ (n=21) after three years and to 13.0 ± 3.3 mmHg; $p < 0.001$ (n=11) after four years. Fifteen patients (55%) required a median of 1 (range 1-3) needling procedures. The median number of antiglaucoma medications was reduced from 2 (1-4) to 0 (0-3); $p < 0.0001$ after three years. One patient required an intervention due to symptomatic hypotony within the first two weeks after surgery, which resolved completely. Only one patient required further glaucoma surgery and was regarded as failure.

Conclusions
The current study showed that XEN45 gel stent is an effective and safe option in the long-term treatment of normal tension glaucoma. Needling was frequently necessary to improve outcome.

P-766

ASSESSMENT OF THE MORPHOLOGIC FEATURES OF NON-PENETRATING DEEP SCLEROTOMY WITH ANTERIOR SEGMENT OPTICAL COHERENCE TOMOGRAPHY

E Lopes, C Mota, A Murta, J Cardigos, T Gomes

Purpose

To correlate the morphologic features of Non-Penetrating Deep Sclerotomy (NPDS) on anterior-segment optical coherence tomography (AS-OCT) with intraocular pressure (IOP) and surgical success.

Methods

Twenty-one eyes of 19 patients who underwent NPDS, alone or combined with phacoemulsification, were enrolled. Cross-sectional features of filtering blebs were obtained with a commercially available swept-source-OCT system (Heidelberg Engineering, Heidelberg, Germany). The association of IOP and surgical success (IOP≤18 mmHg and a reduction of IOP from the last preoperative evaluation superior to 21%; complete success if medication and relative success with medication) with quantitative parameters was investigated.

Results

Successful NPDS cases had a superior bleb heigh and thicker bleb wall than non-successful cases (972.2 vs 330 µm, p=0.042 and 808.9 vs 330 µm, p=0.053, respectively). There was a positive correlation between surgery efficacy, bleb heigh, and bleb wall thickness (r=0.624, p=0.003 and r=0.601, p=0.005, respectively). Bleb wall cysts were detected in 60% (n=9) of cases in the successful group and 50% (n=3) of cases in the failure group, and suprachoroidal drainage was detected in 16.7% (n=1) of cases in the failure group and 26.7% (n=4) in the successful group. There was no statistically significant difference between groups, for both parameters. Forty percent (n=6) of eyes in the overall successful group had an internal cavity against 0% in the unsuccessful group. When analyzing absolute and relative success separately, 80% (n=4) and 20% (n=2) of eyes had an internal cavity, respectively. Eyes in the overall success group had more commonly an intrascleral lake than eyes in the failure group (60%vs 16.7%). In the subgroup of absolute success, 80% (n=4) of eyes had an intrasceral lake vs 50% (n=5) of eyes in the relative success subgroup. For both the presence of internal cavity and intrascleral lake there was a statistically significant difference (p>0.05) in the level of success obtained, with higher success levels being obtained in eyes with an internal cavity and intrascleral lake. This difference, however, was only significant when comparing failure, relative and absolute success.

Conclusions

A post operative higher bleb and thicker bleb wall were associated with good outcome. Trans-conjunctival aqueous drainage can be an important drainage route for NPDS. AS-OCT is a useful tool to evaluate the morphology of the bleb, giving insight about it's function.

P-767

EVALUATION OF THE LONG-TERM RESULTS OF NON-PENETRATING DEEP SCLERECTOMY COMBINED WITH PHACOEMULSIFICATION VS NON-PENETRATING DEEP SCLERECTOMY ALONE

E Lopes, C Mota, B Cunha, J Cardigos, T Gomes

Purpose

To compare the long-term efficacy between Non-Penetrating Deep Sclerotomy (NPDS) combined with phacoemulsification (Phaco-NPDS) and NPDS alone.

Methods

The records of 52 eyes with glaucoma submitted to NPDS alone or Phaco-NPDS were reviewed. Follow-up shorter than and/or another glaucoma surgery before 24 months were considered exclusion criteria. The Esnoper V2000 scleral implant (AJL Ophthalmics, Alava, Spain) was used in all eyes. Glaucoma type, intraocular pressure (IOP), best-corrected visual acuity (BCVA), number of medications, Nd:YAG laser goniopuncture, and complications were studied. Success was defined as IOP<18 mmHg and a reduction of IOP from the last preoperative evaluation superior to 21%.

Results

Sixteen eyes were submitted to Phaco-NPDS and 36 to NPDS alone. Mean pre-operative IOP decreased from 19.9±3.8 mmHg to 12.8±2.7mmHg in the Phaco-NPDS group and from 21.7±5.8 mmHg to 16.9±7.7 mmHg in the NPDS group, 24 months after surgery. The decrease in IOP was statistically significant in both groups ($p<0.05$). Although the Phaco-NPDS group had a lower 24-months post-operative IOP (21.7±5.8 mmHg) than the NPDS group (16.9±7.7 mmHg), thedifferecne was not statistically significant ($p=0.056$). The preoperative mean number of glaucoma medications was 3.5±0.9 in the Phaco-NPDS group and 3.7±0.9 in the NPDS group; at 24 months of follow-up, it was 0.6±0.6 and 1.2±1.3, respectively. Forty percent (n=6) and 47%(n=16) of patients were submitted to Nd:YAG laser goniopuncture until 24 months of follow-up in the NPDS and Phaco-NPDS groups, respectively. There was no statistically significant difference between the groups regarding number of medications or need for Nd:YAG laser goniopuncture ($p>0.05$). Mean BCVA improved from 0.4±0.3 to 0.8±0.4 (decimal notation) in the Phaco-NPDS group; the improvement was statistically significant ($p=0.006$). In the NPDS group the BCVA was maintained (0.8±0.3 to 0.76±0.3 (decimal notation). Regarding the BVCA at 24 months of follow-up, there was no difference between both groups ($p>0.05$). The overall success rate 24 months after surgery was 75% for the Phaco-NPDS group and 50% for NPDS alone ($p>0.05$).

Conclusions

Both groups achieved good IOP control and a decreased in the number of glaucoma medications needed. Phaco-NPDS had better control of the IOP and a greater overall success rate, nevertheless without statistical significance, with the benefit of restoring BCVA. Phaco-NPDS should be considered in patients with cataract undergoing NPDS.

P-769
OUR RESULTS WITH I-STENT INJECT® IMPLANT IN PATIENTS WITH GLAUCOMA

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Purpose
I-stent inject® is a device that helps to decrease intraocular pressure (IOP) in patients suffering from glaucoma. It is mainly used in chronic open-angle, pseudoexfoliative, and pigmentary glaucoma. This surgery belongs to the group of so-called minimally invasive surgeries, and it is performed in the trabecular meshwork, facilitating the passage of aqueous humor from the anterior chamber to Schlemm's canal. Our aim with this data collection is to analyze whether this device is being effective in our patients and to find out which parameters of their visual health are improved.

Methods
We have carried out a retrospective, descriptive study with patients operated between 2021 and 2022. The initial N of our sample was 76 patients, however we finally ended up with an N of 32 due to lack of data in some medical records. The patients included were white with a mean age of 68.2; 21 of them were men and 11 were women. IOP before and after i-stent implantation, number of hypotensive drugs, visual acuity (VA), visual field data, retinal nerve fiber layer (CNRF) in optical coherence tomography, and pachymetry were analyzed.

Results
The analysis of our sample showed a statistically significant decrease in the average IOP after surgery. In addition, a statistically significant decrease was found in the average number of hypotensive drugs postoperatively. The mean number of drugs used before surgery was 2.37, decreasing to 1.43 after surgery (52.32% reduction one year after the intervention). One third of the sample did not require more eye pressure drops and half, only required one drug. We also found a statistically significant improvement in VA. We atribute this improvement to the association of i-stent implant® with phacoemulsification. No significant differences were found before and after surgery regarding to RNFL or visual fields.

Conclusions
I-stent surgery helps to reduce IOP and the number of drugs administered in our patients with glaucoma so it allows them to have a better quality of life. However, more studies are needed to delve into these aspects.

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P-770

SURGICAL OUTCOMES AFTER VIRNA GLAUCOMA DRAINAGE DEVICE IMPLANTATION: CASE SERIES

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Purpose
To observe the outcome and complications of glaucoma patients who underwent Virna Glaucoma Drainage Device (GDD) implantation

Methods
This study was using a prospective cohort method conducted in RSUP Prof Dr. R. D. Kandou Manado. We obtained patients who underwent Virna GDD implantation from Mei 2022 to August 2022 and followed up the patients 1st day, 3 days, 1 week, 2 weeks and 1 month postoperative. We included patients whose IOP was uncontrolled in maximal medical therapy and high risk of trabeculectomy failure. Visual acuity (VA), intraocular pressure (IOP), underlying disease, COA conditions and the number of antiglaucoma medications, tube position, bleb condition according to Moorfields bleb grading system and postoperative complications were evaluated by slit-lamp examination and medical record.

Results
A 20 year old male was diagnosed with glaucoma neovascularization, silicon oil-filled eye and attached retina on the left eye. 1st day postoperative visual acuity was hand movement, normal IOP, bleb intact with Moorfield diffusion area 75%, height category 2, vascularity category moderate-severe, keratic precipitate, cell and flare was found, tube located in supero-temporal of the eye and deep COA, based on these conditions we diagnosed him with toxic anterior segment syndrome. 3 days and 1 week postoperative patient presented with high IOP, hyphema and tube was occluded by blood clotting. 2 weeks postoperative the hyphema was reduced. Blood clotting that occluded the tube disappeared 1 month postoperatively. A 69 years old male was diagnosed with neovascular glaucoma and proliferative diabetic retinopathy. 1st day postoperative visual acuity was light perception, normal IOP, bleb intact with Moorfield diffusion area 75%, height category 2, vascularity category moderate-severe, hyphema, tube located in supero-temporal of the eye and deep COA. 1 week postoperative, IOP was normal, hyphema was reduced, deep COA and occluded tube by blood clotting remain. 2 weeks and 1 month postoperative there were significantly reduced IOP, shallow COA Van Herick grade I, an improvement of hyphema and occluded tube but choroidal detachment was diagnosed.

Conclusions
Although the glaucoma drainage device shows a promising treatment for neovascular glaucoma there were several challenges after the surgery such as inflammation, high IOP due to occluded tube, hyphema and choroidal detachment which may lead to dissatisfaction results.

P-771

A RETROSPECTIVE ANALYSIS OF OUTCOMES OF ISTENT (G2) COMBINED WITH PHACOEMULSIFICATION

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Purpose

Glaucoma is a progressive condition which places a great burden on healthcare systems worldwide. Treatment is focussed on control of intraocular pressure and minimally invasive glaucoma surgery (MIGS) surgery is emerging as an appealing option. The second generation (G2) iStent device is a MIGS device which delivers 2 titanium shunts into the trabecular meshwork to allow drainage of aqueous humour from the anterior chamber into Schlemm's canal. We aimed to assess outcomes for patients who underwent phacoemulsification with iStent at our centre (Moorfields, St Ann's) to determine its impact on outcomes; mainly IOP and use of topical drops.

Methods

We carried out a single centre retrospective case review for patients who had G2 iStent insertion with phacoemulsification between January 2018 and November 2022. We recorded demographic data, visual acuity (VA), IOP, use of topical medication and visual field mean deviation (VF MD) preoperatively at intervals up to a maximum of 48 months. We also recorded whether the patients were seen in face to face or virtual clinics at last follow up.

Results

We had a total of 33 patients (average age 77.5 years, 30.3% female, 69.7% male). The average change in VA following the procedure was a gain of 1.7 lines on a Snellen chart. The average IOP preoperatively was 18.18±4.71mmHg, at 12 months was 15.63±4.26 and at 48 months was 16±2.65mmHg. There was a mean reduction of 2.88mmHg (difference in means 2.55mmHg, p=0.04) at 12 months and 2.33mmHg (difference in means 2.18 mmHg, p = 0.44) at 48 months. The average number of drops used preoperatively was 1.21 ±0.82 compared to 1.00 ± 0.67 at 12 months. Visual field analysis revealed average decrease in MD of 0.57 ±3.21 at 12 months and no worsening of MD at 48 months. 79% of patients were managed in the virtual clinic at most recent follow up compared to 21% in face to face clinics.

Conclusions

In our study of there was a statistically significant reduction in average IOP at 12 months and a reduction in number of topical drops used by patients. 7 patients were able to reduce/stop topical therapy altogether. At most recent review most patients were able to be managed safely in a virtual clinic setting. The iStent therefore appears to play a role in the management of patients with moderate glaucoma, helping to reduce IOP, reliance on topical therapy and follow up in a virtual setting. More studies in a larger cohort would be necessary to draw further conclusions on long term outcomes.

P-773

A CASE OF A SPONTANEOUS INTRAOPERATIVE POSTERIOR CAPSULAR RUPTURE IN PHACOMORPHIC GLAUCOMA WITH WELL-CONTROLLED PRE-OPERATIVE INTRAOCULAR PRESSURE

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Purpose

Spontaneous posterior capsule rupture is a very rare entity. We present the surgical management of a spontaneous posterior capsular rupture during cataract surgery in a chronic phacomorphic glaucoma patient with normal pre-operative intraocular pressure (IOP) on maximum tolerated medical treatment.

Methods

We present the case of an 85-year old female who presented with hand motions (HM) vision in the left eye, chronic angle closure with raised intraocular pressure (IOP: 31mmHg) and significant lens vaulting with nuclear sclerosis and posterior synaechiae. IOP was reduced in the clinic setting with topical and oral maximum tolerated medical therapy (MTMT) to 26mmHg. A YAG laser peripheral iridotomy

was performed early in both eyes and the patient was kept on MTMT at home. 1 week after laser, the IOP in the LE was suboptimal (30mmHg) and the patient was consequently listed for urgent phacoemulsification and Intraocular lens implantation with perioperative Mannitol cover. Biometry demonstrated a shallow anterior chamber (2.02mm) and a short axial length (21.92). A cataract extraction was performed with a temporally placed corneal incision, with a long tunnel and use of Healon 5 as the Ophthalmic Viscoelastic device (OVD). On successful removal of all nuclear fragments, the posterior capsule (PC) spontaneously ruptured from 6 to 12 o'clock. The vitreous remained intact with no breech to the hyaloid face. Careful irrigation and aspiration of the cortical lens matter was performed with the vitrector. Significant positive posterior vitreous pressure was noted. Automated anterior vitrectomy and single piece intraocular lens (IOL) insertion in the bag was performed with a bimanual anterior approach.

Results

The post-operative visual acuity improved to 6/18. The IOP remained suboptimal and the patient was kept on topical and systemic therapy due to extensive chronic glaucomatous optic neuropathy.

Conclusions

To our knowledge only one case of spontaneous posterior capsular rupture has been reported as an intraoperative complication of emergency management of phacomorphic glaucoma cataract surgery. This is the first report of such a complication following nucleus removal. Immediate and appropriate surgical management of this rare complication expedited this patient's visual rehabilitation and allowed for her glaucoma to be appropriately investigated and a definitive management plan to be implemented.

P-774

SEVERE HYPOTONY AND INTRA-OCULAR INFLAMMATION AFTER A NON-VALVED GLAUCOMA DRAINAGE DEVICE IMPLANTATION: A CASE SERIES

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Purpose

To report a case series of exuberant intra-ocular inflammation after a low cost non-valved Glaucoma drainage device(GDD) implantation.

Methods

Retrospective, Observational, Case series. Records of 4 adult patients undergoing Aurolab aqueous drainage device (AADI,Model 350) implantation presenting with sudden hypotony and intra-ocular inflammation 4-6 weeks after surgery were reviewed.

Results

4 patients presented with similar clinical picture of hypotony and intra-ocular inflammation after an initial uneventful postoperative course following AADI implantation. All surgeries were performed by a single experienced glaucoma surgeon. The tube of AADI was occluded tightly near tube plate junction using 6–0 vicryl suture (Braided-coated polyglactin 910 violet) in all subjects. Post-operatively, all patients were receiving topical betamethasone 1% QID in weekly tapering dose and pre-operative antiglaucoma medications(AGM), including oral acetazolamide were continued in view of ligature suture being used which takes around 4-8 weeks to dissolve. 4-6 weeks later,patients presented with sudden onset diminution of vision with hypotony (IOP <6 mm Hg) ,cellular reaction and flare in anterior chamber(AC). 1 patient also had a hypopyon in AC. Posterior segment was quiet in all subjects. On the hypothesis of uveitis induced by blood-aqueous breakdown [1] due to sudden IOP drop after dissolution of polyglactin suture, patients were initially treated conservatively with intensive topical and oral steroids and all AGM were stopped.1 patient presenting with hypopyon did not show significant improvement for 2 days and received single dose of intra-vitireal antibiotics in view of suspected endopthalmitis. All subjects improved over a variable period of 2-3 weeks and regained their preoperative vision and IOP was maintained off AGM.

Image

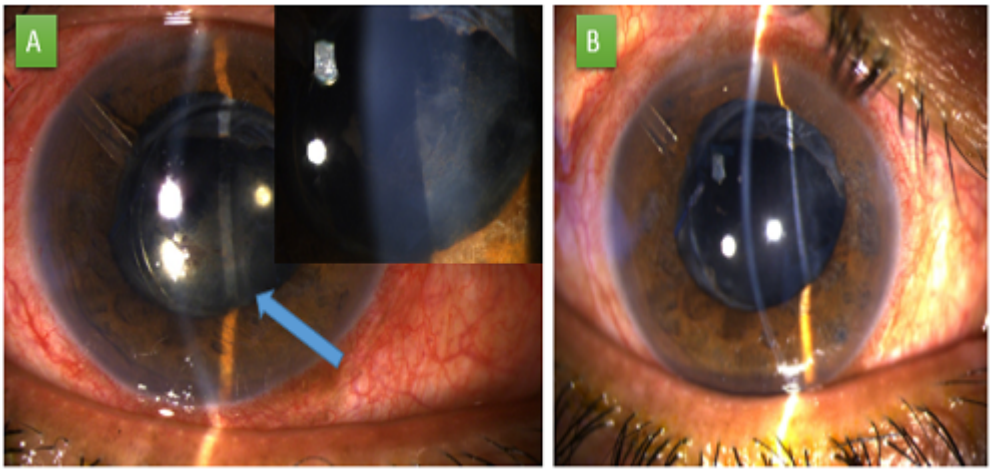


Image: (A) Fibrinous reaction in anterior chamber (B) Resolution of fibrin 2 weeks after treatment (C) Hypopyon in anterior chamber with (D)cells and flare

Conclusions

Aurolab aqueous drainage device (AADI; Aurolab, Madurai, India) is a newer non-valved GDD modelled on Baerveldt prototype. To prevent early post-operative hypotony, ligature suture is applied which degrades over a period of 4–8 weeks, a time when the capsule is formed around AADI. The sudden IOP drop after suture dissolution can result in blood-aqueous barrier breakdown, allowing inflammatory mediators, cells and proteins to enter into intraocular chambers. Intensive inflammatory prophylaxis and gradual tapering of AGM around 4-8 weeks may reduce the risk of severe intraocular inflammation in patients with AADI implantation.

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P-776

SAFETY AND EFFICACY OF IRRIGATING GONIECTOMY (TRABECTOME) IN A SOUTH-AMERICAN POPULATION WITH MOSTLY MODERATE/ADVANCED PSEUDOEXFOLIATION GLAUCOMA

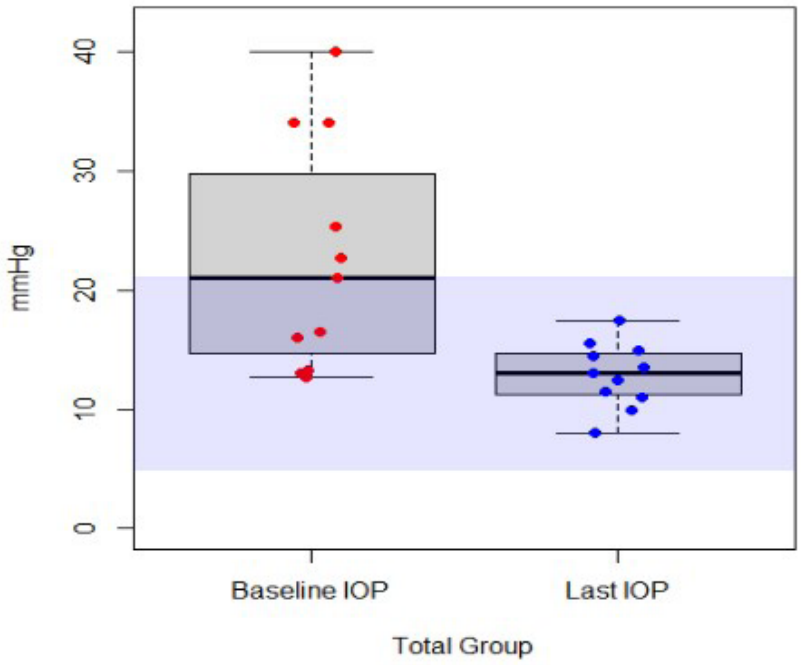
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Purpose
To describe the mid-term efficacy and safety of Trabectome with or without cataract surgery in a real life heterogeneous clinical scenario South-American cohort.

Methods
Retrospective consecutive case series of 15 eyes of 14 patients, Twenty seven percent were treated as combined procedures with cataract surgery. Seventy three percent were classified as moderate/advanced glaucoma. Success criteria A equals an IOP reduction > 20%, 5 < IOP < 21 mmHg, no reoperation, no severe complications. More restrictive definitions of success were also applied for further analysis: B (5 mm Hg < IOP <=18 mm Hg, no resurgery, IOP reduction >20%, no severe complications); C (5 mm Hg < IOP <=15 mm Hg, no resurgery, IOP reduction >=40%, no severe complications).

Results
Mean IOP decreased from 21.5±10.1 to 13.6±2.9 mmHg (17 ± 8.3 months of follow up, 32.7% reduction) (P<0.0001). Success rates were 67% (A), 67% (B), and 20% (C). There were no severe complications recorded. Two eyes (13%) required reoperation because of treatment failure and did not reach the IOP target. For the eleven eyes that were classified with moderate/advanced glaucoma, IOP decreased from 22.6±9.6 to 12.9±2.7 (43% reduction) (P<0.005). Success rates were 73% (A), 73% (B) and 27% (C). There was not a significant difference between standalone and combined surgeries, nor a statistically significant difference between pre-op and post-op medication.

Image



Conclusions

Trabectome is an effective and safe technique to lower IOP in a South-American cohort with pseudoexfoliation glaucoma, representing the whole spectrum of disease severity including moderate/advanced glaucoma, both as a standalone procedure or combined with cataract surgery.

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P-777

TWO YEAR OUTCOMES OF KAHOOK DUAL BLADE COMBINED WITH CATARACT SURGERY IN PATIENTS WITH OPEN ANGLE GLAUCOMA

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Purpose
The aim of this study was to present the 24 month outcomes of the Kahook Dual Blade combined with cataracts surgery (KDB-CS) in patients with open angle glaucoma (OAG).

Methods
Retrospective review of 175 eyes with OAG who underwent combined cataract surgery and KDB was analysed. Open angle glaucoma including primary open angle glaucoma, normal tension glaucoma, pseudo-exfoliative glaucoma and pigment dispersion glaucoma as well as secondary OAG were included. Pre-operative, intra-operative, and post-operative data were collected through the 24-month follow-up period.

Primary outcomes were mean IOP reduction, proportion of patients achieving ≥20% IOP reduction and mean reduction in medication requirements compared to baseline.

Secondary outcomes were need for additional glaucoma surgery and adverse events.

Results
Preoperative baseline mean IOP was 18.7 ± 6.3mmHg on a mean number of 1.4 (± 1.2) medications.

127 eyes (72.57%) at 12 months and 86 eyes (49.14%) at 24 months achieved achieved ≥20% reduction in IOP compared to baseline (P<0.05).

At 24 months followup, 58 (33.4%) eyes achieved a reduction in 1 or more drops. The proportion of patients that were drop free was 47 (26.9%) patients at 12 months and 19 (10.9%) patients at 24 months.

In terms of post-operative adverse events, 10 (5.7%) of patients had a hyphaema within the first 48 hours which resolved at the 1 week follow-up in all patients. Two patients were found to have a cyclodialysis cleft which spontaneously closed in both patients within 8-10 weeks follow-up period. IOP spike (defined as >10mmHg increase of IOP from baseline) within the first six week following surgery occurred in 43 (24.6%) of eyes. 8(4.57%) patients needed further surgery (Trabeculectomy) in order to meet target IOP requirements.

Conclusions
Patients with OAG achieved significant IOP and medication reductions following cataract surgery combined with KDB at 24 months follow-up.

P-778

ONE-YEAR OUTCOMES OF AB EXTERNO XEN45 GEL STENT IMPLANTATION WITH AN OPEN CONJUNCTIVA APPROACH IN PATIENTS WITH OPEN-ANGLE GLAUCOMA

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Purpose
This study aimed to evaluate the 1-year surgical outcomes of Xen45 gel stent implantation with an open conjunctiva approach in patients with open-angle glaucoma (OAG).

Methods
This retrospective cohort study included 19 eyes of 19 patients who underwent Xen45 gel stent implantation with an open conjunctival approach. Surgical success was defined by the following criteria: intraocular pressure (IOP) ≤ 21 mmHg and one of the following: IOP reduction ≥ 20% or reduction of two glaucoma medications with final IOP if baseline IOP ≤ 21 mmHg. The cumulative probability of success rate was analyzed using Kaplan–Meier survival analysis. Cox proportional hazard regression analysis was used to assess prognostic factors for surgical failure.

Results
IOP reduced from 32.37 ± 12.08 mmHg preoperatively to 15.14 ± 2.25 mmHg at 1 year (P = 0.001). The number of glaucoma medication reduced from 3.89 ± 0.32 preoperatively to 0.86 ± 1.35 at 1 year (P = 0.001). The success rates were 84.2% at 6 months and 73.7% at 1 year. Eyes with bleb horizontal extent ≥ 2 clock hours at 1 month postoperatively had a significantly higher success rate (log-rank test, P < 0.001). Greater bleb horizontal extent at 1 month postoperatively was associated with a lower surgical failure rate (hazard ratio = 0.014, P = 0.049). Bleb needling and additional glaucoma surgeries were necessary in 10 (52.63%) and 5 eyes (26.32%), respectively.

Conclusions
Xen45 gel stent implantation with the open conjunctiva approach is effective in reducing IOP and glaucoma medication for over 1 year in patients with OAG.

P-779

TUBE VS TRAB IN UVEITIC GLAUCOMA PATIENTS – IOP AND INFLAMMATION CONTROL

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Purpose

This study was designed to assist in decision making in the treatment in uveitic glaucoma. Glaucoma is the third most common complication of uveitis, seen in 10–20% and upto 54% of uveitic patients.

Intraocular pressure (IOP) elevation may occur by mechanical angle and trabecular meshwork (TM) dysfunction, and maybe due to use of corticosteroids as one of the primary treatments in uveitis.

Uveitic glaucoma is usually very hard to manage medically – due to continuous inflammation, poor function of the ciliary body as a target for some topical treatments, and due to guarded use of prostaglandin analogues in patients with uveitis.

Some patients having to undergo filtration surgery to control their intraocular pressure. Surgical success is limited since usually these surgeries are performed under suboptimal conditions – with uveitis not being fully controlled – with pressures running extremely high urging for emergency surgery. With similar reasoning causing accelerated scarring of most bleb-dependent surgeries, leading to earlier surgical failure.

Thus, more than one intervention may be required

Methods

A retrospective study reviewing all glaucoma surgeries performed for uveitic -glaucoma patients at Carmel Medical Center in the past decade. Reporting and analyzing factors affecting surgical success and comparing uveitic activity before and after surgery

Results

25 eyes, of 22 patients diagnosed with uveitis underwent glaucoma surgery between January 2000 and December 2019. 11 eyes underwent AGV implantation, and 14 eyes underwent a trabeculectomy. Following surgery IOP reduced significantly to 16.6±1.99mmHg ($p<0.001$), with no difference between the trabeculectomy and AGV groups (15.8±9.5mmHg vs. 17.8±10.97mmHg, respectively, $p=0.63$).

Complete success (IOP control with no glaucoma drops or further surgery) was achieved in 13 eyes (52%) with no difference between the trabeculectomy and AGV groups (66.7% vs. 30%, $p=0.11$). Surgery failed and was repeated in eight eyes (32%), with no significant difference between eyes in the AGV group and the trabeculectomy group (40% vs 26.7%, $p=0.67$). We also noticed a decrease in uveitis treatment (systemic and topical) at the end of follow up in 42.85% of eyes in the trabeculectomy group vs 36.36% cases in the AGV group, also not significantly different ($p=0.23$)

Conclusions

Overall, there was no significant difference in IOP control and in uveitis control between the two surgical methods

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P-780

TWO-YEAR LONGITUDINAL EVALUATION OF ISTENT INJECT® SYSTEM FOR OPEN-ANGLE GLAUCOMA IN SOUTH EAST ASIAN EYES

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Purpose

This study is to evaluate the mid-term efficacy of the iStent inject® glaucoma device in patients with open-angle glaucoma. This is a retrospective longitudinal case series which is done to assess 24-month effectiveness and safety of iStent Inject® trabecular micro-bypass implants with and without cataract surgery in patients with open angle glaucoma (OAG) in Hospital Kuala Lumpur, Malaysia.

Methods

Retrospective data collection was done from medical records of patients with OAG post-iStent inject® implant. Effectiveness outcomes were intraocular pressure (IOP) reduction and antiglaucoma medication reduction. Safety outcomes included adverse complications, secondary surgeries, and best-corrected visual acuity (BCVA) post-operatively.

Results

Eight eyes were included in this study, with patients' mean age of 56.3±17.5 years. Six eyes had primary OAG and two had secondary glaucoma, with 75% of the eyes having mild to moderate glaucoma. Five patients underwent combined surgery of iStent inject® implant and phacoemulsification with intraocular lens implantation. The mean baseline IOP was 22.9 ± 8.2 mmHg, while baseline medication was 3.4 ± 0.7. At 2 years post-operation, mean IOP was 13.6 ± 2.8 mmHg, demonstrating an IOP reduction of 44.5% (10.2 ± 2.5 mmHg; P = .002). The mean number of medications was also reduced to 2.0 ± 1.2 (P = .17). One patient underwent trabeculectomy post iStent inject® implant. There was no documented adverse complication with the visual acuity and visual fields were stable throughout the evaluation period.

Conclusions

iStent inject® implantation resulted in substantial IOP reduction safely up to 24 months postoperatively.

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P-781

COMPARISON OF OUTCOMES OF GONIOTOMY ALONE OR IN COMBINATION WITH CANALOPLASTY IN PRIMARY ANGLE CLOSURE GLAUCOMA

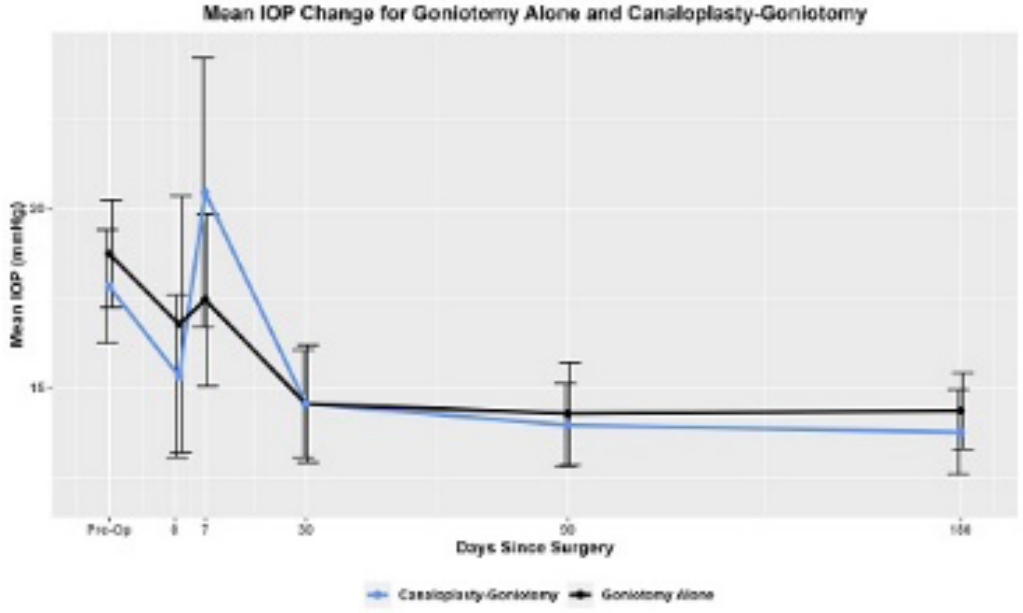
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Purpose
To compare the intraocular pressure (IOP) and medication-lowering efficacy of phacoemulsification combined with either goniotomy alone or in combination with canaloplasty in patients with primary angle closure glaucoma (PACG).

Methods
Retrospective, single-surgeon study of patients with PACG who underwent phacoemulsification with goniotomy alone (goniotomy alone, 31 eyes of 31 patients) or in combination with canaloplasty using OMNI (canaloplasty-goniotomy, 29 eyes of 29 patients) from 2019 to 2022. Mean IOP and ocular hypotensive medications were evaluated at the following time points: preoperatively, 1 day, 1 week, 1 month, 3 months, and 6 months. Secondary surgical interventions (SSIs), adverse events, IOP, ocular hypotensive glaucoma medications, and surgical success between groups were documented. Qualified success was defined as reaching target IOP and no SSIs. Complete success was defined as qualified success with no glaucoma medications. Surgical success was evaluated by Kaplan-Meir survival analysis.

Results
There were no significant differences between the goniotomy alone and canaloplasty-goniotomy cohorts for demographics and baseline ocular characteristics ($P > 0.05$). IOP at 6 months was reduced to 14.4 ± 3.0 mmHg (23.4% reduction) and 13.8 ± 3.2 mmHg (22.8% reduction) in the goniotomy alone and canaloplasty-goniotomy groups, respectively. Medications at 6 months were 0.19 ± 0.5 (82.7% reduction) after goniotomy alone and 0.34 ± 0.7 (71.9% reduction) following canaloplasty-goniotomy ($P > 0.05$). 87.1% of the goniotomy alone group and 75.9% of the canaloplasty-goniotomy group were off all medications at 6 months ($P > 0.05$). Qualified success probabilities were 83.4% for the goniotomy alone group and 77.1% for the canaloplasty-goniotomy group ($P = 0.7$). Complete success probabilities were 73.9% for goniotomy alone and 59.8% for canaloplasty-goniotomy ($P = 0.4$).

Image



Conclusions

Goniotomy alone or in combination with canaloplasty resulted in similar rates of IOP and medication reductions after 6 months following surgery in patients with primary angle closure glaucoma. The results of this study show superior IOP reductions when juxtaposed with phacoemulsification alone in PACG patients in the EAGLE study.[1] Further studies using randomized controlled trials with a cataract-only control group should be conducted to elucidate the benefits of different types of angle surgeries in patients with PACG.

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P-783

SAFETY AND EFFICACY OF THE PRESERFLO MICROSTENT DURING THE INITIAL LEARNING CURVE

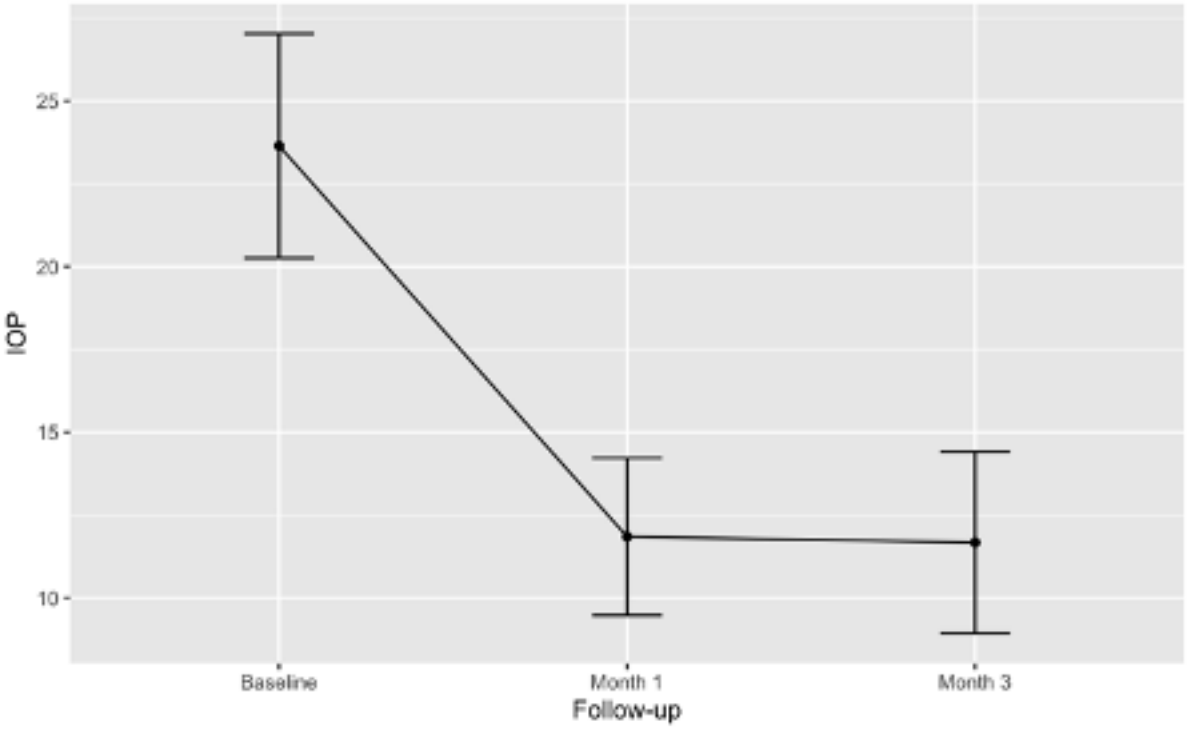
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Purpose
To examine the safety and efficacy of PRESERFLO Microstent during the learning curve of 3 surgeons new to the procedure from a Scottish perspective.

Methods
A retrospective study including a consecutive series of the first 28 PRESERFO microstent with 0.4mg/ml MMC performed by 3 surgeons (AJT, TRM, SD). 2 were experienced cataract and glaucoma surgeons with previous experience of Schlemm's canal minimally invasive glaucoma surgery (MIGS) (istent, ab interno canaloplasty, ab interno trabeculotomy) and 1 a glaucoma fellow with no previous experience of MIGS (surgeon 3). All patients were followed for a minimum of 3 months, with the primary outcomes, percentage, and absolute change in IOP from baseline (IOP at time of listing for surgery) compared to the visit after and closest to 3 months post-op. Secondary outcomes included number of glaucoma medications and complications.

Results
28 eyes were treated with PRESERFLO Microshunt. Mean IOP at baseline was 23.6mmHg (SD 8.73), using an average of 2.5 (SD 0.9) topical medications for glaucoma. Average visual field mean deviation (MD) was -10.8mmHg (SD 6.9). Peak IOP prior to surgery was 34.2mmHg (SD 11.7). Average IOP at 3 months was 11.7mmHg (SD 5.0) (Figure 1), significantly lower than baseline (P<0.001) with a significant reduction of topical medication requirement (96.4%, p<0.001), leaving 27 of 28 patients medication-free. The average reduction in IOP was approximately 50% (-11.9 mmHg, 95% CI 7.8-16.2 mmHg), with an average reduction of 2.3 (95% CI 2.1-2.8) medications. There was no significant difference in change in IOP depending on experience of surgeon (P=0.24). Complications included 1 (3.6%) intraoperative suprachoroidal haemorrhage and 5 (17.6%) transient numerical hypotony, only 1 of which had choroidal effusions. One other case developed choroidal effusion with an IOP of 9. None of these cases required further surgery.

Image



Conclusions

We report significant reductions in IOP and requirement of topical medications post PRESERFLO Microshunt implantation with similar success rates to previous studies(1, 2) among our first 28 patients, demonstrating good efficacy. A higher number of transient hypotony is reported compared to previous studies but these did not require further operations. There were no significant differences in outcomes irrespective of prior experience of the operating surgeon.

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P-784

RESULTS OF CATARACT SURGERY WITH PHACOEMULSIFICATION AND TRABECULECTOMY WITH APPLICATION OF SUBCONCJUNTIVAL MITOMYCIN-C

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Purpose

To show the results of cataract surgery with phacoemulsification and trabeculectomy with application of subconjunctival Mitomycin-C in patients with cataract and glaucoma.

Methods

A retrospective study of 28 patients undergoing combined surgery with subconjunctival Mitomycin-C injection was carried out at the Glaucoma and Cataract Institute in Lima, Perú during the year 2022. Data of the mean standard deviation of the intraocular pressure, the best corrected visual acuity (BCVA) and the number of medication for glaucoma before and after surgery were collectet and analized.

Results

The 28 patients with a mean age of 71.6 years received a subconjunctival injection of Mitomycin-C 0.2 mg/ml at the end of the glaucoma surgery. Patients presented BCVC 0.6 (0.1, 1) and mean intraocular pressure of 16.6+-3.56 mm Hg preoperative and 3 medication on average and a reduction of 5 mm Hg with a mean intraocular pressure of 10.14+- 2.26 in the first week, 11.7+-3.08 at 4 weeks, 11.9+-2.09 at 8 weeks and 11.5+-1.98 at 36 weeks with reduction of glaucoma medications 0.1and BCVAto 0.22(0, 0.9). No major complications were recorded.

Conclusions

Combined surgery of phacoemulsification with trabeculectomy and subconjunctival application of Mitomycin-C has an adequate reduction of the intraocular pressure in patients with cataract and glaucoma at 1, 4, 8 and 36 weeks of follow-up with low rate of complications.

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P-786

DOES THE OUTCOME OF COMBINED ISTENT INJECT IMPLANTATION IN THE FIRST EYE SERVE AS A PREDICTOR FOR THE OUTCOME IN THE SECOND EYE?

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Purpose
To investigate whether in combined iStent inject implantation with phacoemulsification carried out bilaterally, the outcome of the first eye may serve as a predictor for intraocular pressure (IOP)-lowering effectiveness in the second eye in primary open-angle glaucoma (POAG).

Methods
This retrospective study included 72 eyes from 36 participants, who underwent trabecular bypass implantation in combination with cataract surgery, carried out bilaterally by one of two experienced surgeons. Inclusion required a maximum latency between surgery in the first and second eyes, as well as a minimal follow-up of 6 months, respectively. Eyes with prior surgery and concomitant diseases were excluded from the study. Surgery was defined as either 'success' or 'failure' based on three separate scores at the longest follow-up time point: According to Score A and Score B, IOP < 21 mmHg (Score A) or IOP < 18 mmHg (Score B) at follow-up examination with no re-surgery and IOP reduction >20%, respectively qualified for success. The two scores were chosen according to the Tube versus Trabeculectomy Study. The criteria for Score C were IOP ≤ 15 mmHg, no re-surgery, and IOP reduction ≥40%, according to the criteria of the World Glaucoma Association on surgical glaucoma trials.

Results
Mean follow-up time in the entire cohort was 26.6 ± 15.4 months. There was no significant difference between the IOP lowering outcomes of first and second eyes. The chance of success in the second eye after effective surgery in the first eye significantly exceeded that after prior failure. Within our cohort, the probability calculations determined a 76% chance of success following prior success for Score A. If surgery in the first eye failed, the chance of success in the subsequent eye was 13%. The corresponding probabilities were 75% and 13% for Score B and 40% and 7% for Score C.

Conclusions
In bilateral trabecular bypass implantation combined with cataract surgery, there is a high predictive potential for subsequent eyes based on the outcome in the initial eye, which should be considered by the surgeon for second eye surgeries.

P-787

SHORT TERM SAFETY AND EFFICACY OUTCOMES OF PRESERFLO MICROSHUNT SURGERY IN GLAUCOMA PATIENTS FOLLOWING FAILED DEEP SCLERECTOMY

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Purpose
To report the short-term safety and efficacy outcomes of Preserflo Microshunt surgery as a secondary procedure following failed deep sclerectomy (DS) in patients with open-angle glaucoma.

Methods
Retrospective case series of eyes with open angle glaucoma and previous mitomycin C (MMC) augmented DS who underwent Preserflo Microshunt (augmented with MMC 0.4mg/mL) for uncontrolled intraocular pressure or glaucoma progression. Consecutive eyes from November 2021 to December 2022 in a single centre were included.

Results
Five eyes of five patients were reviewed. All patients had undergone previous DS, with mean time since DS of 25.8 months (range, 4 to 58 months). All eyes except one, were high myopes, with an average axial length of 25.23mm (SD1.7). All eyes except one had undergone at least one or more other previous ocular procedures (including bleb needling, goniopuncture, vitrectomy). Mean pre-operative IOP was 23.0mmHg (SD 10.0) and number of medications was 2.4 (SD 0.9), decreasing after Preserflo Microshunt surgery to 12.0mmHg (SD 5.6; range, 6-20mmHg) and 0.2 (SD0.4) respectively, at latest follow up. Mean follow up was 6.7 months (SD 4.1; range 6 weeks to 12 months). There were no cases of clinical hypotony or choroidal effusion. No patients suffered loss of visual acuity of 2 lines or more. One eye lost 1 line of vision attributed to posterior capsule opacification and is awaiting posterior capsulotomy. One eye has required return to theatre for bleb needling with 5-Fluoruracil at 4 weeks post operatively and has been recommenced on one glaucoma agent with a pressure of 20mmHg. All other eyes remain off all glaucoma drops and have not required further intervention.

Conclusions
We found an excellent safety profile and promising short-term efficacy outcomes for Preserflo Microshunt in this real-world series of complex, myopic glaucoma patients with previous failed DS. Preserflo Microshunt surgery should be considered a viable option as second surgery, if further intervention in this patient group is required.

P-788

12-MONTH OUTCOMES OF COMBINED PHACOEMULSIFICATION AND ISTENT INJECT W IMPLANTATION IN ASIAN EYES WITH PRIMARY OPEN ANGLE GLAUCOMA

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Purpose
To evaluate the efficacy and safety of combined phacoemulsification and iStent inject W implantation in Asian eyes with primary open angle glaucoma (POAG), up to 12 months after surgery.

Methods
A retrospective study of consecutive eyes ("collective cohort") that underwent combined phacoemulsification and iStent inject W implantation at a single centre from August 2020 to November 2021. Data was obtained at post-operative day 1 (POD1), week 1 (POW1), month 1 (POM1), month 3 (POM3), month 6 (POM6), and month 12 (POM12). Analysis was performed on available clinical data at each time point. Outcome measures included reduction in intraocular pressure (IOP), number of glaucoma medications, and adverse events. Subgroup analysis was also performed for eyes with no missing data at all timepoints, up to POM12 ("consistent cohort").

Results
For the collective cohort, data from a total of 37 eyes from 34 subjects was collected. 22 (59.5%) eyes were from male subjects. Mean age of subjects was 76.8 ± 7.6 years. Pre-operatively, mean IOP was 15.3 ± 4.2 mmHg and mean number of medications was 1.4 ± 0.6. There was no significant decrease in IOP at all time points in this cohort. For the consistent cohort, data from 13 eyes from 13 subjects was analyzed. 7 (53.8%) eyes were from male subjects. Mean age of subjects was 73.2 ± 8.7 years. Pre-operatively, mean IOP was 14.4 ± 4.5 mmHg and mean number of medications was 1.3 ± 0.5. At all timepoints, there was no statistically significant decrease in IOP compared to baseline. However, in both cohorts, number of medications was significantly reduced at all timepoints compared to baseline. At POM12, the mean reduction of number of medications was 1.3 ± 0.5 ($n=32$; $p<0.001$) in the collective cohort and 1.2 ± 0.4 ($p<0.001$) in the consistent cohort. In the collective cohort, 2 of 37 (5.4%) eyes had partial stent occlusion and underwent laser iridoplasty. None of the subjects developed hyphema post-operatively. No sight-threatening intra- and post-operative complications were observed in any of the eyes throughout the follow-up period.

Conclusions
Combined phacoemulsification and iStent inject W implantation is a safe and efficacious procedure in Asian eyes with POAG, demonstrating a significant decrease in medication burden up to 12 months post-operatively.

P-789

POSTOPERATIVE CORNEAL EPITHELIAL REMODELING AFTER PHACOEMULSIFICATION AND ISTENT INJECT® W: AN OPTICAL COHERENCE TOMOGRAPHY STUDY

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Purpose

To assess epithelial corneal remodeling by anterior segment optical coherence tomography (AS-OCT) after cataract surgery versus cataract and iStent device implantation versus micro-bypass stent implantation without phacoemulsification surgery.

Methods

This prospective observational pilot study included patients with cataracts, patients with cataracts and mild open-angle-glaucoma (OAG) and patients with clear lens and mild OAG. AS-OCT, corneal topography and endothelial cells counting were performed before the surgery and the day, the week and the month after the surgery. Corneal pachymetry mapping was performed and total corneal and epithelial thicknesses (3 mm central and 16 points on 6-mm zone) were measured over the pupila center using AS-OCT.

Results

A total of 36 eyes were analysed in three groups. Corneal pachymetry mapping revealed that epithelial thickness increased significantly the day and the week after the surgery compared with the values before the intervention in the only phacoemulsification and intraocular lens implantation group and in the group with the cataract and iStent implantation. No statistically changes between these two groups were observed. In the third group, the study of the corneal postoperative remodeling after the solo iStent W ® inject implantation, showed no statistically differences in the measures before and after the surgery.

Conclusions

The iStent creates a 'bypass' between the front chambers of the eye and its natural drainage pathway. Significant epithelial thickening occurs after phacoemulsification adjacent to the incisions of the surgery in the groups that the phacoemulsification and lens implantation had been performed. The iStent W® inject implantation do not cause an increase in cornea thickness by itself.

It is a safe procedure in patients with corneal endothelial cells dysfunction and do not disrupt the epithelial remodeling after a phacoemulsification surgery.

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P-790
ABINTERNO INFERIOR CYCLODIALYSIS TECHNIQUE IN GLAUCOMA SURGERY

K Abueleinen

Purpose
This pilot study evaluated the efficacy and complications of Abinterno inferior cyclodialysis operation in cases of advanced-uncontrolled glaucoma.

Methods
Patients with advanced glaucoma and uncontrolled IOP despite maximally tolerable antiglaucoma medications were selected to undergo Abinterno inferior cyclodialysis. Through a paracentesis, the AC was filled with viscoelastic material and a trabeculotome, 27, 25-gauge canula or spatula was passed into the AC angle between the Ciliary Body and the sclera, then rotated to complete separation between the sclera & CB in, at least, one quadrant to a depth of about 5 to 8 mm from the limbus. Intraoperative Gonio lens was used to examine the angle before and after cyclodialysis. Inferior quadrants were selected to help faster absorption of postoperative hyphema with postoperative semi sitting positioning.

Results
Forty-eight eyes of 41 patients completed follow up at one year. Mean age was 48.12 ±20.3 years. Open-angle glaucoma was the most common diagnosis; 28 eyes (58.3%), 21 of them (43.75%) were Primary open-angle glaucoma and 7 (14.6 %) were pseudoexfoliation glaucoma. Eight eyes suffered from chronic angle closure glaucoma, 4 of them were combined with phacoemulsification for associated cataract. Sixteen eyes (33.33%) had previous glaucoma surgeries. Mean untreated IOP before surgery was 43.9±8.2 mm Hg. This was reduced significantly at 1 year to 16.2 ±7.1 mm Hg (mean reduction of 27.8 mmHg:63.3%, $P < 0.0001$, Paired samples t-test). The mean number of antiglaucoma medications decreased significantly from 3.2 ±1.2 drops before surgery to 0.48 ±1.1 at 1 year of follow-up ($P < 0.0001$, Wilcoxon test, paired samples). Visually significant hyphema on the 1st postoperative day was encountered in 18 eyes (37.5%). We noted significant improvement of mean BCDVA from 0.31 ±1.2 to 0.55 ± 2.3, decimal ($P = 0.0066$, Wilcoxon test, paired samples). This improvement can be attributed to cataract extraction by phacoemulsification that was combined with cyclodialysis in 16 eyes. Cyclodialysis failed to control IOP in 3 of 4 eyes with neovascular glaucoma (75%) at 6 months due to continuous proliferation in these eyes. The duration of the procedure of cyclodialysis (Not the whole operation) did not exceed 1 minute in all cases.

Conclusions
Abinterno inferior Cyclodialysis is a simple and short glaucoma procedure that achieved significant reduction of IOP and antiglaucoma medications. It can be easily combined with cataract operations.

P-791

SAFETY AND EFFICACY OF GONIOTOMY WITH TRABEX DEVICE IN COMBINATION WITH PHACOEMULSIFICATION IN A LATIN-AMERICAN COHORT

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Purpose

To describe the short-term efficacy and safety of combined phacoemulsification and goniotomy using the TrabEx device, in a real life heterogeneous clinical scenario Latin-American cohort. This work reports the first experience using TrabEx in Latin-America.

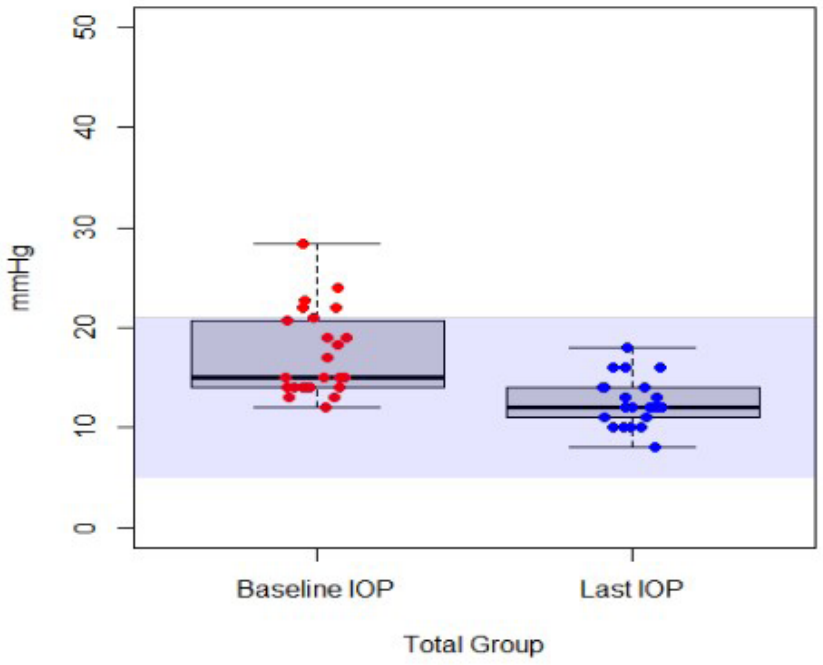
Methods

Retrospective consecutive case series of 25 eyes of 24 adult patients with glaucoma, from four different sites within Latin-America. Success criteria A equals an IOP reduction > 20%, 5 < IOP < 21 mmHg, no reoperation, no severe complications. More restrictive definitions of success were also applied for further analysis: B (IOP reduction >20%, 5 mm Hg < IOP <=18 mm Hg, no resurgery, no severe complications); C (IOP reduction >=40%, 5 mm Hg < IOP <=15 mm Hg, no resurgery, no severe complications).

Results

Mean IOP decreased from 17.2 ± 4.2 preoperatively to 12.5 ± 2.3 mmHg postoperatively (2.6 ± 2.7 months of follow up, 27% reduction) (P<0.0001). Eighty percent were classified as moderate/advanced glaucoma. Success rates were 68% (A), 68% (B), and 16% (C). There was not a statistical difference between pre-op and post-op medication. There were no severe complications recorded and no subsequent glaucoma procedures performed in any of the patients. For the 20 eyes that were classified with moderate/advanced glaucoma, IOP decreased from 17.4 ± 4.5 to 12.2 ± 2.4 (30% reduction) (P<0.001). Success rates were 70% (A), 70% (B) and 20% (C) for the moderate/advanced glaucoma group.

Image



Conclusions

Combined phacoemulsification and goniotomy using the TrabEx device is an effective and safe technique to lower IOP in a Latin-American cohort representing the whole spectrum of disease severity and miscellaneous clinical scenarios.

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P-792

THREE-YEAR OUTCOMES OF XEN GEL STENT IMPLANTATION IN PATIENTS WITH OPEN-ANGLE GLAUCOMA

I Liehneova

Purpose

The aim of the study was to evaluate the efficacy of XEN Gel Stent implantation in glaucoma patients.

Methods

Prospective, single - center interventional study. Consecutive eyes with uncontrolled intraocular pressure (IOP) or signs of disease progression were included to undergo XEN implantatio with mitomycin C injections. Main outcome measures were mean reduction in IOP and in the number of medications and the rates of reoperations.

Results

Thirty eyes underwent XEN surgery (30 patients, mean age of women 61,3 years,mean age of men 52,2 years). Before surgery mean IOP was 33,78 +/- 15mmHg, IOP was 18,94+/- 4,0mmHg 12 months postoperatively, 19,8 +/-5,05mmHg 24months and 19,54+/- 4,2mmHg 36months. Mean number of IOP- lowering medications was significantly reduced from 2,7+/- 1,1 before surgery to 1,1 +/- 1,2 ($p<0.001$) at 36 months after surgery. In 55% of the patients needling procedures had to be performer.

Conclusions

The XEN Gel Stent is effective minimal invasive glaucoma surgery for open- angle glaucoma. After 3 years XEN gel stent surgery achieved a clinically and statistically significant reduction in IOP and the number of glaucoma medications. Needling procedures were necessary to restore aqueous flow in a high rate of patients.

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P-794

TRIALS AND TRIBULATIONS OF FILTERING SURGERY IN A CASE WITH LOW SCLERAL RIGIDITY

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Purpose

To present a case in which filtration surgery was performed on a patient with Juvenile open-angle glaucoma and uncontrolled intraocular pressure (IOP) despite maximum medical therapy.

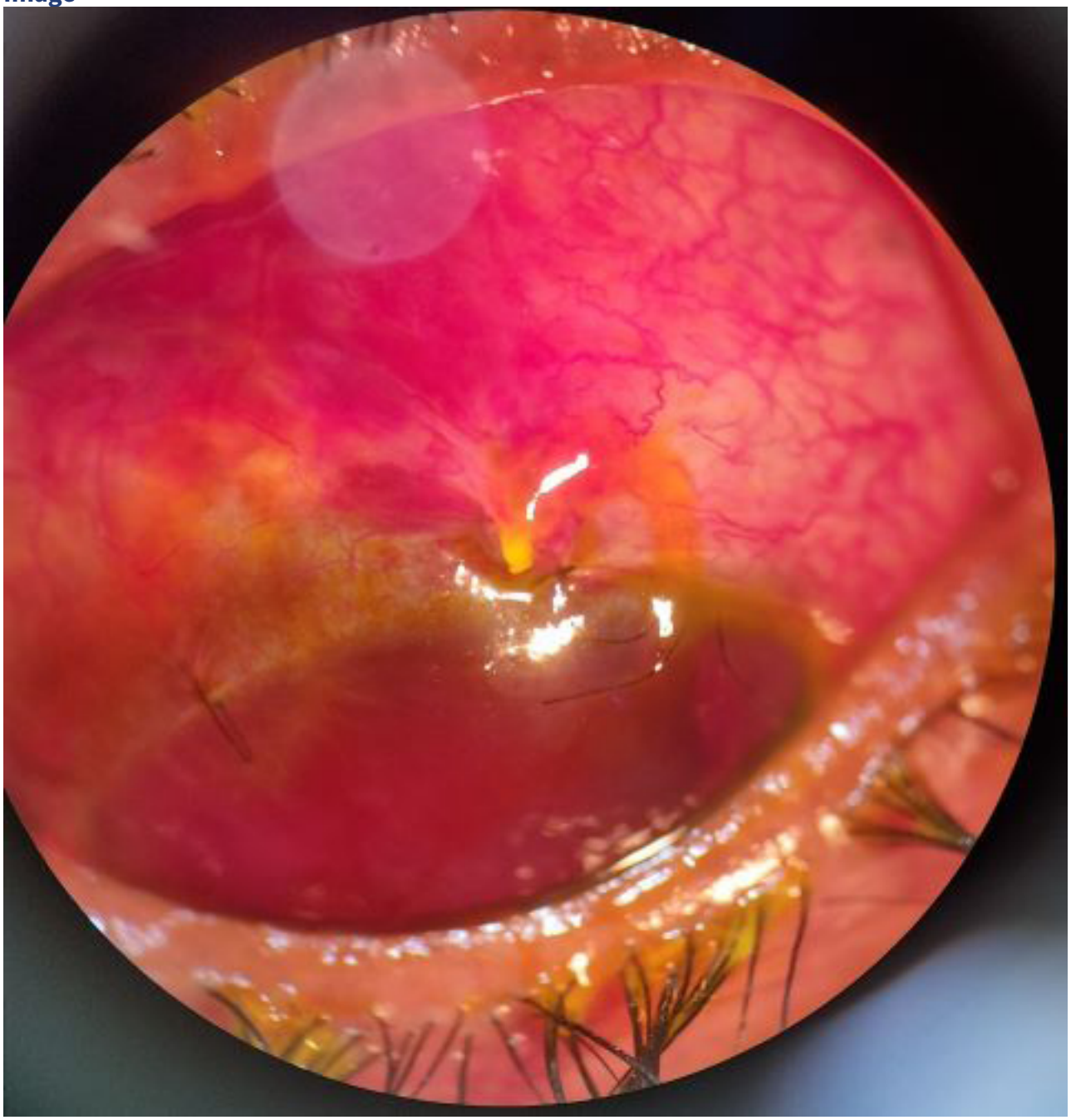
Methods

Combined phacoemulsification with intraocular lens implantation and re-trabeculectomy was performed to control IOP in a patient with Juvenile open-angle glaucoma. During conjunctival dissection an engorged episcleral vessel was noted. The scleral flap was dissected carefully avoiding the vessel. The surgery was rendered difficult due to low scleral rigidity. However surgery was completed uneventfully.

Results

Immediate postoperative IOP was in the low teens and visual acuity was maintained to the pre-operative status. However, on follow-up, hyphaema was encountered when the IOP lowered further. The source of hyphaema was determined to be the engorged episcleral vessel adjacent to the scleral flap. Management of the hyphaema was challenging as low IOP led to recurrent hyphaema. Attaining the optimum IOP was the goal.

Image



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Conclusions

There is an increased possibility of hypotony following filtration surgery in eyes with low scleral rigidity which can lead to many challenges. In this case, we learn how best recalcitrant hyphaema could be managed.

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P-795

SMALL POSTERIOR CONJUNCTIVAL INCISION LIMBAL-BASED (SPCIL) TRABECULECTOMY – A REVIVAL OF THE LIMBAL-BASED TRABECULECTOMY

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Purpose
Limbal-based trabeculectomy has the advantage of avoiding anterior bleb leak and limbal suture abscess, but it has seen a marked decline in the last two decades due to legitimate concerns about the formation of posterior 'wall-of-steel' where scarring at the site of a large posterior conjunctival incision causes limitation to posterior aqueous flow. We describe here a novel Small Posterior Conjunctival Incision Limbal-based (SPCIL) technique whereby a short-length conjunctival incision (3-4mm as opposed to a typical 12mm) is used. The early postoperative course of a small series is examined.

Methods
A series of 14 trabeculectomies performed by two surgeons using the SPCIL technique were analyzed. The conjunctival incision was at least 9mm from the limbus at 12 o'clock position. Traction sutures were used to achieve exposure of the anterior sclera for the purpose of scleral flap formation. Blunt sub-tenon dissection was achieved with a Blumenthal dissector and Mitomycin C (0.2-0.4mg/mL) was applied with sub-tenon injection followed by irrigation after 2-3 minutes. The conjunctival incision was closed with Vicryl 9-0 or 10-0 suture. Primary outcome measures are changes in IOP, Visual Acuity, number of topical medications, needling rates, and revision rates.

Results
The majority of cases were primary open-angle glaucoma (n=10) with 2 cases of uveitic glaucoma and 2 cases of primary angle closure glaucoma. Two cases were combined with cataract surgery. Pre-operative IOP was 32.4 ± 3.7 mmHg using 3.4 ± 0.4 topical glaucoma agents. Five patients were on Diamox preoperatively. Post-operative IOP at Day 1, Week 1, Week 2, 1 month, 2 months and 3 months were 17.1 ± 2.8 mmHg, 14.3 ± 4.0 mmHg, 11 ± 2.6 mmHg, 11.6 ± 2.2 mmHg, 8.0 ± 1.9 mmHg and 7.5± 2.5mmHg respectively. As expected, there were no cases of anterior bleb leak. Needling was performed in 2 cases for scleral flap adhesion. There was one case of transient self-resolved hypotony with choroidal effusion.

Conclusions
Small Posterior Conjunctival Incision Limbal-based Trabeculectomy when applied to suitable patients with mobile conjunctiva can result in good post-operative outcomes with no risk of anterior bleb leak and avoids the formation of conjunctival 'wall-of-steel'.

P-796

MEDIUM-TERM VISUAL AND REFRACTIVE OUTCOMES IN PATIENTS WITH PSEUDOEXFOLIATION IMPLANTED WITH A TORIC INTRAOCULAR LENS

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Purpose

To report medium-term visual and refractive outcomes of patients with pseudoexfoliation implanted with toric intraocular lenses (IOLs).

Methods

We retrospectively reviewed patients with pseudoexfoliation who had undergone phacoemulsification between 2016 and 2020 with at least 24 months follow-up.

Results

Mean follow-up was 44.17±14 months. Toric IOLs were implanted in 48 eyes: mean uncorrected LogMAR visual acuity one month after surgery was 0.03±0.09, decreasing to 0.08±0.11 at the last visit (P=0.01). Mean refractive cylinder was -0.12±0.36 diopters one month after surgery and -0.25±0.44 diopters at the last follow-up visit, p=0.012. In eyes with pseudoexfoliation, absolute spherical equivalent prediction error was 0.22±0.20 diopters for toric IOLs. One month after surgery 68.6% of eyes with toric IOLs were within ±0.25 diopters of target spherical equivalent and 91.6% were within ±0.5 diopters. Spherical equivalent did not change significantly during follow-up.

Conclusions

Prediction error in eyes with pseudoexfoliation implanted with toric IOL was low and similar to values reported for normal eyes. Postoperative refractive cylinder with toric IOLs was low, with little change during follow-up. Visual function in patients receiving toric IOLs was excellent. Therefore, the implantation of these IOLs may be considered in eyes with pseudoexfoliation.

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P-798

THE ROLE OF VITREOUS ON AHMED GLAUCOMA VALVE SUCCESS FOR AMYLOIDOSIS SECONDARY GLAUCOMA

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Purpose

to assess the role of previous pars plana vitrectomy on the surgical outcomes of patients with hereditary transthyretin amyloidosis (hATTR) who underwent Ahmed Glaucoma Valve (AGV) implantation.

Methods

A retrospective cohort study was performed enrolling consecutive patients with a diagnosis of hATTR secondary glaucoma who underwent primary AGV implantation in our department in the last decade. Previous pars plana vitrectomy (PPV) was used to split the patients in two groups. The primary outcome was success, defined as intraocular pressure (IOP) ≥ 6 mmHg and ≤21 mmHg with or without medication, with no need for further glaucoma surgery. Secondary outcomes were postoperative IOP, early-onset complications and the number of IOP-lowering medications.

Results

The study included 100 eyes of 79 patients, of which 45 eyes have been submitted to PPV. No significant differences were found between groups for age at the time of surgery, hATTR diagnosis or symptoms onset, gender, liver transplant or use of Tafamidis® (all p>0.05). Vitrectomized eyes had worse vision (0.46±0.51 vs 0.22±0.22 logMAR, p=0.002) and had a higher proportion of pseudophakia (40% vs 7%, p<0.001). Preoperative IOP and the number of IOP-lowering drops were not significantly different between groups (p=0.20 and p=0.47, respectively). At 1 year (100% vs 91%, p=0.024) and 3 years (92% vs 72%, p=0.024) surgical success was significantly higher for non-vitrectomized eyes, and presented a trend in the same direction at 2 years (91% vs 77%, p=0.076); no differences at 4 and 5 years. No differences were found in postoperative IOP at all timepoints but at 2 months (higher in vitrectomized eyes: 18.70±5.62 vs 15.74±4.26, p=0.009). No differences were found in postoperative complications. Median [interquartile range] of follow-up was 3.53 [1.93-5.64] years.

Conclusions

The management of glaucoma secondary to hATTR is very complex. In our cohort, almost half of the patients were previously submitted to PPV which led to a lower success of AGV surgery at 12 and 24 months. As no differences were found at baseline, the disease duration does not seem to justify the differences. Instead, those patients might likely have a more aggressive phenotype, leading to earlier PPV and worse vision. PPV itself might also contribute to the lower success of surgery by increasing the amount of amyloid that can deposit in the trabecular meshwork instead of the vitreous and due to previous conjunctival manipulation.

P-799

A SEVERE CASE OF RECURRENT ENCAPSULATION AFTER AHMED GLAUCOMA VALVE IMPLANTATION: SURGICAL APPROACH

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Purpose

Glaucoma drainage devices (GDD) are an important tool in the treatment of complicated and refractory glaucoma cases. Excessive capsular fibrosis, which is a frequent cause of long-term failure of Ahmed glaucoma valve (AGV) surgery, is difficult to manage and often requires additional surgical interventions.

Methods

Clinical case report. We describe a severe case of recurrent encapsulation following AGV implantation in a patient with Schwartz-Matsuo syndrome. Photographs and video records were performed with the patient's consent during follow-up visits and surgeries.

Results

A 32-year-old man was sent for ophthalmologic evaluation because of ocular hypertension in his left eye (LE). His distance corrected visual acuity was 20/20 in his right eye (RE) and 20/400 in his LE. Intraocular pressure (IOP) was 16 mmHg in his RE and 39 mmHg in his LE under antiglaucoma maximal medical therapy. Anterior segment examination of the LE showed 0.5+ anterior chamber cell. LE fundoscopy revealed chronic superior macula-off retinal detachment and advanced glaucomatous neuropathy (cup-disk ratio 0.8). Scleral buckling and pars plana vitrectomy were performed. Due to uncontrolled postoperative IOP, one month later, an FP7 AGV was implanted in the superior-temporal quadrant of the LE, with tube insertion in the anterior chamber. During the following year, IOP was successfully controlled under timolol and dorzolamide eyedrops, but severe valve encapsulation with an extensive bleb had progressively developed, causing secondary restrictive strabismus. The patient underwent surgical revision of the AGV with fibrous capsule removal, which significantly improved the ocular movement restriction and bleb elevation postoperatively. Three months later, the patient presented uncontrolled IOP and severe recurrence of valve encapsulation and restrictive strabismus. A second surgical revision was performed, in which the fibrous capsule and the AGV were removed, and an Ahmed ClearPath was implanted in the nasal-inferior quadrant. Ocular movements were successfully restored and target IOP was achieved.

Image



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Conclusions

GDD can fail due to excessive wound healing and fibrosis around the plate. Severe cases occur more often in young patients. Treatment options include needling and mitomycin C application, surgical excision of the fibrous capsule, or valve removal and reimplantation/ replacement. Ahmed ClearPath can be a good option for eyes more prone to complications.

P-800
12 MONTHS OUTCOME OF PRESERFLO™ MICROSHUNT

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Purpose
To monitor safety and efficacy 12 after implantation of the PreserFlo™ Microshunt (PF-MS) for uncontrolled glaucoma.

Methods
Consecutive patients with uncontrolled glaucoma despite maximal medical treatment were treated with PS-MS with mitomycin C (MMC) between September 2020 and the end of October 2021. Efficacy and safety data were evaluated 12 months after surgery. The primary outcome was surgical success, defined as intraocular pressure (IOP) between 5 and 21 mmHg, > 20% reduction from baseline and no further glaucoma surgery (success revision/bleb needling of the Preserflo was permitted). Complete success was without the use of glaucoma medications, whereas qualified success was with glaucoma medications. Secondary outcomes were mean reduction in IOP, reduction in glaucoma drug therapy, surgical complications and rate of bleb needling or revision.

Results
Data were available from 59 eyes at 12 months. 43 patients (73%) met the criteria for complete success, with an additional patient (1.7%) a qualified success. Mean intraocular pressure decreased from 28.1mmHg to 15.3mmHg (45% reduction). The mean number of glaucoma medications decreased from 2.2 to 0.2 at 12 months (91% reduction). Postoperatively, two tube erosions (3.4%) were noted, but no sight-threatening complications. Bleb needling or revision was performed in 27% of patients, and 6.7% required a new glaucoma operation.

Conclusions
PF-MS with MMC significantly reduced IOP and glaucoma drug therapy 12 months after surgery. Success rates were high but 27% required bleb needling or revision.

P-801

COMPARISON OF THE SURGICAL ONE-YEAR OUTCOMES BETWEEN EX-PRESS DEVICE IMPLANTATION AND TRABECULECTOMY IN PATIENTS WITH OAG AFTER PARS PLANA VITRECTOMY

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Purpose
In this retrospective 12-month follow-up study, we investigated surgical outcomes of Ex-PRESS device implantation and trabeculectomy in patients with open angle glaucoma (OAG) after par plana vitrectomy (PPV).

Methods
Patients with OAG after PPV were enrolled from June 2009 to December 2022 at Kansai Medical University and divided into two group: Ex (treated with Ex-PRESS) and TLE (treated with trabeculectomy). The following parameters were investigated: intraocular pressure (IOP), the number of IOP-lowering medications, the incidence rate of postoperative ocular hypotony, and success rate based on Kaplan–Meier survival analysis. Postoperative IOP and the number of IOP-lowering medications were recorded at 1 and 2 weeks, then 1, 3, 6, 9, and 12 months after surgery. Failure of these 2 surgeries were defined as the performance of additional surgery and IOP > 21 mmHg or IOP < 5 mmHg.

Results
A total of 20 eyes from 20 patients with OAG (Ex group:15 eyes, TLE group: 5 eyes) who underwent glaucoma filtration surgeries after PPV were enrolled in this study. The mean IOP in the Ex and TLE group was 25.2 ± 8.4 and 35.6 ± 10.9 at baseline,9.9 ± 9.0 and 7.4 ± 3.1, 6.9 ± 3.5 and 6.4 ± 4.4, 8.5 ± 3.3 and 9.8 ± 4.8, 9.5 ± 5.4 and 10.1 ± 1.5, 11.4 ± 5.5 and 12.8 ± 6.9, 10.1 ± 4.1 and 15.8 ± 8.8, and 11.7 ± 4.4 and 11.4 ± 3.6 mmHg at 1 and 2 weeks and 1, 3, 6, 9, and 12 months after surgery. Mean IOP was significantly reduced from baseline ($p < 0.05$) in both groups. The mean number of IOP-lowering medications in the Ex and TLE group was 4.9 ± 1.1 and 3.8 ± 0.8 at baseline, 0.1 ± 0.5 and 0.0 ± 0.0, 0.0 ± 0.0 and 0.0 ± 0.0, 0.2 ± 0.8 and 0.0 ± 0.0, 0.5 ± 1.4 and 0.0 ± 0.0, 0.4 ± 0.8 and 0.2 ± 0.4, and 0.7 ± 1.6 and 0.6 ± 0.9 at 1 and 2 weeks and 1, 3, 6, 9, and 12 months after surgery. The mean number of IOP-lowering medications was significantly decreased from baseline ($p < 0.05$) in both groups. Success rate was achieved in 93.3% and 40% in the Ex and TLE groups respectively. Postoperative ocular hypotony was significantly less common in the Ex group (6.7%) than in the TLE group (20%, $p < 0.05$).

Conclusions
The 1-year postoperative results suggest that Express is more effective glaucoma filtration surgery with fewer postoperative complications compared to trabeculectomy.

P-802

BAERVELDT GLAUCOMA IMPLANT SURGERY FOR SECONDARY GLAUCOMA IN PATIENTS WITH HEREDITARY TRANSTHYRETIN AMYLOIDOSIS

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Purpose
To report the postoperative results of Baerveldt glaucoma implant surgery for secondary glaucoma in patients with hereditary transthyretin amyloidosis, a rare disease.

Methods
The medical records of 4 consecutive secondary glaucoma eyes in patients with hereditary transthyretin amyloidosis which underwent Baerveldt glaucoma implant surgery were retrospectively reviewed.

Results
Case 1: A Japanese female in her 40s with transthyretin Tyr114Cys mutation. In the eye with previous trabeculotomy, Baerveldt glaucoma implant surgery (tube insertion into the vitreous cavity) was conducted. The preoperative intraocular pressure was 24 mmHg. At the last visit (13 months after the operation), the intraocular pressure was 12 mmHg. Case 2: A Japanese female in her 50s with transthyretin Val30Met mutation. In the eye with previous trabeculectomy, Baerveldt glaucoma implant surgery (tube insertion into the vitreous cavity) was performed. The preoperative intraocular pressure was 22 mmHg. At the last visit (37 months after surgery), the intraocular pressure was 8 mmHg. Case 3: A Japanese male in his 40s with transthyretin Val30Met mutation. The right eye with previous trabeculectomy underwent Baerveldt glaucoma implant surgery (tube insertion into the anterior chamber). The preoperative intraocular pressure was 34 mmHg. At the last visit (49 months after surgery), the intraocular pressure was 14 mmHg. In the left eye with previous trabeculectomy, Baerveldt glaucoma implant surgery was conducted (tube insertion into the anterior chamber). The preoperative intraocular pressure was 24 mmHg. At the last visit (31 months after surgery), the intraocular pressure was 10 mmHg. No postoperative complications were observed in these 4 eyes.

Conclusions
Baerveldt glaucoma implant surgery may be effective for secondary glaucoma in patients with hereditary transthyretin amyloidosis.

P-803

CLINICAL RESULTS OF MICROHOOK AB INTERNO TRABECULOTOMY COMBINED WITH CATARACT SURGERY

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Purpose
To evaluate the clinical results of microhook ab interno trabeculotomy combined with cataract surgery.

Methods
We retrospectively reviewed 83 eyes of 59 consecutive patients who had undergone microhook ab interno trabeculotomy combined with cataract surgery and were followed up for a period of at least 3 months. Mean age (SD) of the subjects in this study was 68.7 (8.4) and there were 42 eyes of primary open-angle glaucoma, 37 eyes of normal tension glaucoma, 8 eyes of primary angle closure glaucoma, 6 eyes of exfoliation glaucoma, and 1 eye of other type of secondary open-angle glaucoma.

Results
Mean operation time (SD) was 11.3 (1.4) minutes and there were no cases with any intraoperative complications. Mean preoperative intraocular pressure (IOP) (SD) and medication score (SD) were 15.9 (3.0) mmHg and 2.8 (1.1), and they significantly decreased respectively to 13.9 (2.2) mmHg ($p<0.01$) and 1.0 (1.0) ($p<0.01$) at 3 months after surgery, and to 14.8 (3.5) mmHg ($p<0.01$) and 1.2 (1.1) ($p<0.01$) at 6 months after surgery. The rates of patients with IOP control ≤ 15 mmHg and ≤ 18 mmHg were respectively 76.6% and 98.9% at 3 months after surgery, and 69.5% and 91.5% at 6 months after surgery. Post-operative complications included 26 eyes (27.7%) with hyphema or coagulation in the anterior chamber,17 eyes (18.1%) with a transient increase in IOP of ≥ 30mmHg,and 6 eyes (6.4%) with fibrin formation. Factors which were significantly correlated with IOP control ≤ 15 mmHg at 3 months after surgery using multivariate analysis were IOP at 1 week and 1 month after surgery ($p<0.01$).

Conclusions
Although 1/5 of patients suffered from a transient increase in IOP after surgery, our results indicate that microhook ab interno trabeculotomy combined with cataract surgery seems to be effective, at least in the short term.

P-804

ONE YEAR RESULTS OF DEEP SCLERECTOMY WITH UVEOSCLERAL IMPLANT WITH AND WITHOUT MITOMYCIN C IN TWO EUROPEAN CENTERS

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Purpose

To evaluate the efficacy and safety of deep sclerectomy (DS) with the Esnoper Clip (EC) implant (AJL Ophthalmic, Alava, Spain) with and without use of antifibrotic agents in uncontrolled open angle glaucoma (OAG).

Methods

We retrospectively investigated 104 eyes of 96 patients (48 female, 48 male) with uncontrolled OAG who underwent DS with EC implantation between 2017 and 2019 at University Hospital Královské Vinohrady, Prague, Czech Republic (50 patients, 52 eyes – Group 1/G1) and at University Hospital Trias i Pujol, Barcelona, Spain (46 patients, 52 eyes – Group 2/G2). In G1, antifibrotics were not used either peri– or postoperatively. In G2, Mitomycin C was used perioperatively. Intraocular pressure (IOP) reduction, intraoperative and postoperative complications, number of goniopunctures, needlings and glaucoma medications required were noted at 1 day, 1 week, also 1, 3, 6, 9 and 12 months after surgery.

Results

Mean IOP was 21.1±7.8 mmHg (G1) and 24.5±10.6 mmHg (G2) preoperatively, and significantly decreased upon follow-up, reaching 14.6±4.0 mmHg and 14.3±4.5 mmHg respectively ($p < 0.01$) at the 12-month follow-up. Mean IOP reduction was significantly greater in G2 (11.7 mmHg) compared with G1 (9.1 mmHg), $p < 0.01$. The mean number of medications preoperatively was 3.2±0.6 (G1) and 3.0±0.9 (G2), and these significantly decreased to 0.3±0.8 and 0.2±0.6 respectively ($p < 0.01$) at the last follow-up. No significant difference in medication reduction between the groups was found ($p > 0.05$). YAG goniopuncture was performed in 34.6% of eyes (G1) and in 55.6% (G2). Needling was carried out in 13.3% of eyes (G2) and 0% (G1). No significant visual acuity changes were registered in either group. In terms of complications, we noted a trabeculodescemet membrane microperforation perioperatively in one eye (G1) and in 3 eyes (G2). At 1 day and at 1 week after surgery, we registered hypotony (2-5 mmHg) in 32.6% and 32.6% of eyes respectively (G1) compared to 36.5% and 19.2% of eyes (G2). We also observed, at 1 week, an anterior chamber shallowing in 1 eye (G1), a hyperemic bleb in 1 eye (G2) and a bleb leakage in 1 eye (G2). At one month, neither group showed signs of hypotony.

Conclusions

The use of antifibrotic agents is a safe and effective method, which may improve the results of DS. We note that there were more postoperative interventions in G2. Differential aspects in DS technique as well as environment and possibly ethnic differences may account for this.

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P-805
STAB INCISION GLAUCOMA SURGERY

A Gamil

Purpose
To study the outcome of stab incision glaucoma surgery (SIGS) among glaucoma patients attending Khartoum Eye Teaching Hospital (KETH).

This is the first study in Sudan.

Methods
This is a hospital based study, conducted in the specialized glaucoma clinic in (KETH).

Period of study is September 2017 till March 2023.

60 eyes of 55 glaucoma patients underwent (SIGS), after full clinical examination and investigations.

Records of the patients were recalled from the statistical department to analyze their age, sex, eye affected, diagnosis, type of surgery, pre-operative and post-oprative intra-ocular pressure (IOP).

The main outcome measure was post-oprative (IOP) and stop treatment with anti-glaucoma drugs.

A video of (SIGS) will be shown in the WGC.

Details of the surgery are as follows: the conjunctiva is drawn downwards by an IOL forceps and a keratome 2.8 millimeter 1.5 mm from the limbus is taken to create sclero-corneal tunnel. The anterior chamber is entered 1 mm from the limbus. Then the keratome is withdrawn. The anterior chamber is maintained with viscoelastic material through a sideport. Kellys Descemet's Punch is introduced through the tunnel to punch the posterior lip of the cornea. Patency of sclero-corneal tunnel is checked. The conjunctiva is sutured by 10/0 nylon. The sideport is hydrated.

Results
Males are affected more than females.

The age was between 14 and 73 years.

Patients with primary open glaucoma (POAG) were more than narrow angle glaucoma (NAG) and angle closure glaucoma (ACG).

Patients were treated surgically with (SIGS) only, (SIGS) with peripheral iridectomy (PI) or (SIGS) plus phaco- emulsification.

The highest pre-operative (IOP) was 59 and 25 mmhg.

The post-oprative (IOP) was between 21 and 6 mmhg.

Conclusions
The outcome of SIGS in the glaucoma patients was very good in Sudan.

SIGS showed good control of IOP in glaucoma patients.

P-806
LENS EXTRACTION IN ACUTE ANGLE CLOSURE GLAUCOMA PATIENTS

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Purpose
Glaucoma is the leading cause of irreversible blindness, and studies show that primary angle closure glaucoma (PACG) carries a two to three-fold increased risk of bilateral visual impairment compared with the rates of blindness in primary open angle glaucoma (POAG). PACG is associated with anatomically apposition or direct contact of iris and trabecular meshwork, causing obstruction of outflow of aqueous humor. Acute angle-closure glaucoma (AACG) occurs when the iris bulges forward and obstruct the trabecular meshwork from the anterior chamber preveting aqueous humour from being able to drain away. Its clinical presentations as a sudden onset of severe unilateral ocular pain or/and a headache associated with blurred vision, halos, even nausea, and vomiting.

Surgery of lens extraction offers another approach to treating angle closure besides laser treatment. The purpose of this study is to investigate the effectiveness of lens extraction in AACG in any stage and to present a series of cases of early phacoemulsification in AACG.

Methods
Literature view and case series presentation

Results
We investigate the effectiveness of lens extraction in PACG in any stage and to present a series of cases of early phacoemulsification in AACG. The clinical presentations of each patient were recorded including detailed ocular exams and changes of intraocular pressure (IOP) before and after cataract surgery. The biometry of anterior chamber depth, lens thickness, and axial length were recorded from attack eye and fellow eye. The final outcome of visual aciuty and glaucoma status including glaucomatous optic neuropathy and numbers of glacuoma medication were also recorded for comparison.

Conclusions
Lam et al randomized patients with acute primary angle closure (APAC) to either early phacoemulsification or laser iridotomy after the attack was successfully treated with medications, the results revealed the group of phaco/IOL resulted in lower rate of IOP failure at 2 years compared with laser treatment if it is performed within the first week in patients with APAC and coexisting cataract.There is increasing evidence regarding the effectiveness of lens extraction for AACG treatment.

From literature review, cataract surgery lowers IOP in patients with primary angle-closure glaucoma (PACG) at every phase of the disease: after an acute attack, in chronic angle closure, when AACG is stable, and even in eyes with clear lenses.

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P-807

CONJUNCTIVAL BLEB COMPRESSION SUTURES: AN EFFECTIVE METHOD OF ADDRESSING SYMPTOMS OF BLEB DYSTHESIA AFTER TRABECULECTOMY

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Purpose

Over-filtration is a well-known complication of trabeculectomy and related procedures, especially with adjunctive antimetabolites. Symptoms related to over filtration of bleb can result in reduced visual acuity and persistent foreign body sensation in the eye. We describe an effective adaptation of placing deep anchoring partial sclera thickeness compression sutures directly over the conjuctival bleb.

Methods

A retrospective consecutive case series of all patients who underwent conjunctival compression suturing from 2017 to 2019 at Princess Alexandra Eye Pavilion, Edinburgh, UK. Under sub-tenon's anaesthesia, a 9/0 nylon figure-of-eight transconjunctival sutures were placed horizontally across the bleb the first over the limbus and the second over the the bleb posteriorly anchoring the partial thickeness of the scleral.

Results

A total of 12 patients underwent conjunctival compression suturing, and all patients had successful reversal of the bleb dysthesia related symptoms within 1 month with corresponding clinical improvement. Intraocular pressure control was maintained without topical pressure-lowering agents in all twelve patients (median = 10 mmHg, range = 7-12 mmHg) with a median follow-up of 35.9 months (range = 11-61 months). No patients required a return to theatre.

Conclusions

This series demonstrates that conjunctival compression sutures can successfully resolve symptoms of bleb dysthesia due to over drainage without increase in intraocular pressure. This technique offers an effective option for glaucoma surgeons in addressing symptomatic over draining blebs.

P-808

FACTORS THAT PREDICT INTRAOCULAR PRESSURE CHANGE AFTER PHACOEMULSIFICATION IN TRABECULECTOMIZED EYES

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Purpose

To investigate the factors that affect the intraocular pressure (IOP) change after phacoemulsification (phaco) in eyes with functioning filtering blebs after trabeculectomy.

Methods

This retrospective cohort study included 73 eyes with functioning filtering blebs of 70 Japanese patients who underwent phaco after primary trabeculectomy at Okayama Saiseikai General Hospital. Complete success was defined as an IOP increase ≤ 2 mmHg from pre-phaco IOP without additional glaucoma medication or additional glaucoma surgery at 1year after phaco; qualified success was defined as an IOP increase ≤ 2 mmHg from pre-phaco IOP without additional glaucoma surgery at 1year after phaco. The eyes were classified into two groups according to the complete success criteria, namely the successful group and unsuccessful group. Sex, glaucoma type, history of glaucoma surgery except trabeculectomy, and mean number of glaucoma medications before phaco were compared between the two groups.Associations between the IOP change after phaco and age, interval from trabeculectomy to phaco and pre-phaco IOP were assessed using Spearman's rank correlation coefficient (rs).

Results

The mean age was 67.1 ± 10.1 years. The mean interval between primary trabeculectomy and phaco was 554.9 ± 238.5 days. The mean IOP of 8.9 ± 3.4 mmHg increased significantly to 10.1 ± 3.2 mmHg after phaco (P = 0.001), while the mean number of glaucoma medications increased significantly from 0.2 ± 0.6 to 0.5 ± 1.0 (P= 0.003). Kaplan–Meier survival analysis showed that the complete success rate was 41.1% and the qualified success rate was 50.7% at 1 year after phaco. There were no significant differences between the successful group and unsuccessful group in terms of sex (P = 0.101), glaucoma type (P = 0.337), history of glaucoma surgery except trabeculectomy (P = 0.534), and mean number of glaucoma medications before phaco (P = 0.267). The IOP change after phaco showed a significant negative correlation with the IOP before phaco (rs = -0.480; P < 0.001), and with the interval between trabeculectomy and phaco (rs = -0.402; P < 0.001).

Conclusions

The IOP before phaco and the interval between trabeculectomy and phacomay predict IOP change after phaco in eyes with functioning filtering blebs. Eyes with well-functioning filtering blebs with lower IOP are more likely to be affected by phacoand it may be recommended that phaco be retarded in eyes with well-functioning filtering blebs.

P-809

GONIOTOMY USING A NEW AB INTERNO IRRIGATING TRABECULOTOMY DEVICE (TRABEX PRO) FOR TREATMENT OF OPEN-ANGLE GLAUCOMA: INITIAL RESULTS

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Purpose

To provide short-term results of combined phacoemulsification and goniotomy performed with a new irrigating and aspirating trabecular excision device via ab internal approach with follow-up to 6 months.

Methods

This prospective interventional case series comprised 30 consecutive eyes with open-angle glaucoma and cataract udergoing combined phacoemulsification and goniotomy performed with a new irrigating and aspirating trabecular excision device. The new TrabEx Pro device is designed to open a direct pathway for aqueous to flow from the anterior chamber into Schlemm's canal and collector channels. Under gonioscopic visualization the new device equipped with irrigation and aspiration, and a dual bladed footplate was used to excise trabecular meshwork and the inner wall of Schlemm's canal. The procedure was perfromed following cataract suergery in all cases. The main outcome measures were intraocular pressure (IOP), glaucoma medication use, and complications.

Results

The mean IOP was 20.5 mm Hg+/-6.0 (SD) preoperatively and 14.7+/-3.2 mm Hg post-operatively. There was a corresponding drop in glaucoma medication use from 2.1+/-1.2 at baseline to 0.9 +/-1.1 post-operatively. No subsequent glaucoma procedures were performed in any patient through the course of the study. All procedures were performed without complication or trauma to adjoining angle tissues. The most common averse event was post-op micohyphema in 21 (70%) of patients, which invariably resolved within one week.

Conclusions

Combined phacoemulsification and goniotomy using the TrabEx Pro irrigating and aspirating device was safe and effecitve. Intra-operative complications did not occur and post-op microhyphema incidence and severity was comparable to other canal based procedures.

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P-810

CLINICAL FEATURES ,MANAGEMENT AND OUTCOMES OF EXPULSIVE CHOROIDAL HAEMORRHAGE DURING CATARACT SURGERY

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Purpose

To study the risk factors, clinical features ,management and outcomes of intraoperative expulsive choroidal haemorrhage (ECH) during cataract surgery

Methods

Retrospective hospital based study

Out of 1,167.250 patients who underwent cataract surgery between 2008 and 2020 ,patients diagnosed with intraoperative ECH were included. Demography, ocular and systemic risk factors ,visual acuity, type of ocular anaesthesia ,intraoperative and postoperative records ,management and surgical outcomes were analysed

Results

52 eyes (0.004%) of 1,167,250 patients had ECH. Of the 52 cases, 43 cases (incidence rate 0.002%) in the years 2008 to 2015 and 9 cases (incidence rate 0.002%) in the years 2016 to 2020. The change in the ocular anaesthesia from peribulbar and retrobulbar anaesthesia to sub-tenon anaesthesia was associated with a reduced rate of ECH (P= .002). 28 eyes (53.8%) experienced limited ECH and 24 eyes (46.2%) full- blown ECH .The visual outcome was better in eyes with limited ECH compared with full- blown ECH at all follow up visits.The median vision (inter-quartile range) before the cataract surgery and at postoperative day 1 were 1.30 (0.78 to 2.60) and 2.45 (1 to 2.75),respectively . The median final vision (interquartile range) after the second surgical intervention was 2.2 (0.60 to 2.60).

Conclusions

This series included 52 eyes with each, recognised associations of ECH with different types of anaesthesia and with different cataract surgical procedures ,and described management of ECH. Post operative visual outcome was poor.

P-811

XEN GEL STENT IMPLANTATION IN TREATING GLAUCOMA - POSTOPERATIVE LONG-TERM RESULTS

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Purpose
The aim of this study was to assess the efficacy and safety of XEN Gel Stent implantation in glaucoma patients.

Methods
Retrospective and single-center study conducted on glaucoma patients who underwent a XEN Gel Stent implantation, between July 2018 and October 2020. Main parameters evaluated were: changes in IOP measured with Goldmann applanation tonometer, number of antihypertensive medications used, postoperative complications and necessity of further surgical procedures. Success was defined as an IOP reduction of at least 20% without (complete) or with (qualified) hypotensive medication.

Results
45 eyes were included in the study. Median IOP was significantly lowered from 25,0 ± 7,5 mmHg pre-operatively to 15,0 ± 2,3 mmHg at the end-of-follow-up (36 month). At the end of the study the mean IOP reduction was 32,8%. The median number of medications was reduced from 2,8 at baseline to 1,4 at the end-of-follow-up. At the last follow-up visit, 62,6% eyes were considered success, 18,8% eyes as complete success and 43,8% as qualified success. Needling was performed in 15 (33,3%) eyes. Twenty (44%) eyes presented adverse events. The most adverse events were transient and resolved spontaneously within a month.

Conclusions
The XEN Gel Stent enables significant reduction in intraocular pressure with very low complication rates. XEN Gel Stent implantation is effective and safe at 36 months' follow-up.

P-812
RETROSPECTIVE EVALUATION OF XEN® AND KAHOOK DUAL BLADE®

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Purpose
To compare two different minimally invasive glaucoma surgeries (MIGS), Xen implant and Kahook Dual Blade, in terms of surgical success rates regarding intraocular pressure reduction.

Methods
Retrospective data analysis of patients receiving glaucoma surgery through Xen implantation or Kahook Dual Blade, from January 2018 to end of February 2022.

Main outcome parameter was surgical success 6 months postoperatively. Surgical success was defined as complete success (IOP ≤18mmHg without medical glaucoma treatment), qualified success (IOP ≤18mmHg with medical glaucoma treatment) or no success (IOP >18 mmHg or necessity of further glaucoma surgery).

Results
The data analysis included 203 surgical cases, 113 Xen impantations and 90 Kahook Dual Blade (KDB) surgeries. All Xen implantations were done as stand alone procedures, whereas all Kahook Dual Blade surgeries where combined with cataract surgery via phakoemulsification. In 81 (62 Xen and 19 Kahook Dual Blade) cases, intraocular pressure values where available 6 months postoperatively.

Preoperative Intraocular pressure (IOP) was 24.9 ± 8.3 mmHg in the Xen group and 23.0 ± 8.7 mmHg in the KDB group. Postoperative pressure at 6 months was 17.7 ± 6.2 mmHg in the Xen group and 18.2 ± 3.8 mmHg in the KDB group.

Surgical success after 6 months was 51.6% (22.6% qualified and 29.0% complete success) in the Xen group and 42.1% (21.05% qualified and 21.05% complete success) in the KDB group (p=0.735).

Conclusions
No statisitical difference was found regarding surgical success rates of Xen as standalone procedure and Kahook Dual blade combined with cataract surgery.

P-813
REAL WORLD MEDIUM TERM RESULTS OF PRESERFLO GLAUCOMA SHUNT

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Purpose
Evaluation of the Preserflo Glaucoma shunt in a UK district hospital presenting medium-term real-world outcomes and adverse events of operations carried out over a period of two years

Methods
Retrospective open-label consecutive case series of operations carried out by a single surgeon in 2021/2022. All patients had open angle glaucoma and had stand-alone procedures augmented by MMC (o.4 mg/ml applied for 2-3 minutes). Goldman Tonometry was carried out at time of listing, day 1, month 1, 3 and 6 post-surgery by multiple observers. Success defined as a drop in IOP of at least 20% without additional medication (qualified – with medication), tfailure as requiring major revision or loss of more than 3 Snellen lines. Other outcome measures include complication and augmentation rates.

Results
42 eyes with (36 patients, 42% female) were included for analysis, 3 eyes had previous glaucoma procedures (Xen, trabeculectomy and Hydrus). Mean pre-op IOP 23.2 (range 14-40) on mean 2.8 topical medications. 70% reached 3-month follow-up: mean IOP 12.8 (8-30), 79% success (92% qualified), mean medication 0.3 (13%), 83% had IOP < 15; 44% reached 6 month follow-up: mean IOP 12.4 (9-28), 69% success (qualified 87%), mean medication 0.2 (15%), 84% had IOP < 15; Two eyes were classed as failures requiring revision, no eyes lost > 3 Snellen lines, 4 eyes (9%) required 5FU, 2 eyes had transient clinically significant hypotony; 1 eye required Tutoplast at the time of surgery, 8 eyes had small bleb leaks post-op, one requiring intervention (single suture). One eye developed CRVO and needed anti-VEGF but maintained good IOP

Conclusions
The results in this series are comparable to that of other published Preserflo outcomes with 4 out of 5 eyes reaching IOP < 15 mmHg on little medication (1). The requirement of additional interventions was low, although the high incidence of bleb leak was a surprise that required a modification of suturing technique. Serious adverse events including persistent hypotony did not occur in this series. The Preserflo efficacy is comparable to but less than augmented trabeculectomy but required relative fewer follow up visits and post-operative management. Bleb raised were generally healthier and more diffuse than trabeculectomy blebs. Preserflo remains a viable alternative for medically uncontrolled glaucomas with high IOP, but more long term data are needed.

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P-814
RESULTS OF 40 EX-PRESS IMPLANTATION IN OPEN-ANGLE GLAUCOMA

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Purpose
Glaucoma is a chronic disease that can lead to visual impairment and blindness. Treatment is focused on intraocular pressure decreasing by topical eyedrops or surgery. The purpose of this study is to evaluate the results, with a one year follow-up, of external filtration surgery by implantation of Ex-Press mini shunt device (Alcon/Novartis laboratories) in 40 eyes with open-angle glaucoma. The Ex-Press glaucoma device was developed to decrease IOP like trabeculectomy avoiding its complications.

Methods
A prospective study of 40 eyes (23 women and 17 men; mean age: 67.5±13.9 years; range: 35-82 years) with long-term open-angle glaucoma was performed for 3 years for this study.

All patients had topical treatment with at least 1 IOP-lowering eyedrop. All of them had filtration surgery (Ex-Press Implant model P-50 with the same surgical technique and without phacoemulsification) stopping topical medication. All patients were evaluated during one year. A group of 33 normal subjects (mean age 65±12.5 years) was used as a control group.

Results
All patients completed the study and had a significant reduction in intraocular pressure (IOP) after the filtration surgery. Mean IOP before surgery was 24.2+/-5.18 mmHg decreasing to 17.4+/-3.3 at the end of the study. There was no statistically significant difference in the mean values of visual acuity after surgery (not associated to phacoemulsification). Flat anterior chamber related to hypotony during the early postoperative period appeared in 32.5% of cases but was solved spontaneously excepting in 3 cases where an AC reformation with viscolastic was necessary. Seven patients had choroidal effusion, without hypotonous maculopathy. Three patients had early bleb leak resolved with contact lenses.

Conclusions
Ex-Press filtration surgery allowed stopping topical treatment by decreasing IOP in all patients. It had no effect on postoperative values of visual acuity and had minimal complications in these patients.

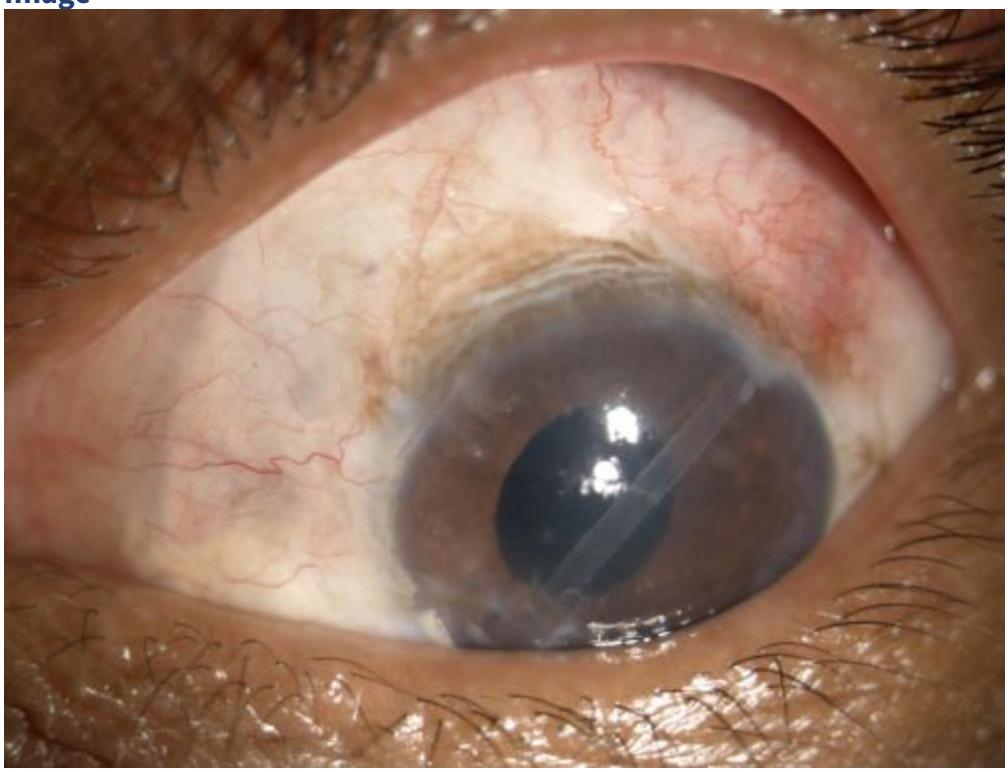
P-815
FREE FALL- SPONTANEOUS DETACHMENT OF AHMED GLAUCOMA VALVE TUBE

V G Belamgi, G Murthy

Purpose
To report a rare case of Ahmed Glaucoma valve tube detachment from the plate

Methods
A regularly followed up patient who underwent AGV implantation for Secondary Silicone oil induced Glaucoma after primary repair for Penetrating corneal injury and Intraocular foreign body. After 2 years of implantation, concurrent movement of AGV tube into the Anterior chamber was noted. Despite the tube movement the implant appeared to be functioning well with good intraocular pressure control until this year when he presented with detachment of tube from the plate. Immediate surgical removal of the AGV tube was performed.

Results
Immediate surgical removal of the detached tube in the anterior chamber was performed.

Image


Conclusions
Although dynamic movement of AGV tube has been reported previously, Spontaneous detachment of AGV tube from plate is a yet not documented complication. The proposed mechanism in this case appears to be the anterior migration of the encircling band leading to slow weakening of the plate tube junction and eventually tube detachment. AGV tube movement and migration of encircling band are known complications. Synchronously leading to tube extrusion is being reported for the first time.

P-816

ONE-YEAR PRELIMINARY SURGICAL OUTCOMES OF THE PRESERFLO® MICROSHUNT IN PRIMARY OPEN-ANGLE GLAUCOMA

M Cusato[1], A Giudiceandrea[1], T Salgarello[1], M Cocuzza[1], A Giugliano[1], G Oreste[1], A Perugini[1], M Cozzupoli[2], F Amore[1], B Falsini[1], S Rizzo[1]

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Purpose

To evaluate the medium-term efficacy of the PreserFlo® Microshunt (PSM) implantation in Primary Open-Angle Glaucoma (POAG) patients.

Methods

A cohort of consecutive pseudophakic POAG patients inadequately controlled on maximal tolerated medical therapy who underwent surgery with the ab externo minimally invasive glaucoma surgery device PSM was evaluated. PSM was implanted by an experienced surgeon as a stand-alone procedure with adjunctive use of topical mitomycin C (MMC; 0.2 mg/ml) for 3-5 minutes, using little sponges soaked in 0.1 ml of MMC. Afterwards, a solution composed by 0.1 ml of MMC and 0.1 ml of lidocaine was injected subconjunctivally 15 days after the surgery, while removing conjunctival stitches. One-year success was defined as an IOP of 18 mmHg or less and an IOP reduction of 20% or more, with (qualified) or without (complete) any hypotensive medication.

Results

Sixteen eyes underwent PSM and had 1-year follow-up. The mean age was 70 ± 13.2 years. Mean IOP was lowered significantly from 20 ± 9.5 mmHg at baseline to 8.9 ± 2.7 mmHg at the end of follow-up. At month 12, 100% of eyes was categorized as complete successes. The number of hypotensive medications was significantly reduced from 3.0 ± 1.0 medications at the preoperative visit to 0 medication at month 12. Throughout the study, 7 eyes (43.75%) required one MMC-augmented bleb needling. No adverse events were reported.

Conclusions

In this study, glaucoma surgery with the PSM provided a significant reduction in both IOP and glaucoma medications, with a good safety profile after one year of follow-up.

P-817

ORBITAL CELLULITIS FOLLOWING UNCOMPLICATED GLAUCOMA DRAINAGE DEVICE IMPLANTATION: A CASE REPORT

K Singh, J Singh, S Chaudhary, F Thattaruthody, S Pandav, U Tekchandani, R Singh

Purpose

Orbital cellulitis (OC) is a rare postoperative complication of glaucoma drainage device (GDD) implantation. To the best of our knowledge, this is the first case report of OC following implantation of a low cost GDD Aurolab aqueous drainage device(AADI) without any tube exposure.

Methods

A Case Report

Results

We report a case of OC in a 28-year-old female who developed pain, proptosis, purulent discharge and limited extraocular motility five days after an uneventful AADI implantation in the right eye. Contrast-enhanced computed tomography of the orbits demonstrated fat stranding, proptosis and fluid collection in supero-temporal orbit surrounding plate of the tube, consistent with OC. No evidence of endophthalmitis was noted on ultrasonography. She was empirically started on intravenous Vancomycin, Ceftazidime and Metronidazole for broad-spectrum coverage along with topical fortified Vancomycin (50 mg/ml) and Ceftazidime (50 mg/ml) every 30 minutes. Pus culture from conjunctival swab revealed growth of Staphylococcus aureus which was sensitive to Vancomycin. She had minimal improvement with intravenous antibiotics and ultimately underwent GDD explantation. Intraoperatively, pockets of purulent material surrounding the tube valve were noted with no evidence of tube erosion or footplate exposure. She subsequently received 3 doses of sub-conjunctival Vancomycin for the localized pus pocket. Culture of scleral patch graft and tube also revealed Staphylococcus aureus growth. Topical and oral antibiotics along with oral prednisolone were continued till full clinical recovery. 3 months post-operatively, she underwent trans-scleral Diode laser cyclophtocoagulation for uncontrolled intraocular pressure(IOP). She regained her preoperative visual acuity of 1/60 with well controlled IOP off antiglaucoma medications.

Image

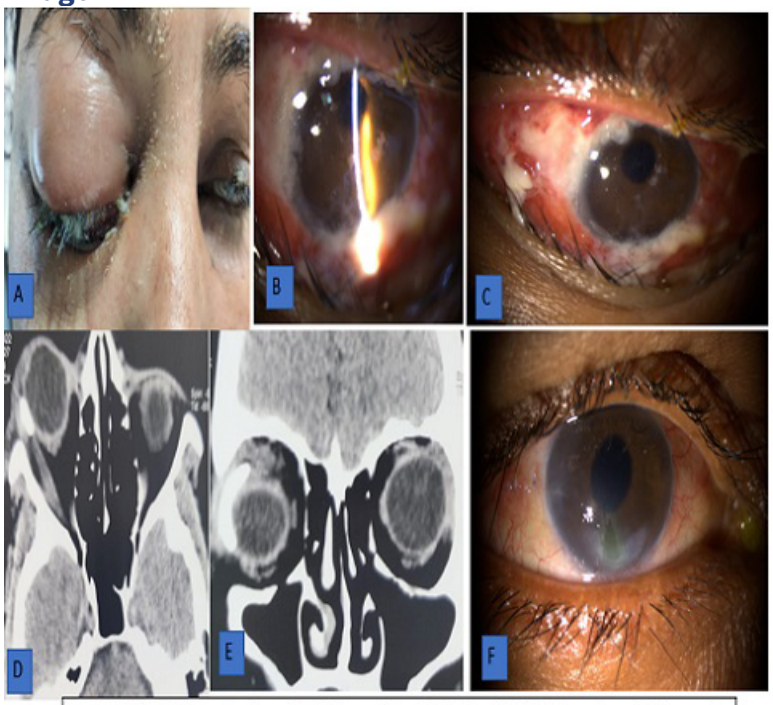


Image: (A,B,C) Clinical pictures showing proptosis of Right eye with purulent discharge (D,E) Axial and coronal computed tomography scans showing proptosis ,thickened preseptal tissues, thickened extraocular muscle in addition to the presence of implanted GDD plate over the supero-temporal area of the right eye (F)3 weeks after GDD explantation(Resolved OC with corneal epithelial defect)

Conclusions

Development of OC following GDD implantation can occur in the early or late postoperative period.1 Immediate hospitalization with intravenous administration of broad-spectrum antibiotics is recommended. Explantation of the infected GDD is often required for source control.

References

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P-818

COMPARE THE SURGICAL SUCCESS AND OUTCOMES OF AADI V/S AGV IN INDIAN POPULATION

N Nagdev, D Maheshwari

Purpose

Comparative study of surgical success and outcomes of AADI v/s AGV in Indian population.

Methods

A retrospective comparative study of 71 (50 AADI, 21 AGV) patients underwent glaucoma drainage device for lowering intraocular pressure in cases of secondary and refractory glaucoma's. Best corrected visual acuity, intraocular pressure and no.of AGMs were recorded on postoperative day 1, 15, 1month, 1.5,3 and 6months. Out of 50 AADI patients, the tube placement in vitreous cavity was 36, anterior chamber 8, sulcus placement 4, tube was tucked beneath inferior rectus muscle 1 and 1 case was aborted due to intraoperative hemorrhagic choroidal effusions. Any further complications were noted on every visit.

Results

Mean Best corrected visual acuity for AADI was 0.94±0.8 to 0.92±0.9 and for AGV it was 0.78±0.5 to76±0.8 with significant p value (0.857, 0.982) at end of 6 months. Mean IOP for AADI reduced from 29.80±11.6mmHg to 14.62±6.9mmHg (P< 0.001) and for AGV, 29.90±9.9 to 16.11±6.9mmHg (P<0.001) by last visit. Average IOP for AADI and AGV was 14.62mmHg and 16.11mmHg by end of 6 months respectively. There was more 2mmHg reduction in IOP in AADI group at last follow up. Mean AGM for AADI preoperatively was 3.35±1.3 which reduced to 1.79±1.3 (P<0.001) and for AGV, it was 3.90±1.1 to 1.26±0.9 (P<0.001). Complete and qualified surgical success for AADI (20, 26) and AGV (4, 11) was noted. Failure rate for AADI and AGV was 3 and 5 respectively. In 3 cases of AADI, Choroidal effusions developed at 1 and half month follow-up which resolved with Oral Wysolone, topical steroids and cycloplegics. In one case of AADI, tube was blocked by vitreous and Yag Vitreolysis was done. Only 1 case of AGV shows kissing choroidal's on Bscan which resolved by conservative treatment.

Image

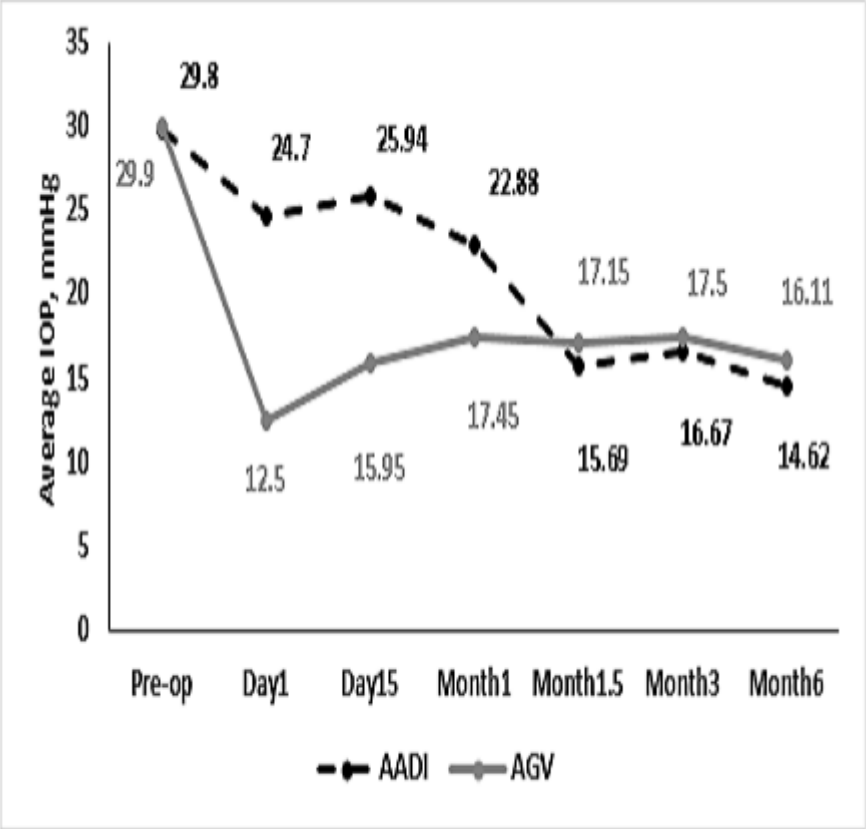


Figure1: Trajectory of IOP over the visits using line graph between AADI and AGV

Conclusions

AADI shows more safety profile as compared to AGV.

RF

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P-819
A RETROSPECTIVE ANALYSIS OF BEVACIZUMAB AS AN ADJUNCT IN TUBE SURGERY

D Muhundhakumar, E Fahy, A Elkarmouty

Purpose
Tube surgery is an important IOP-lowering treatment option in patients with complex glaucomas – such patients are likely to have had multiple prior surgeries and are at high risk of a strong scarring response which is a limiting factor for surgical success.

Bevacizumab is administered in retina clinics in the management of choroidal neovascularisation for its anti-VEGF properties. This drug has the potential to modulate the angiogenic component of the wound healing response after glaucoma surgery. Studies have explored the use of bevacizumab with trabeculectomy surgery(1) but there is limited data on the use of bevacizumab alongside tube surgery.

The aim of this study was to report outcomes for a surgical centre (Moorfields St Ann's) with a diverse patient cohort and assess whether intra-operative avastin is associated with improved outcomes.

Methods
A retrospective case note review was performed of tube surgeries performed (20 cases) by the authors at Moorfields St Ann's between February 2022 – September 2022, up to 6 months follow up (with the intention to extend follow up further.) Tube shunt surgeries were performed with either Baerveldt 101-350 or Paul Glaucoma Implant devices (with mitomycin C) and Bevacizumab (1.25mg/0.05mL) was injected sub-conjunctivally over the plate at the end of the operation. Data collected includes acuity, pressure, fields, drop medications and complications – 5 patients did not receive avastin and they were treated as controls.

Results
In both groups 2/3 of patients had POAG (primary open angle glaucoma), the rest having normal tension, angle closure, uveitic or neovascular glaucoma. 50% were of African descent, 20-33% Asian descent and the remainder of Caribbean or white ethnic descent. The listing pressure was 22.8mmHg (+/- 3.2) in the control group dropping to 15.4mmHg (+/- 1.4) at 6 months follow up (p=0.0015.) Medications dropped from 3 to 1.4 agents. Listing pressure was higher in the treatment group: 24mmHg(+/- 7.29) dropping to 14.25mmHg (+/-3.65) at 6 months follow up (p=0.002.) Medications dropped from 4 to 1.4 agents. In both groups there were no significant events or need for re-operation at 6 months follow up.

Conclusions
Initial data indicates that Bevacizumab has a good safety profile in our patient cohort with significant IOP lowering effect in the treatment group (greater than controls over 6 months of follow up.) Further long-term survival data will be acquired as part of this study.

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P-820

OUTCOMES OF AB-EXTERNO MICROSHUNT IMPLANTATION IN THE MANAGEMENT OF COMPLEX PAEDIATRIC GLAUCOMA

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Purpose

Glaucoma drainage devices are a mainstay of treatment for complex childhood glaucoma. Recently a microshunt device has been introduced which allows easier implantation and does not require a large conjunctival incision.[1] We present the results of this device in paediatric patients with complex glaucoma. This study is a retrospective single-center case series.

Methods

Research ethics board approval was obtained. The medical notes of all patients with complex childhood glaucoma treated surgically with the microshunt device were reviewed.

Results

Five eyes of 6 children (3 months to 17 years of age) were identified. One patient had congenital glaucoma and 5 patients had glaucoma associated with anterior segment dysgenesis. Five patients had undergone previous glaucoma surgeries. The patient with no previous surgery had microphthalmia with 360 degrees of angle closure. The mean preoperative intraocular pressure was 29.1±5.2 mmHg. The mean number of topical medications required was 3.2±0.7 and 3 of 5 patients were on oral acetazolamide. In all cases, mitomycin-C (0.4mg/ml) was applied to sclera for 2 min before the microshunt was implanted. Postoperatively the mean intraocular pressure dropped to 11.4±6.9 mmHg at 1 month (n= 6), 17.7±11.1 mmHg at 3 months (n=5) and 20.0±2.8 mmHg at 6 months (n=3). There were no cases of hypotony. During the follow-up period, the mean number of topical medications was 0.8± 1.0. One patient had a pressure spike due to tube obstruction and required additional surgery.

Conclusions

These early data suggest that the microshunt device is safe and appears effective in complex cases of childhood glaucoma.

References

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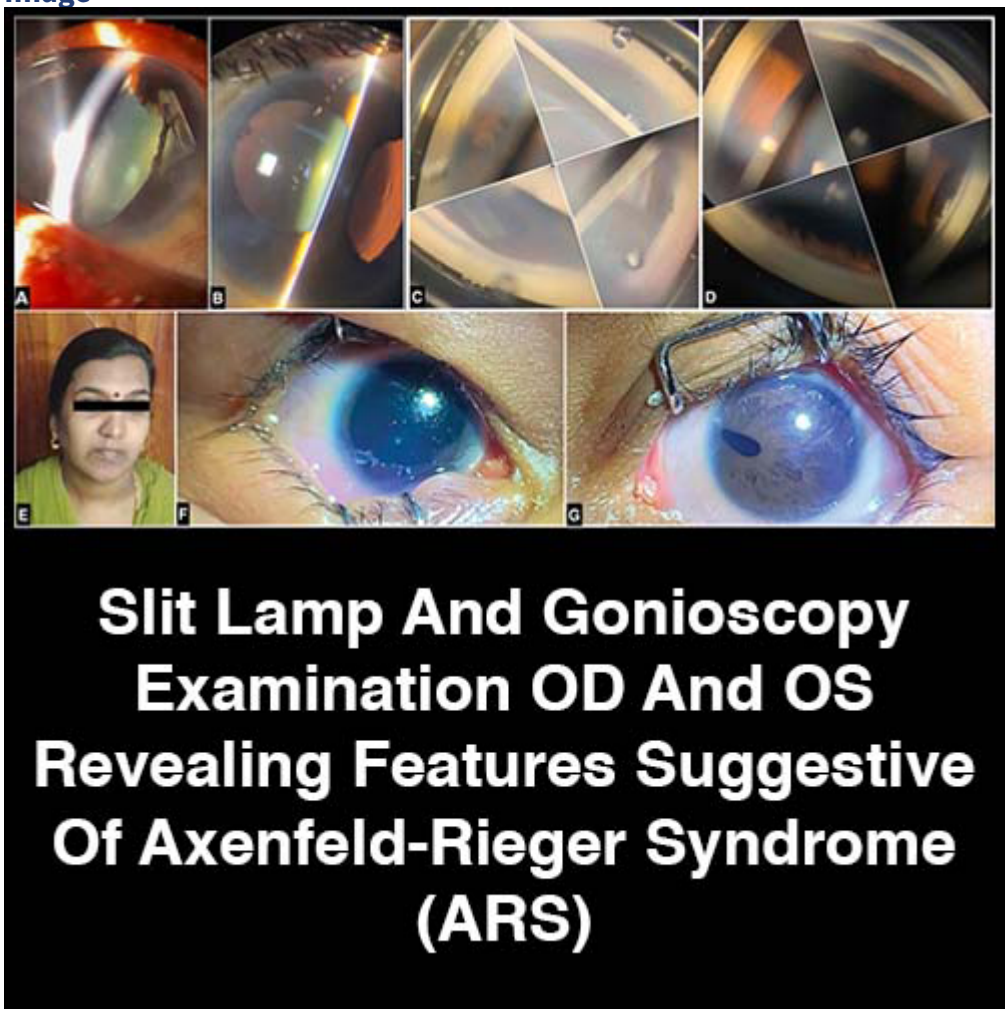
P-821
GLAUCOMA DRAINAGE IMPLANTATION IN A PREGNANT WOMAN WITH AXENFELD-RIEGER SYNDROME

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Purpose
Axenfeld-Rieger syndrome (ARS) is a rare disease characterised by anterior segment anomalies with or without glaucoma.[1]

Methods
28-year-old antenatal woman diagnosed with ARS presented with uncontrolled intraocular pressures (IOPs) and advanced glaucoma despite maximal medical therapy and progressive vision loss during her third trimester. The refractory and progressive nature of glaucoma with useful vision in one eye necessitated immediate surgical intervention. After obstetric consultation, Ahmed glaucoma drainage device (GDD) was implanted in OD under sub tenon's anesthesia with foetal monitoring in a facility, where obstetric emergency services were within reach, after weighing risks to both mother and child.

Results
Following the GDD implantation, there was successful control of the IOP, lasting till the final follow-up period of 18 months.

Image


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Conclusions

In this paper, we discuss the role of glaucoma surgery, for ARS patients with refractory glaucoma, during the third trimester with a comprehensive review of the literature.[2,3]

References

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P-822

INTERMEDIATE-TERM OUTCOMES OF INTRAOCULAR PRESSURE AFTER BAERVELDT DRAINAGE IMPLANT PROCEDURE IN SECONDARY GLAUCOMA

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Purpose
To describe the postoperative surgical success of a Baerveldt drainage device (BG-101-350) in a 74-year-old male with secondary glaucoma.

Methods
A 74-year-old male was diagnosed with secondary glaucoma in the right eye due to diabetic retinopathy had undergone a vitrectomy pars plana (VPP) surgery. Visual acuity (VA) and intraocular pressure (IOP) in both eyes were Light perception /6.7.5 and 24/26 mmHg (with maximum glaucoma medication) and glaucomatous optic neuropathy. The patient got treated with several antiglaucoma medications but didn't give any good progress on IOP and we planned to do GDD implantation in the right eye with Baerveldt implants (BG-101-350). IOP were reviewed pre-operatively at 1, 7, 14 days, 4 and 6 weeks, 2 and 3 months postprocedure.

Results
Post operation IOP as we expected, was slightly higher on day 7 post-op, we continue observing without any antiglaucoma medication. IOP one month post-operation is still a bit higher and we decided to prescribe a carbonic anhydrase inhibitors eyedrop three times a day for several weeks after that the patient is well-controlled and given a good result

IOP within the normal limit at each time visit.

Conclusions
Baerveldt implant is safe and provided successful control of IOP 21 mmHg with single antiglaucoma medications (carbonic anhydrase inhibitors) in this patient. It has improved IOP control in the intermediate term.

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P-823

GLAUCOMA DRAINAGE DEVICE AS MANAGEMENT OF GLAUCOMA SECONDARY TO CONGENITAL ANIRIDIA: A CASE REPORT

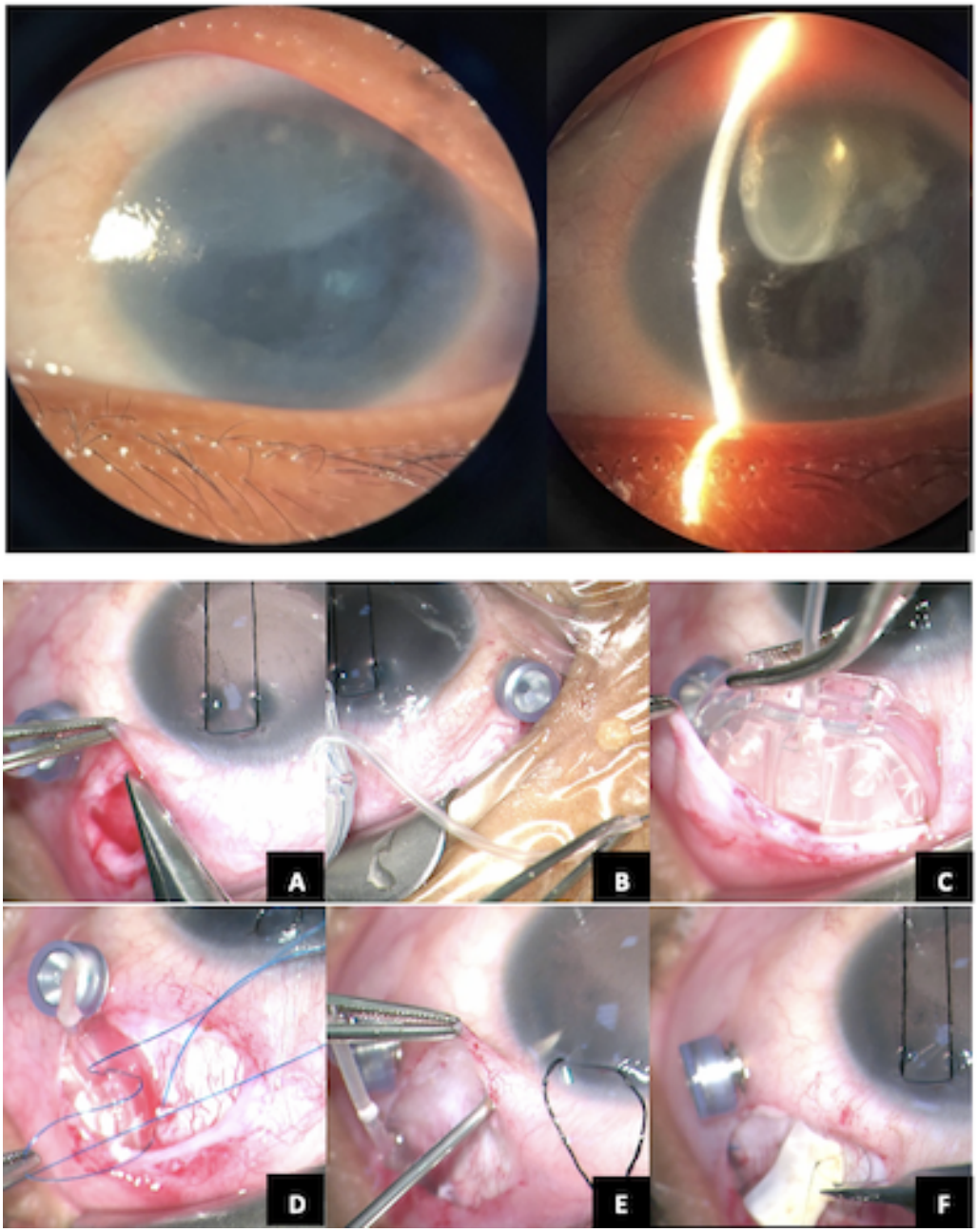
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Purpose
Congenital aniridia is a rare genetic disorder with total or partial absence of the iris from birth. Secondary glaucoma is the most common manifestation of this condition that can further reduce visual function. Topical antiglaucoma medication alone is known to be ineffective in reducing intraocular pressure (IOP). A surgical approach such as glaucoma drainage device (GDD) implantation is recommended as initial treatment in such cases.

Methods
This case report aims to report a case of secondary glaucoma in congenital aniridia managed with GDD implantation.

Results
A 10-year-old boy presented to the Glaucoma Clinic with blurred vision in his left eye accompanied by photophobia and painful sensation. Visual acuity of the right eye (RE) was No Light Perception (NLP) and the left eye (LE) was 0.05. Intraocular pressure was soft on palpation RE and 40 mmHg LE. Nystagmus was present in both eyes. Anterior segment examination showed bilateral iris hypoplasia with rudimentary iris tissue. Superiorly subluxated lens LE was found and reduced foveal reflex was seen on funduscopy. The patient was diagnosed with bilateral congenital aniridia, bilateral nystagmus, secondary glaucoma LE, subluxated lens LE, foveal hypoplasia LE, and phthisis bulbi RE. The patient was treated with pars plana lensectomy and GDD implantation LE. One-month postoperative follow-up resulted in 30% reduced IOP and aphakic eye LE with the best corrected visual acuity of 0.1.

Image



Conclusions

Implantation of GDD can be considered an initial treatment of a patient with glaucoma secondary to congenital aniridia to reduce IOP and preserve visual function.

References

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P-824

6 MONTHS OUTCOMES OF EXCISIONAL GONIOTOMY WITH TRABEX + COMBINED WITH PHACOEMULSIFICATION IN BOLIVIA

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Purpose
To characterize intraocular pressure (IOP) and IOP-lowering medication reductions through 6 months following excisional goniotomy (EG) using the TrabEx + (MicroSurgical Tecnologies) combined with phacoemulsification in Bolivia.

Methods
This was a single-surgeon, retrospective analysis. Preoperative and postoperative IOP and medication use data were collected through 6 months of follow-up. Changes from baseline were analyzed using paired t-tests.

Results
Overall, 18 eyes of 15 patients were included; all were seen through 6 months of follow-up. Their mean (standard deviation) age was 66 (4.98) years, and most had primary open-angle glaucoma (61.1%), pseudoexfoliation glaucoma (33.3%) and Ocular hypertension (5.5%). Mean preoperative IOP was 20.8 (2.17) mmHg with subjects using a mean of 1.05 (0.8) medications per eye. Across time points (1 week, 1, 3, and 6 months), mean IOP ranged from 14.8-14.1 mmHg ($p<0.0001$ at all-time points). At 6 months postoperatively, mean IOP was 14.1 (1.07) mmHg (a reduction of 6.7 mmHg, 32.2%, $p<0.0001$) and mean medication use was 0.1 (0.32) medications per eye (a reduction of 0.95 medications, 90.4%, $p<0.0001$). 94.4% of eyes had IOP reductions $\geq$20% from preoperative baseline and 88.8% were medication-free.

Conclusions
Consistent with prior reports,1-3 excisional goniotomy lowered IOP by 32.2% and medications by 90.4 % 6 months postoperatively. These are both statistically significant and clinically significant therapeutic outcomes.

Excisional goniotomy with TrabEx + combined with phacoemulsification provides safe reductions in both IOP and the need for IOP-lowering medications in eyes with primary open angle glaucoma or pseudoexfoliation glaucoma in Bolivia. Longer follow up is recommended.

References
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P-825

SAFETY AND EFFICACY OF THE OMNI PROCEDURE DURING THE INITIAL LEARNING CURVE

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Purpose
To examine the safety and efficacy of OMNI procedure.

Methods
33 consecutive patients were included performed by two surgeons (AT and MLC). Both surgeons were experienced with canal-based minimally invasive glaucoma surgery (MIGS) but had no previous experience with OMNI. 23 cases were combined with phaco and 10 were standalone procedures. All patients had 360-degree canaloplasty performed by 120- to 180-degree trabeculotomy, with the exception of one patient treated with 360-degree trabeculectomy.

Results
78.8% (26/33) eyes had ≥20% reduction in IOP on same or fewer medications at 3 months post-operatively, with an average reduction in IOP of 31.3 +/- 18.9%. Mean pre-operative IOP was 20.4 +/- 6.1 mmHg (range 11 to 40mmHg), reduced to 13.4 +/- 3.5 mmHg (range 8 to 21mmHg) at 3 months, P<0.001. The number of medications used decreased from an average of 2.5 +/- 1.0 (range 1 to 4) to 1.1 +/- 1.1 (range 0 to 3). Regression analyses revealed no significant relationship between surgeon experience with OMNI (recorded as n_th OMNI procedure performed) and percentage reduction in IOP (P=0.300). Eyes with higher IOP at listing had greater percentage reductions in IOP (P=0.001), with each 1mmHg higher IOP at listing associated with a 1.7% greater reduction in IOP. Percentage reductions in IOP were not significantly different between combined and standalone procedures.

Conclusions
The OMNI procedure seems to have a short learning curve, with no significant difference in outcome over the first cases performed by two glaucoma surgeons. OMNI produced significant reductions in IOP whether combined with cataract surgery or performed as a standalone procedure.

P-826

XEN45 GEL STENT COMBINED WITH HEALAFLOW INJECTABLE VISCOELASTIC IMPLANT

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Purpose

To present an optional Glaucoma surgical procedure after failed glaucoma surgeries, together with the use of Healaflow as a spacer, to possibly reduce failure rate

Methods

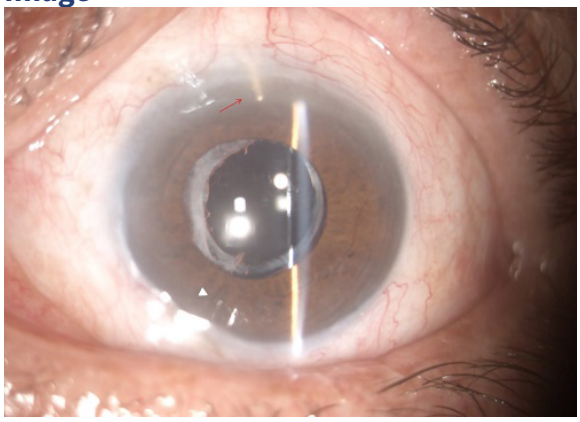
We present the results of an inferonasal implantation of an ab interno Xen gel stent in a 74-year-old man suffering from uncontrolled advanced glaucoma in his left eye. The patient had undergone previous glaucoma surgeries and procedures in this eye. For this procedure, we used Healflow as a spacer, implanting the stent into a subconjunctival Healaflow bubble.

Xen implantation was performed as a stand-alone procedure following a standardized implantation technique. In brief, the XEN45 was implanted under intracameral anesthesia using an ab interno approach. At first, a volume of 0.1 ml of MMC solution (0.02% MMC, a total dose of 10µg) was injected subconjunctivally into the nasal inferior quadrant to prevent further scarring of the conjunctiva. After injecting the MMC, we injected 0.1 ml of Healaflow (Swiss Aptissen) subconjunctivally, between the limbus and previously injected MMC. After the anterior chamber was filled with a medium grade viscoelastic device (Hanita Visco 1.8%), the preloaded Xen injector needle was inserted through a 2.4 mm corneal paracentesis incision opposite the site of the desired implantation. The needle was directed across the anterior chamber and the Xen implanted with the subconjunctival part inside the Healaflow bleb. The eye was left half filled with viscoelastic.

Results

At postoperative day 1, the IOP decreased to 7mmHg. During the subsequent follow up, the patient developed hypothony with choroidals, that was managed conservatively with topical medications. At 6 months post operatively, the IOP was 14 mmHg with an inferior elevated bleb, complete resolution of the choroidals, and no additional topical medications.

Image



Conclusions

the inferior nasal implantation of the XEN 45 stent can be considered an option in patients who have undergone previous glaucoma surgeries, are at a high risk of endothelial cell loss, suffer from superior conjunctival scarring and cannot undergo tube shunt procedures or CPC. An addition of subconjunctival Healaflow to the XEN implantation procedure may reduce failure rates.

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P-827

4-0 NYLON THREAD GUIDED, EASY AND PRECISE INSERTION OF AHMED GLAUCOMA VALVE IMPLANT TUBE INTO CILIARY SULCUS: A CASE REPORT

K Nitta

Purpose
To report a case of 4-0 nylon thread guided, easy and precise insertion of Ahmed glaucoma valve implant tube into ciliary sulcus.

Methods
A case report.

Results
An 88-year-old woman received Ahmed glaucoma valve (AGV) implantation for traumatic glaucoma in her left eye. She also had pseudoexfoliation syndrome, with mild IOL oscillation and poor mydriasis, with a maximum pupil diameter about 3.5 mm. A 4-0 nylon thread was placed into the anterior chamber through a 1 mm incision opposite the site of the AGV implant. Subsequently, a 23G needle was inserted into the sclera 2 mm from the corneal limbus in the same quadrant as AGV implants. The tip of the 23G needle was proceeded horizontally to the iris, through the sclera and ciliary body, and into the ciliary sulcus. At the center of the pupil, the 4-0 nylon thread was introduced into the lumen of the 23G needle. Next, the 23G needle was withdrawn out of the eye, so that the 4-0 nylon in the lumen was also withdrawn out of the eye. The 4-0 nylon was then inserted into the tube lumen of the AGV implant. Finally, pushing the tube and the 4-0 nylon into the eye, with the 4-0 nylon as a guide, the tube tip was easily and precisely inserted into the ciliary sulcus.

Conclusions
Ciliary sulcus tube insertion of the AGV implant can be difficult when IOL oscillation or poor mydriasis are present. However, 4-0 nylon guided technique enabled easy and precise insertion of the tube into the ciliary sulcus.

P-828

PAUL GLAUCOMA IMPLANTS FOR TREATING EYES WITH SILICONE OIL ENDOTAMPONADE GLAUCOMA

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Purpose

The role of silicone oil for tamponade in vitrectomized eyes is well established. However, elevated intraocular pressure (IOP) after silicone oil implantation is quite common. Glaucoma drainage device (GDD) implantation is often the preferred surgical intervention in such cases, but isolated reports have mentioned silicone oil egressing through or obstructing traditionally designed GDDs. Paul Glacuoma implant is a novel GDD with a smaller tube, which may prevent silicone oil migrating into the tubes. We report two successful cases of silicone oil endotamponade glaucoma treated with the Paul implant.

Methods

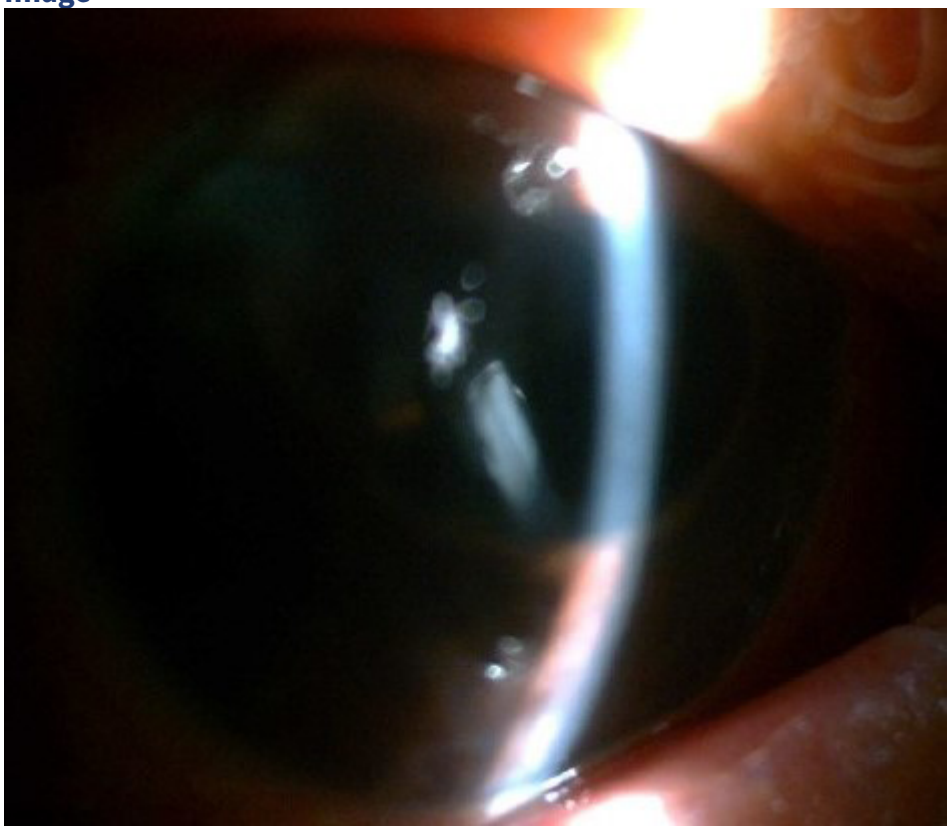
Case report

Results

Case 1: A 48-year-old man, with a history of blunt injury to his right eye at age 20, presenting with ocular hypertension, traumatic cataract and rhegmatogenous retinal detachment (RRD). He underwent twice pars plana vitrectomies and ultimately silicone oil endotemponade for recurrent RRD. Due to the dislocation of the intraocular lens, silicone oil entered the anterior chamber, and intraocular lens replacement was performed. As the IOP continued to rise, the Paul Glaucoma implant was implanted inferonasally in an attempt to avoid silicone oil bubbles. After three months, IOP was reduced to below 20mmHg with combigan and continued for 8 months No silicone oil obstructed the tube or migrated into subconjunctival space.

Case 2: A 69-year-old male with recurrent RRD underwent twice pars plana vitrectomies and eventually intraocular silicone oil placement in his right eye. Subsequently, even with maximal medical therapy, his IOP remained elevated and he was referred for IOP control. The eye showed cornea microcystic edema with total iris-corneal touch, sutured IOL and silicone oil endotamponade in vitreous cavity. Inferonasal Paul glaucoma implantation into the ciliary sulcus was performed and the patient's IOP responded well and maintained around 8-11 mmHg for 6months after implantation. Slitlamp showed "candle wax" appearance of the silicone oil wrapped around the tip of the Paul tube, but no silicone oil blocked the tube or egressed into subconjunctival space.

Image



Conclusions

A rise in IOP and subsequent development of secondary glaucoma with silicone oil endotemponade is quite common. Paul glaucoma implants similar to Baerveldt's have smaller tubes that prevent oil from entering the implant and provide a great option for achieving a good IOP.

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P-829

OUTCOMES OF BLEB NEEDLING APPLIED UNDER THE SCLERAL FLAP IN THE BLEB FAILURE AFTER TRABECULECTOMY

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Purpose
To describe the needling technique applied under the scleral flap when the bleb is faint and intraocular pressure (IOP) rises after trabeculectomy and to evaluate the surgical results.

Methods
All consecutive cases who underwent bleb needling under the scleral flap in our clinic between February 2019 and January 2022 and had at least 3 months of follow-up were evaluated retrospectively. Demographic characteristics of the patients and clinical findings before and after surgery were recorded. The time between trabeculectomy and needling procedure and failure rates were assessed.

Results
Twenty-one eyes of 21 patients (17 males, 4 females, mean age 64.9±17.6 years) were included in the study. The mean follow-up period was 13.4±8.7 months (3-29 months). The mean time between trabeculectomy and needling was 37.9±44.1 months (2 months-10 years). There was no correlation between this time and final success (p=0.63). Mean IOP was 22.9±10.1 mmHg before needling and 13.7±5.7 mmHg at final follow-up (p=0.001). A bleb could not be formed after needling in one eye and the procedure was unsuccessful. Success was achieved after the second needling procedure in 2 of 20 successful eyes. Complete success (without medication) was achieved in 10 (50%) eyes, and partial success (with medication) was achieved in 16 (80%) eyes with blebs at the last control. Four eyes (20%) were considered unsuccessful (second trabeculectomy in 1 eye, seton implantation in 1 eye, and diode laser in 2 eyes).

Conclusions
If there is bleb failure and high IOP after trabeculectomy surgery, successful surgical results can be obtained by reconstructing the bleb with the bleb needling procedure applied by entering under the scleral flap. Thus, the need for new glaucoma surgery is eliminated in these cases.

P-830

INTRAOPERATIVE INJECTION OF MITOMYCIN C DURING TRABECULECTOMY AND PHACOTRABECULECTOMY AT A TEACHING HOSPITAL: A 1-YEAR RETROSPECTIVE STUDY

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Purpose
To describe the safety and efficacy of intraoperative injection of mitomycin C (MMC) during trabeculectomy and phacotrabeculectomy 1 year after surgery in a teaching hospital.

Methods
We retrospectively analyzed data collected from the medical records of 72 patients, most of them with primary open- (n=23) and primary closed-angle (n=40) glaucoma, who underwent trabeculectomy (group 1; n=34) or phacotrabeculectomy (group 2; n=38) at the Asociacion para Evitar la Ceguera en Mexico's glaucoma department between. The main outcome was the success rate based on intraocular pressure (IOP). Surgical failure was defined as a case in which additional glaucoma surgery for IOP control is required, or one of the following criteria are met: medicated IOP >21mmHg or <6mmHg confirmed at two consecutive follow-up visits, use of oral antiglaucoma medication, or loss of light perception. The secondary outcomes were frequency of postoperative complications and interventions, number of topical antiglaucoma drugs and visual acuity (VA) at the end of the follow-up.

Results
Mean age was 65.4±11.7 years, 59.7% were women. 80.5% of the surgeries were done by a glaucoma fellow. Mean MMC dose used was 0.15mg/ml (IQR: 0.1-0.20mg/ml). Mean IOP was 17mmHg (IQR: 14-21mmHg) preoperatively and 12mmHg (IQR: 10-14mmHg) postoperatively; p=<0.5. Mean preoperatively topical antiglaucoma drugs was 4 (IQR: 3-4), mean postoperatively topical drugs were 0 (IQR: 0-1); p=<0.5. Mean preoperative and postoperative VA were not statistically different (p=0.19). The most common postoperative complication and intervention were the avascular bleb (33.3%) and injection of 5-Fluorouracil, respectively. Overall, success rate (complete + qualified) was 88.9%. Success rate and postoperative VA were not statistically different between group 1 and group 2. Mean postoperative IOP and number of topical antiglaucoma drugs were statistically lower in group 1 (p=0.01 and p=0.04, respectively).

Conclusions
The injection of MMC during trabeculectomy and phacotrabeculectomy seems to be an effective and safe procedure, even done by less experienced surgeons.

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P-831

XEN® VS. TRADITIONAL GLAUCOMA FILTRATION SURGERIES ON LOWERING INTRAOCULAR PRESSURE: A SIX-MONTHS FOLLOW UP

J Andrés Abad, S Montoya Ortega , C Castellà Capsir

Purpose

To compare Xen® implant Vs other glaucoma filtration surgeries (non-penetrating deep sclerectomy and trabeculectomy) in intraocular pressure (IOP) reduction and assess non-inferiority in the efficacy of glaucoma interventions.

Methods

This is a retrospective study of glaucoma patients that required filtration surgery either with trabeculectomy, non penetrating deep sclerectomy or Xen® implant with mitomycin. We included 164 eyes from 137 patients, 132 eyes in group 1 were intervened with either trabeculectomy (55 eyes) or non penetrating deep sclerectomy (77 eyes) and 32 eyes in group 2 with Xen® implant. After a follow-up of 6 months we studied the IOP reduction and the antiglaucoma medication required.

Results

After 6 months of follow-up, IOP for group 1 was 14,27 (DS+/- 5,74) against 18,11 (DS+/- 7,59) in group 2. The initial IOP for group 1 was 22,78 (DS+/- 8,78) and for group 2 was 19,31 (DS+/- 6,18), so we observed a total IOP reduction of -7,67 (DS+/- 10,13) in group 1 and -2,875 (DS+/- 0,096) in group 2 with the reduction of antiglaucoma medication 2,01 (+/- DS 1,5) Vs 0,56 (+/-DS 1,59) in each group.

Conclusions

In this study we observed that the use of Xen® implant in filtration surgeries induces a minor reduction in IOP pressure and also a minor reduction on required antiglaucoma medication at a six months follow-up against traditional glaucoma surgeries, although further studies are required.

P-832

HYPOTONY MANAGEMENT: NOVEL USE OF A PRESERFLO MICROSHUNT TO RESTRICT FLOW OF A BAERVELDT DRAINAGE DEVICE IN A CASE OF PAEDIATRIC UVEITIC GLAUCOMA

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Purpose

To report the outcome of a novel surgical technique, using a Preserflo Microshunt to modulate the flow of an overdraining Baerveldt implant.

Methods

We present the case of an 8-year-old female with a background of ANA+ uveitic glaucoma. She underwent insertion of a Baerveldt-250 drainage device with an intraluminal 3-0 supramid, ligated with 6-0 vicryl. At the six-week postoperative mark, she presented with a pressure of 3mmHg and reduced visual acuity (>6/60) secondary to hypotony maculopathy from tube overdrainage. Initial surgical management involved anterior chamber reformation and insertion of an additional 3-0 supramid segment into the Baerveldt tube lumen. She was also treated with a course of systemic steroids to treat any inflammatory ciliary body shutdown. However, this failed to improve the pressure. Subsequently, she underwent insertion of a Preserflo Microshunt into the lumen of the Baerveldt tube to modulate flow, which successfully treated her hypotony maculopathy.

Results

Surgical technique involved externalisation of the distal end of the Baerveldt tube through a vertical corneal incision. The Baerveldt lumen was then widened with a lacrimal probe. A Preserflo microshunt was trimmed below the flange and inserted into the distal lumen of the Baerveldt drainage device. By week 1 post operatively, vision had improved to baseline level (6/7.5) and has remained stable to current follow up of 6 weeks. Intraocular pressure improved from 3mmHg (week 1) to 8mmHg (week 3) and 6mmHg (week 6) and hypotony maculopathy has resolved. Intraoperative still photographs and pre and post operative OCT scans of the macula are presented.

Conclusions

A Preserflo microshunt was successfully used as an intraluminal flow restrictor for a Baerveldt drainage device to treat visually significant hypotony, after a conventional approach had failed. In this clinically challenging entity of paediatric uveitic glaucoma, this technique could be a safe alternative to permanent tube ligation, with the advantage of allowing ongoing function of the drainage device and thus maintaining pressure control.

P-834

IMPLANTATION OF MOLTENO3 GLAUCOMA DRAINAGE DEVICE IN TWO YOUNG MALES WITH SEVERE OCULAR TRAUMA AND HIGH INTRAOCULAR PRESSURE – CLINICAL RESULTS

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Purpose

To present two cases of unilateral uncontrolled glaucoma on maximal topical and general treatment in young male patients with severe ocular trauma and posttraumatic aniridia and aphakia.

Methods

Both cases were implanted with the Molteno3 (SL 245 mm^2) Glaucoma Drainage Device. Artificial iris and posterior chamber intraocular lens (IOL) sutured to the sclera with nonabsorbable, monofilament 8k10, CV-8 Gorethex TTc-7 suture was also performed via a separate surgery. Both cases were followed for IOP, visual acuity, endothelial cell count, optic nerve and macula assessment for a minimum of 6 months.

Results

In both cases a significant reduction in IOP was observed, from over 50 mmHg at baseline to 14-16 mmHg at 6 months postoperative. The glaucoma therapy was also reduced from 4 different topical medications and 200 mg x3-4 times/day general Acetazolamide to 2 different topical medications at 6 months postoperative. The endothelial cell count, optic nerve and macula parameters were stable. Uncorrected visual acuity improved significantly following the IOL-artificial iris implantation.

Conclusions

The Molteno3 Glaucoma Drainage Device is safe and effective in reducing IOP in unicameral posttraumatic eyes (aniridia and aphakia), with a disruption of the diaphragm which separates the anterior from the posterior segment. Along with the glaucoma drainage device surgery, these eyes also required a separate restorative surgery such as IOL-artificial iris implantation to improve the visual acuity and photophobia in young, active patients.

P-835

A NOVEL APPROACH OF GONIOSYNECHIALYSIS FOR PACG: TIME SAVING, NO GONIOLENS, NO TILT MICROSCOPE, 360 DEGREE COVERED

L Yang

Purpose

To investigate the clinical efficacy of a novel goniosynechialysis with phacoemulsification for primary angle-closure glaucoma coexist cataract and compared with conventional method.

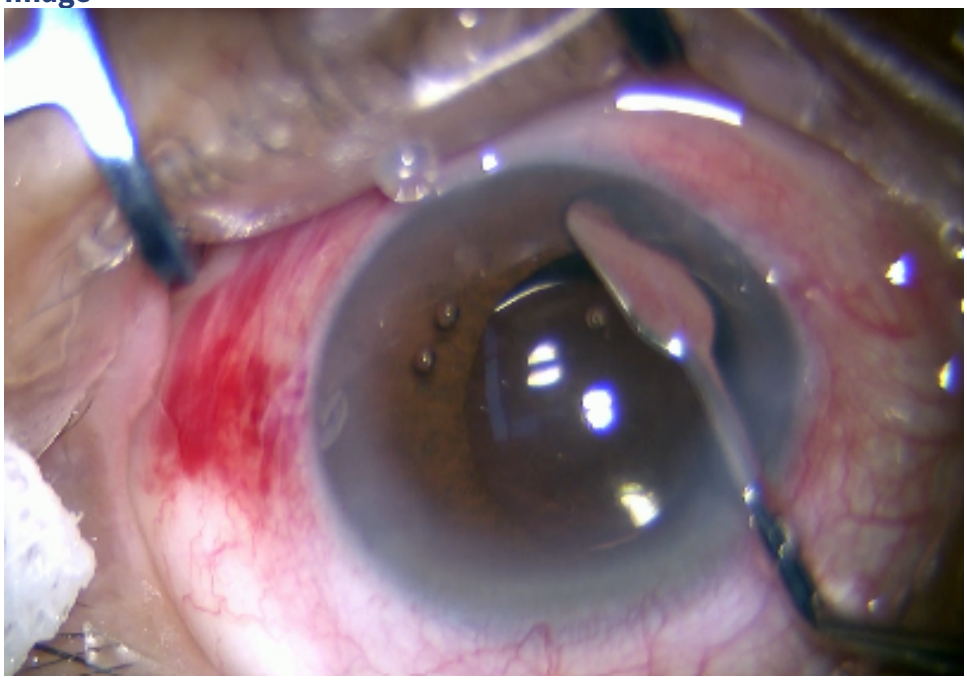
Methods

This is a comparative study. 50 eyes of 39 patients with primary angle-closure glaucoma (PACG) coexist cataract were performed phacoemulsification combined with goniosynechialysis (Phaco-GSL). They were randomly divided into two groups, 25eyes underwent Phaco-GSL combined with novel GSL(modified-spatula, both act as intraocular goniolens and spatula, CN213850636U) were performed in group A; in group B, 25 eyes were performed Phaco-GSL with conventional GSL (surgical goniolens ,tilt microscope). The time of GSL, dosage of viscoelastic, complications and peripheral anterior synechia (PAS) were recorded in the two groups. Best corrected visual acuity(BCVA) , intraocular pressure (IOP), anterior chamber depth, PAS,corneal endothelial cell density ,the count of aqueous flare and number of glaucoma medications were measured before and 1week,1,3,6month after the operation.

Results

The time of GSL of group A and group B were 4.44±2.93s,25.37±17.32s(t=-5.96,p<0.01) respectively, the dosage of viscoelastic used in two groups were 48.08±12.13μL,118.73±14.72μL(t=-18.52,p <0.01) respectively. The mean IOP of two groups decreased from 25.64±11.43 mmHg , 32.40±15.28 mmHg preoperatively to 17.84±2.70 mmHg, 18.40±2.78 mmHg postoperatively at the last follow up visit(t_a=3.30,,t_b=4.63,p<0.05). At 1week,1,3,6 mo after the operation, the count of aqueous flare were 28.61±17.09ps/ms,16.20±8.86ps/ms,12.61±5.65ps/ms,10.34±4.39ps/ms in group A, and 25.62±8.91ps/ms,17.21±7.24ps/ms,14.24±4.80,12.12±3.35ps/ms in group B, there were no significance different at all time points between two groups. At the last visit, BCVA logmar improved from 0.37±0.46 to 0.15±0.31 in group A(t=2.57,p<0.05) and from 0.50±0.45 to 0.19±0.39 in group B(t=5.00,P<0.05). The anterior chamber depth was deepened in both groups after operation (p < 0.05), but there was no significance different between the two groups (p > 0.05). There was no significance different in PAS and the number of glaucoma medications at 1,3, 6mo after operation between the two groups(p> 0.05).

Image



Conclusions

Two kinds of Phaco-GSL are equal effective in the treatment of PACG with cataract. the novel GSL has the advantages of time saving ,less consumables, easy performing and more efficient. It deserve used widely.

P-836

ENDOCYCLOPHOTOCOAGULATION: SHORT TERM OUTCOMES IN PRIMARY VERSUS SECONDARY/REFRACTORY GLAUCOMA

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Purpose

To investigate the short-term efficacy and safety of endocyclophotocoagulation (ECP) in primary and secondary or refractory glaucoma.

Methods

Design: Retrospective, interventional, comparative.

Participants: Retrospective review of consecutive subjects with either primary (POAG and PACG – group 1) or secondary and/ or refractory glaucomas (group 2), aged 30 years or more, who underwent ECP with or without phaco.

Primary outcome measure was intraocular pressure (IOP). Secondary outcome measures were number of antiglaucoma medications (AGMs), complete success and serious complications - defined as sight threatening complications like CD, RD, Hypotony - and NLP vision.

Results

78 patients underwent ECP; 49 in group 1 and 29 in group 2. Follow-up was 7.5±4.1 months in group 1 and 6.8±3.4 in group 2. In both groups, there was significant reduction in IOP and AGM (p<.001 for both). The pre-operative IOP and AGM in group 2 was significantly more vs. group 1 (p<.001), but at final visit there was no difference in IOP between groups(p=.509). However, number of AGM was significantly more in group 2 (p<.001). Complete success was >50% in group 1 and was significantly more than group 2, 13.8% (p<.001). Rate of serious complications was low but occurred more in group 2 (p=.038). Failure also occurred more in group 2 (20% vs 4%) p=.019.

Conclusions

ECP is an effective and safe procedure in primary and secondary/refractory glaucomas, with significantly greater efficacy and lesser need for topical medications in primary glaucomas. A randomised control trial with long-term follow-up is recommended to check for validity of the results.

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P-837

REFRACTIVE ERRORS AFTER DEEP NON-PENETRATING SCLERECTOMY: A SINGLE SURGEON SERIES

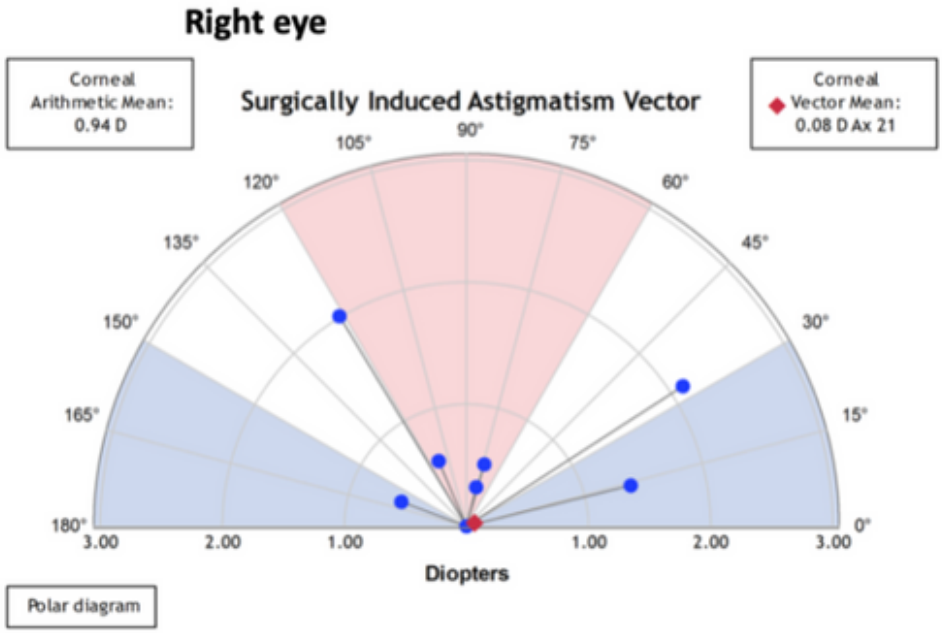
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Purpose
To describe and analyze the postoperative refractive changes observed in patients with open-angle glaucoma (OAG) that underwent non-penetrating deep sclerectomy (NPDS).

Methods
A retrospective, transversal, observational, and descriptive case series of 28 eyes of 23 patients with OAG that underwent NPDS as a stand alone procedure in the period between 2015 and 2020 operated by the same surgeon. Data about: IOP values, best-corrected visual acuity (BCVA), number of glaucoma medication used, and visual field (mean deviation and visual field index) were collected preoperatively and postoperatively. Intraoperative and postoperative surgical complications were also analyzed. The Wilcoxon signed-rank test with a significance level of 0.05 was used for comparisons. The statistical package Stata® version 15.1 (StataCorp. 2015, Stata Statistical Software: Release 15. College Station, Texas, US: StataCorp LP.). The refractive error and postoperative surgical induced astigmatism (SIA) was analyzed using ASSORT (Alpins Statistical System for Ophthalmic Refractive surgery Techniques) method for vector analysis.

Results
A total of 28 eyes of 23 patients were included (mean age 56.9 ± 16.8 years). The mean astigmatic vector power of post-surgical induced astigmatism was 0.08 x 21° in the right eye and 0.22 x 155° in the left eye with no significant difference in spherical equivalent. Baseline intraocular pressure had a mean of 21 mmHg (IQR 17 - 30) decreased in a statistically significant manner to 13 mmHg (IQR 10 - 15) and the number of medications changed from 3 (IQR 3 - 4) preoperatively to 1 postoperatively (IQR 0 - 2). No significant change in best corrected visual acuity or visual field was found. A prevalence of complications of 19% was reported. Patients in whom surgery was penetrating had higher values of induced astigmatism.

Image



Conclusions

Our results suggest that refractive change in patients undergoing nonpenetrating deep sclerectomy is minimal and that surgery has a positive impact on intraocular pressure control and reduction in the number of medications.

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P-838

AHMED GLAUCOMA VALVE IMPLANTATION THROUGH THE CILIARY SULCUS IN 'PHAKIC' EYES WITHOUT LENSECTOMY

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Purpose

To report the results of the patients who underwent Ahmed glaucoma valve implantation through the ciliary sulcus without lensectomy.

Methods

Medical records of the patients who underwent Ahmed glaucoma valve implantation with the tube placement in the ciliary sulcus between January 2018 and December 2022 were reviewed retrospectively. Only phakic eyes were included in the study, aphakic/pseudophakic eyes or eyes in which combined surgery (tube shunt placement and lensectomy) were performed were excluded. Success defined as postoperative intraocular pressure (IOP) ≥ 6 mmHg and ≤ 21 mmHg with or without antiglaucomatous medications, without further surgery for IOP control, without loss of light perception and without removal of the implant. Glaucoma diagnosis, visual acuity levels, IOP levels and complications were recorded.

Results

A total of 15 eyes of 15 patients (9 male, 6 female) were included in the study. The mean age was 53.86 ± 10.85 years (range, 38-76 years) and the mean postoperative follow-up period was 13.30±12.40 months (range, 1-36 months). Glaucoma diagnosis was narrow-angle glaucoma in 4 eyes, neovascular glaucoma in 3 eyes, primary open-angle glaucoma in 2 eyes, pseudoexfoliative glaucoma in 2 eyes, juvenile glaucoma in 2 eyes, glaucoma due to iridocorneal endothelial (ICE) syndrome in 1 eye and uveitic glaucoma in 1 eye. The mean preoperative intraocular pressure level was 33.93±6.97 mmHg (range, 24-50 mmHg), and it was found as 12.66±5.52 mmHg (range, 6-20 mmHg) at final visit. Decrease in intraocular pressure level was statistically significant (p=0.001). At final visit, success was achieved in 13 eyes (86.66%). During surgery no serious complication including injury to the crystalline lens did not occur in any eye. As a serious complication malignant glaucoma developed in 5 eyes (33.33%) in the early postoperative period.

Conclusions

In 'phakic' eyes with refractory glaucoma, Ahmed glaucoma valve can be placed in the ciliary sulcus without lensectomy.

P-839

COMPARING THE EFFECTIVITY OF TRABECULECTOMY AND PRESERFLO MICROSTENT IMPLANTATION IN PRIMARY OPEN-ANGLE GLAUCOMA IN THE INTERMEDIATE TERM

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Purpose

The aim of this study was to compare the efficacy of trabeculectomy (TE) and preserflo (PF) microshunt during an intermediate postoperative follow-up of two years with special attention to functional and anatomic parameters in primary open-angle glaucoma (POAG) cases.

Methods

Two groups of patients were treated either by TE or PF for progressive POAG. During regular post-surgical follow-up intraocular-pressure (IOP), number of IOP-lowering medication, mean defect of standard-automated perimetry (SAP) and mean thickness of peripapillary retinal nerve fiber layer (RNFL) thickness measured using optical coherence tomography (OCT) was assessed and compared between treatment groups.

Results

Baseline characteristics (age, gender, laterality, IOP, medication) were comparable between both groups. During 2 years of follow-up mean IOP decreased from 24.1±1.2 mmHg and 21.7±0.8 mmHg to 11.4±1.1 mmHg ($p<0.001$) and 15.5±1.5 mmHg ($p=0.028$) and mean number of IOP-lowering medication decreased from 3.3±0.14 and 3.5±0.14 to 0.5±0.14 ($p<0.001$) and 1.1±0.4 ($p<0.001$) in the TE and PF groups. Mean defect remained stable (11.5±0.9 dB and 11.2±1.7 dB to 10.7±0.9 dB ($p=0.226$) and 10.4±4.8 dB ($p=0.628$) in TE and PF groups) but RNFL thickness further decreased during follow-up (62.8±1.9 µm and 62.6±2.1 µm to 57.4±1.8 µm ($p<0.001$) and 60.2±2.0 µm ($p=0.182$) in TE and PF groups).

Conclusions

PF is comparably effective in the intermediate term concerning lowering of IOP and glaucoma medication. Although visual field defects were stable RNFL further decreased during follow-up.

P-840

THE PAUL GLAUCOMA IMPLANT (PGI) AS A FIRST-CHOICE GLAUCOMA DRAINAGE DEVICE: 6-MONTHS FOLLOW-UP

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Purpose
To evaluate the intraocular pressure (IOP) lowering effect of PGI.

Methods
A prospective study of glaucoma patients treated with PGI at a single Danish tertiary center from January 2022 to January 2023. The primary endpoint was IOP. Secondary endpoint was use of IOP lowering medications. A standard protocol with removal of the intraluminal stent (Prolene® 6-0) after 3 months was followed.

Results
A total of 23 eyes (23 patients) had surgery with PGI implantation. All eyes had previously undergone trabeculectomy or had other risks of failure (neovascular glaucoma, oil filled eye or uveitis). 21 eyes had the PCI placed in the anterior chamber, 1 in sulcus and 1 in pars plana. Datacollection is ongoing. The majority had peroperative application of MMC 0.4 mg/ml on a wick. No major per- or postoperative complications were seen. At baseline mean (SD) IOP was 27.9 (± 6.2) mmHg and the mean number of IOP lowering medications (topical and systemic) used was 3.5. 6 months after surgery IOP was lower than at baseline in all eyes; mean IOP was 13.3 (± 2.6) mmHg on mean 1 IOP lowering medication. 50% were medication free. Tube placement, behind or in front of the iris, did not affect IOP.

Conclusions
This study indicates that PGI provides a good IOP lowering effect in a population with risk factors for failure.

P-841

EARLY POSTOPERATIVE INTRAOCULAR PRESSURE AS A PROGNOSTIC FACTOR IN GLAUCOMA SURGERY

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Purpose
The relationship between early and late postoperative intraocular pressure (IOP) after glaucoma surgery remains unclarified. Few published studies have investigated the long-term effects of early IOP after trabeculectomy and nonpenetrating deep sclerectomy, and the existing ones have differing results. This study aims to evaluate the effects of early postoperative IOP after these two procedures on long-term surgical success rate.

Methods
We retrospectively studied the patients with open-angle glaucoma who underwent primary trabeculectomy (86 eyes of 72 patients) or primary nonpenetrating deep sclerectomy (137 eyes of 117 patients) between January 2010 and July 2020 that were followed for at least 24 months postoperatively. For each procedure, the study population was divided into three groups according to the IOP registered in the early postoperative time (the first 1-2 weeks): IOP <6 mmHg, IOP 6-18 mmHg and IOP >18 mmHg. Postoperative IOP, the number of IOP-lowering medications and best corrected visual acuity were compared among the groups. Surgical success was defined as presenting postoperative IOP ≤18 mmHg during medium and long-term follow-up period. Success probability analysis was performed using a Kaplan-Meier survival curve.

Results
Patients with an early IOP >18mmHg had significantly worse IOP control at 6 months for both procedures and at 12 months for nonpenetrating deep sclerectomy, a higher final number of IOP-lowering medications and the lowest cumulative success rate. Patients with early transient hypotony after trabeculectomy had a tendency for a better long-term surgical outcome, although not statistically significant.

Conclusions
The early postoperative IOP state influences the long-term prognosis after glaucoma surgery. This study suggests that maintaining a lower level of IOP during immediate postoperative period can be beneficial in long term. Knowledge of this may be helpful for clinical decisions during postoperative care.

P-842

SUPRA CILIARY DRAINAGE WITHOUT ENTERING THE ANTERIOR CHAMBER AND WITHOUT BLEB: 12 MONTHS FOLLOW-UP RESULTS

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Purpose

Assess the long-term clinical outcomes of a novel Cilioscleral Interposition device ("CID")

Methods

A CID is a 26% hydrophilic acrylic implant, 6*4*0.2 mm, inserted behind limbus in the supraciliary space through 2 scleral incisions. Anterior chamber is untouched. Incisions are sutured watertight

42 Caucasian patients were enrolled in 2 clinical studies from December 2020 to May 2021 and followed at D1, D7, D30, M3, M6, M12

Inclusion criteria: POAG Shaffer 3 & 4 with medically uncontrolled IOP > 21 mmHg, naive from prior glaucoma surgery, glaucoma standalone surgery only. No wash out. Prostaglandins mandatory 30d post-op. IOP, comedications and safety parameters were collected at each time point

The cohort was divided in 2 groups: 20 patients received 1 CID, 22 received 2 CIDs overlapped one onto the other

Results

22F/19M composed the PP population (n=41), mean age was 64.1±9 years

Overall safety appeared very good, there was no visual acuity decrease, no visual field loss detected along follow-up. No patient needed adjunctive treatment nor new surgery up to M12

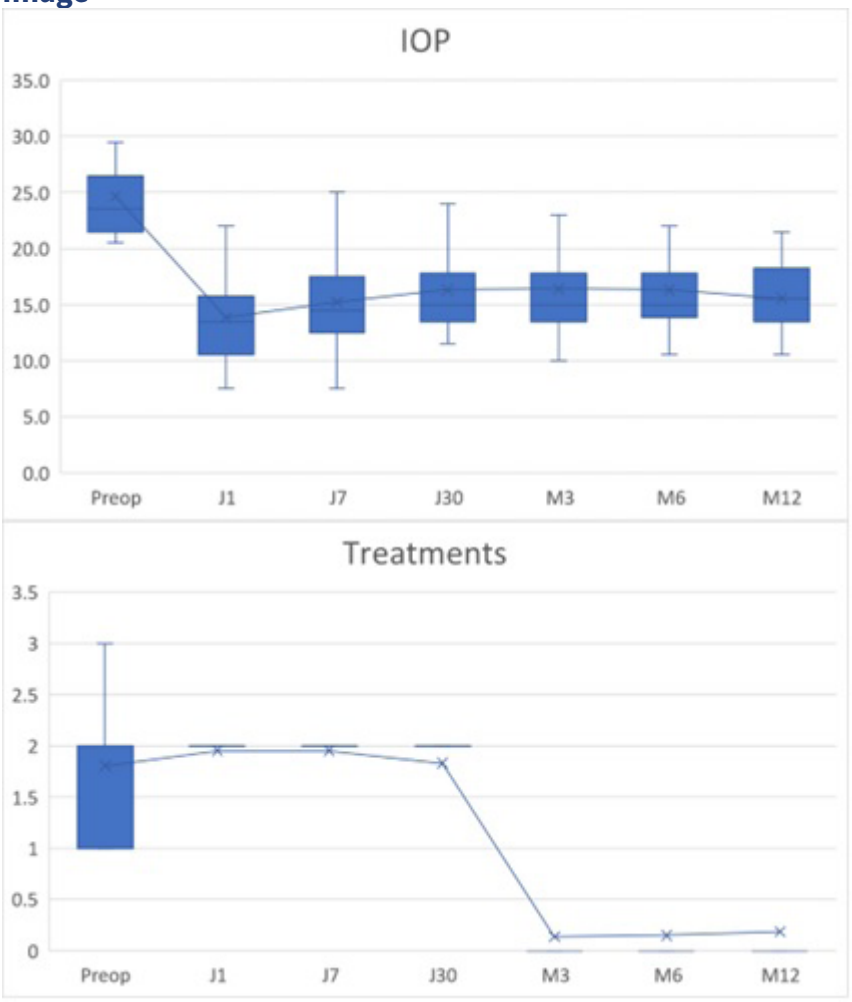
Baseline IOP was 24.7±3.8 mmHg w 1.9±0.6 meds, then 16.4±5.5 w 0.1±0.3 meds at M3 (n=37), 16.3±5.1 w 0.1±0.4 meds at M6 (n=34), 16.5±4.1 w 0.2±0.5 meds at M12 (n=31) showing IOP drop of 34, 34 and 33%, and meds drop of 90, 90 and 87% at M3, M6 and M12 respectively

87% of patients were still free of medication at M12

There was no statistically significant difference regarding gender, age, phakic or pseudophakic, Shaffer 3 or 4, or between the groups receiving either 1 or 2 CIDs

UBM exams shown ideal placement at the angle, w/o postop movement along FU. No subconjunctival filtration was detected, gonioscopy confirmed absence of angle modification

Image



Conclusions

These results confirm the ones obtained at M6 and tend to show a stability and sustainability of both the IOP lowering performance and safety of CID on the long-term. Patient's quality of life is significantly improved with 87% of patients still free of medication at M12.

Surgical enhancement of uveoscleral outflow through physiological pathways, without opening the anterior chamber and without bleb seems to be a very promising approach

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P-844
PSEUDOPHAKIC MALIGNANT GLAUCOMA-CASE REPORT

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Purpose
To present a clinical case of a patient with malignant glaucoma, unresponsive to maximal medical therapy with a successful outcome after surgical treatment.

Methods
We present a clinical case of a 63-years-old male patient, who developed malignant glaucoma four days after cataract surgery in the right eye, with no prior medical history of glaucoma. Intraocular pressure after the surgery was 50 mmHg. Treatment was carried out with maximal topical and systemic antiglaucoma therapy without significant influence on the intraocular pressure (no values below 35mmHg). Vitrectomy, hyaloidotomy , capsulotomy and IOL extraction were performed with significant improvement of IOP values on the first postoperative day

Results
Intraocular pressure after surgical treatment was 15mmHg with well-formed anterior chamber and a significant effect on the patient's subjective statement. One month after the second surgery, intraocular lens (IOL) implantation with scleral fixation was performed.

Conclusions
Malignant glaucoma in pseudophakic patient is a rare but serious complication which can occur months after cataract surgery. Anterior vitrectomy with anterior hyaloidotomy and iritomomy is considered an effective treatment for the condition. Eye biometrics should be monitored before and after surgery in order to prevent malignant glaucoma. The option of early secondary scleral fixated IOL implantation should be carefully considered.

P-845

SAFETY AND EFFICACY OF IRRIGATING GONIECTOMY (TRABECTOME) IN A SOUTH-AMERICAN GLAUCOMA POPULATION

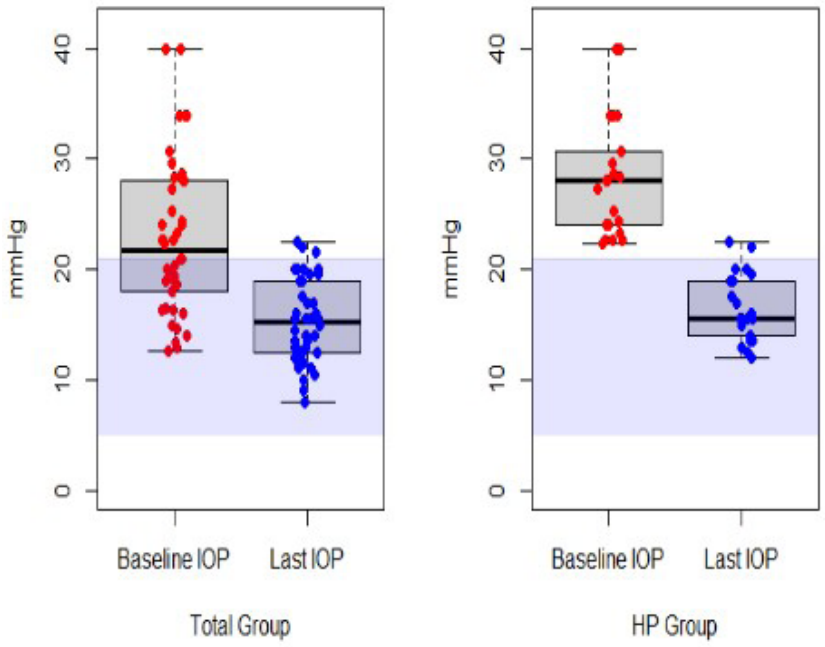
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Purpose
The aim was to describe the mid-term efficacy and safety of Trabectome in a real life heterogeneous clinical scenario South-American cohort.

Methods
Retrospective consecutive case series of 42 eyes of 39 patients. Twenty nine percent were treated as combined procedures with cataract surgery. Seventy one percent were classified as moderate/advanced glaucoma. Success criteria A equals an IOP reduction > 20%, 5 < IOP < 21 mmHg, no reoperation, no severe complications. More restrictive definitions of success were also applied for further analysis: B (5 mm Hg < IOP <=18 mm Hg, no resurgery, IOP reduction >20%, no severe complications); C (5 mm Hg < IOP <=15 mm Hg, no resurgery, IOP reduction >=40%, no severe complications).

Results
Mean IOP decreased from 22.2 ± 8.0 to 15.2 ± 3.7 mmHg (20.5 ± 12.7 months of follow up, 30% reduction) (P<0.0001). Success rates were 71% (A), 62% (B), and 19% (C). Complications included intraoperative arterial hemorrhage in two cases and late venous blood reflux in two cases. Six eyes (14%) required reoperation because of treatment failure. Twenty-one eyes (50%) had baseline IOP >= 22 mm Hg. In this subgroup IOP decreased from 27.6 ± 8.0 to 16.6 ± 3.0 (40% reduction) (P<0.0001). Success rates were 81% (A), 62% (B) and 29% (C). The high-pressure subgroup percent reduction (39.7%) was greater than the total group percent reduction (30.0%) (P<0.0001). Including the use of sub-therapeutic pilocarpine qhs (at night) to prevent synechiae formation, there was not a statistically significant difference in medication. Excluding pilocarpine, there was a statistical difference between pre-op and post-op medication, decreasing from 3.5 ± 1.1 to 2.9 ± 1.0 (p<0.05). There was not a significant difference between standalone and combined surgeries.

Image



Conclusions

Trabectome is an effective and safe technique to lower IOP in a South-American cohort representing the whole spectrum of disease severity and miscellaneous clinical scenarios, and even more so in patients with a baseline IOP above 22 mmHg, both as a standalone procedure or combined with cataract surgery.

P-847
COLCHICINE FOR FIBROSIS CONTROL

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Purpose
To demonstrate the benefit of introducing colchicine for the post-operative management of trabeculectomy into a single surgeon glaucoma practice.

Methods
Commencing from July 2021 colchicine was prescribed for bleb fibrosis. Patients 1 and 2 in the colchicine series initially received 5FU injections before commencing colchicine whereas patients 3-7 were commenced on colchicine in preference to 5FU in all cases. Colchicine dosage started at 500mcg per day increasing to 1000mcg per day if fibrosis was not significantly controlled. Comparison was made to eight trabeculectomies performed prior to July 2021. Two patients underwent phaco-trabeculectomy and were in the colchicine group. The duration of colchicine usage ranged from 9 days to 300+ days. Photographs were taken of blebs at every attendance after July 2021.

Results
All trabeculectomies achieved successful IOP outcomes with no significant difference in final IOP and no significant requirement for post operative pressure medication in either group. Three post operative 5FU injections were given in the colchicine group compared to nine 5FU injections in the pre-July 2021 no colchicine group. Bleb needling was undertaken once in the colchicine group and on five occasions in the no-colchicine group. There were seven returns to theatre in the no-colchicine group for drainage of choroidal effusion, hypotony and wound leak. There were no returns to theatre in the colchicine group. The probability of intervention (5FU, needling, return to theatre) was lower in the colchicine group (P=0.028). Diarrhoea occurred in one patient whose dose was increased after worsening of bleb fibrosis. Diarrhoea ceased with withdrawal of medication. No significant bleb avascularity occurred in the colchicine treated group.

Conclusions
Colchicine reliably controlled post trabeculectomy bleb fibrosis and was well tolerated.

P-848

FACTORS ASSOCIATED WITH AVOIDING TRABECULECTOMY IN SECONDARY GLAUCOMA ASSOCIATED WITH OCULAR INFLAMMATORY DISEASE

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Purpose

A retrospective study was conducted to examine the factors related to the presence or absence of a history (avoidance) of trabeculectomy (TLE) in patients with secondary glaucoma associated with ocular inflammatory disease (uveitic glaucoma [UG]).

Methods

The subjects were 480 patients (745 eyes) diagnosed with ocular inflammatory disease at Nippon Medical School Tama Nagayama Hospital, Ocular Inflammation Service between April 2018 and September 2022. The mean age was 57.1±19.6 years, with a male-to-female ratio of 205:275. Logistic regression analysis was performed using whether or not TLE was avoided as the objective variable and the following as explanatory variables: causative disease, inflammation site, treatment, and other background factors such as age.

Results

We found that 44.3% had UG. The most common causative disease was scleritis (25.1%), followed by sarcoidosis (19.7%), Vogt-Koyanagi-Harada disease (7.1%), Bechet disease (6.0%), Herpetic kerato-uveitis (3.4%), HLA-B27 associated uveitis (2.3%), CMV iritis/corneal endothelitis (1.3%), Posner-Schlossman syndrome (0.4%). The disease type for 19.2% was unclassifiable. Anti-inflammatory treatments were: topical steroid (100%), sub-conjunctiva or sub-tenon injection of steroid (16.8%), oral steroid (16.6%), oral immunosuppressants (9.1%), and biological agents (8.2%). Of these, 68 eyes (20.6%) had a history of TLE. Factors associated with avoidance of TLE were the group using biological agents (odds ratio [OR] 2.93, P=0.01) and those taking oral immunosuppressants (OR 1.45, P=0.162).

Conclusions

Twenty percent of UG cases need TLE. It is suggested that the use of biological agents and oral administration of immunosuppressants are effective in avoiding TLE among patients with UG.

P-849

ASSESSING HYPOTONY DEFINITIONS USED AS FAILURE CRITERIA IN GLAUCOMA SURGICAL STUDIES

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Purpose
To systematically review hypotony failure criteria used in the glaucoma surgical studies.

Methods
We performed a systematic review on MEDLINE searching for glaucoma surgical techniques providing ab externo (*e.g.*, trabeculectomy, glaucoma drainage devices, deep sclerectomy, Preserflo MicroShunt, Express shunt) or ab interno (*e.g.*, Xen Gel) subconjunctival filtration. Patients receiving glaucoma surgeries targeting trabecular meshwork and suprachoroidal space were not included. Both stand-alone and combined surgeries were included. Only studies reporting success rates were included. Only studies published in English and conducted on human subjects were included. We filtered search results for articles published between January 1, 2010, to November 21, 2022, and selected the following article types: clinical study, clinical trial (all types), comparative study, multicenter study, and observational study. Two independent investigators screened titles and abstracts to select studies to include and extracted hypotony definitions (if any) used as surgical failure criteria. Discordance was solved by open adjudication, and in case of disagreement, a third investigator was involved in making a final decision. Study outcomes were specific hypotony definitions, their type (*i.e.*, numerical, clinical, mixed), and their prevalence in the current literature.

Results
Among the 2,503 studies identified through database search, 278 were eligible. Ninety-nine (35.6%) studies had no hypotony failure criteria; numerical hypotony (IOP below a certain threshold (expressed in mmHg), regardless of hypotony complications) was the most used failure criterion (157 studies [56.5%]). A minority of studies had clinical complications of hypotony among failure criteria, isolated (3 studies [1.1%]) or in combination with a low IOP cutoff (19 studies [6.8%]). Fifty different specific hypotony failure criteria were found, with IOP<6 mmHg, IOP<6 mmHg on ≥2 consecutive visits after 3 months, and IOP<5 mmHg being the most used failure criteria in 41 (14.7%), 38 (13.7%), and 13 (4.7%) studies, respectively.

Conclusions
Hypotony failure criteria are highly heterogenous in current glaucoma literature, with few studies focusing on clinically relevant signs of hypotony. Further studies are warranted to examine the impact of different hypotony definitions on surgical success rates.

P-850

XEN 63, AN EFFECTIVE AND SAFE OPTION IN AN ONLY EYE CASE WITH MICROPHTHALMIA AND APHAKIC GLAUCOMA

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Purpose

Microphthalmia is a developmental ocular disorder that predisposes to glaucoma and congenital cataract. Cataract removal in microphthalmic eyes is characterized by several complications. One of the major concerns is aphakic glaucoma with still an unclear mechanism.

The aim of this study is to review the pathogenesis of glaucoma in microphthalmia and its management, with reference to a complex case report.

Methods

We report the case of a 33-year-old male with microphthalmia, nystagmus and refractory aphakic glaucoma undergoing inferonasal ab-interno XEN 63 implantation after posterior vitrectomy and an updated literature review about the topic.

Results

The patient's right eye was amaurotic and the left one aphakic. He presumably underwent lensectomy or intracapsular lens extraction in infancy for congenital cataract (no data was retrieved). The visual acuity (VA) was 0.3 and the intraocular pressure (IOP) around 23 mmHg with maximally tolerated medication including oral acetazolamide. No further examination was possible due to severe nystagmus and photophobia. The patient was scheduled for exploration under deep sedation and retrobulbar anaesthesia to decide surgical management. The optic disc was visualized presenting preserved neuroretinal rim with 0.6 optical cupping. Posterior vitrectomy was performed and an inferonasal XEN 63 was implanted because of severe superior limbar scarring and conjunctival fibrosis. At the follow up the patient maintained previous VA and IOP ranged from 16 to 18 mmHg without medication and any complications.

Lens extraction in microphthalmia prevents lens thickening with age and late angle-closure glaucoma. In our case, no intraocular lens had been implanted, and the patient developed aphakic glaucoma. The most frequently performed procedure is trabeculectomy but a thick Tenon's capsule and the rapid wound healing response in young patients especially in an area with postoperative scarring, decreases its benefit. Other alternatives include drainage devices which might confer higher success rates. The implantation of XEN 63 after posterior vitrectomy safely controlled IOP without medication nor complications in this severe case.

Image

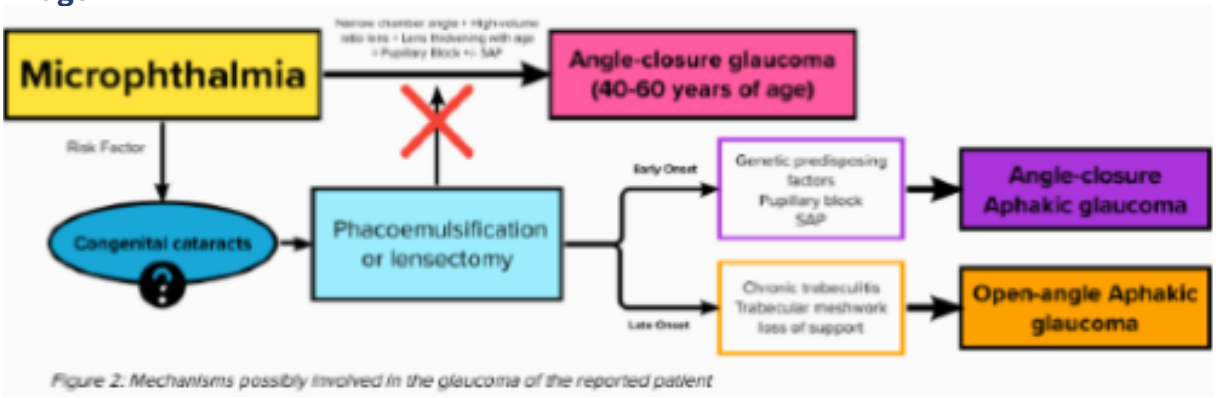


Figure 2: Mechanisms possibly involved in the glaucoma of the reported patient

Conclusions

Glaucoma in microphthalmia has still a controversial pathogenesis and a challenging management. XEN 63 combined with posterior vitrectomy may be an effective and safe option in aphakic glaucoma, especially due to its versatility and possibility of implantation in other quadrants, although further investigation is needed.

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P-851

AB INTERNO CANALOPLASTY AND TRABECULOTOMY COMBINED WITH PHACOEMULSIFICATION IN GLAUCOMA PATIENTS IN A UK HOSPITAL SETTING: 24 MONTH OUTCOMES

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Purpose
To report 2 year efficacy and safety outcomes of sequential phacoemulsification with Ab interno canaloplasty standalone or with trabeculotomy using the OMNI surgical system (Sight Sciences,Inc) in glaucoma patients.

Methods
Retrospective review of the clinical notes of glaucoma patients who underwent Ab interno canaloplasty with or without trabeculotomy performed standalone or preceded by phacoemulsification with intraocular lens was performed at Royal Surrey County Hospital in Guildford, UK.

Data on visual acuity, intraocular pressure, number of medications and complications was recorded on day 1, month 1,3,6,9,12,18 and 24.

Efficacy outcomes included changes in mean IOP and medications at the end of the follow up. Safety outcomes included adverse events (AE) and complications.

Results
A total of 60 surgical procedures were reviewed.

The mean intraocular pressure was reduced from 22.4mm/Hg on 2.3 drops at baseline to 16.3 mm/Hg on 1.7 drops at month 1. There was further reduction to 14 mmHg on 2 drops at month 12. The mean IOP was then 15mmHg on 1.6 drops at month 24.

The most common adverse event was transitory hyphaema recorded as 20% (macro/level 5% and red blood cells 15%) followed by a less common spike of intraocular pressure, and a reduction on the visual acuity. Within the follow up 4 cases required filtering surgery. Analysis above included descriptive statistics and t-test evaluating change from baseline.

Conclusions
This novel device and technique showed to be effective by providing a significant and sustained reduction in the mean intraocular pressure and drops after 1,12 and 24 months postoperative. It also demonstrate to have a favorable intra and perioperative safety profile.

P-852

CYCLODIALYSIS REVIVAL OF AN ABANDONED TECHNIQUE IN GLAUCOMA SURGERY

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Purpose

This study evaluated the efficacy and complications of cyclodialysis operation in cases of advanced and uncontrolled glaucoma.

Methods

Patients with advanced glaucoma and uncontrolled intraocular pressure (IOP) despite maximally tolerable antiglaucoma medications were selected to undergo cyclodialysis. Through fornix based conjunctival incision, episcleral vessels were cauterized for hemostasis. Cyclodialysis was done through 2 mm radial scleral incision, 3-4 mm from the limbus to expose the outer surface of the ciliary body (CB). A 27, 25-gauge canula, spatula or trabeculotome was passed between CB and the sclera into the anterior chamber, then rotated to complete separation between the sclera & CB on both sides. Follow-up examinations took place until one year postoperatively.

Results

Thirty-five eyes of 31 patients were included. Mean age was 47.17 ±17.99 years. Open-angle glaucoma was the most common diagnosis 18 eyes (51.43%), 14 of them (40%) were Primary open-angle glaucoma and 4 (11.4%) were pseudoexfoliation glaucoma. Best corrected distant visual acuity (BCDVA) at baseline ranged between 0.7 and 1.6 log MAR. Mean untreated IOP before surgery was 47.1±9.5 mm Hg. This was reduced significantly to 16.4 ±8 mm Hg (mean reduction 30.7 mmHg:65.2% reduction, $P < 0.0001$) at 6 months. The mean number of antiglaucoma drops decreased significantly from 3.6 ±0.8 drops before surgery to 0.52 ±1.12 at 6 months of follow-up ($P < 0.0001$). Visually significant hyphema on the 1st postoperative day was encountered in 16 eyes (45.7%). We noted non-significant reduction of mean BCDVA from 1.14 ±0.28 to 1.24 ± 0.22 log MAR ($P = 0.1198$). Cyclodialysis failed to control IOP in 3 of 5 eyes with neovascular glaucoma (60%) at 6 months due to continuous proliferation in these eyes.

Conclusions

Cyclodialysis is an efficient glaucoma surgery that achieves significant reduction of IOP and the number of antiglaucoma drops. Further studies are needed to assess the success of this technique in different types of glaucoma.

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P-853
SECONDARY GLAUCOMA DUE TO MUCOPOLYSACCHARIDOSIS: A CASE REPORT

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Purpose
To report the diagnostic features and ocular management strategy of secondary glaucoma due to Mucopolysaccharidosis (MPS).

Methods
A case report of a young, Asian male who came to our department in early September 2021.

Results
A 15 years old boy came with a chief complaint of progressive onset of blurred vision in both of his eyes 4 years before the visit. He was being treated as a case of hypermetropia since then. His stepmother noticed that there was cloudiness in both of his eyes and the patient also complained that his vision had been deteriorating for 3 months. From thorough examinations, we observed visual acuity (VA) was CF at 1m, corneal clouding, borderline IOP, shallow anterior chamber depth according to Van Herick grading in both eyes, also signs and symptoms that may lead to MPS such as growth restriction, facial coarse, dysostosis multiplex, upper airway obstruction, and structural cardiac valvular dysfunction, which was supported by a genetic test that showed the possibility of MPS type VI. Hence, we concluded that this patient had secondary glaucoma due to MPS. Three months before, the patient had been prescribed anti-glaucoma medications, yet the patient's IOP still had not been under control, instead, the patient had developed eye pain, teary eyes, glare, and headache. Therefore, we decided to perform a trabeculectomy with a releasable suture in both eyes alternately. We started with his right eye, while his left eye was still being treated with topical anti-glaucoma medications. After the surgery, we prescribed the patient an antibiotic, analgetic, and steroid, as well as anti-glaucoma medications. The IOP was reduced on day 1 and day 7 after the surgery, however, on day 14 the IOP rose so we decided to release the releasable suture and did a slight digital pressure on the bleb under topical anesthesia by using a slit lamp. We then measured his IOP right after and 30 minutes after these procedures. We noticed that there was a reduction in the IOP. Moreover, we shifted the steroid to a lower potent group. The VA remained the same as before the surgery, but the patient stated that he felt more relief. There was also a deepening of the anterior chamber in his right eye. Unfortunately, the patient did not make any visit afterward for further follow-up.

Conclusions
The underlying syndrome was suspected only after glaucoma had set in. Further examination and regular visitation are needed to determine the diagnosis and the long-term outcome of IOP after trabeculectomy.

P-855

GONIOSCOPY - STILL A SILENT GUARDIAN, A WATCHFUL PROTECTOR AND A DARK KNIGHT IN MODERN DAY PRACTICE

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Purpose

Recently, gonioscopy is being taken for granted and is becoming a dying art. The importance of gonioscopy in modern day practice, despite various anterior segment imaging gadgets is highlighted in this paper.

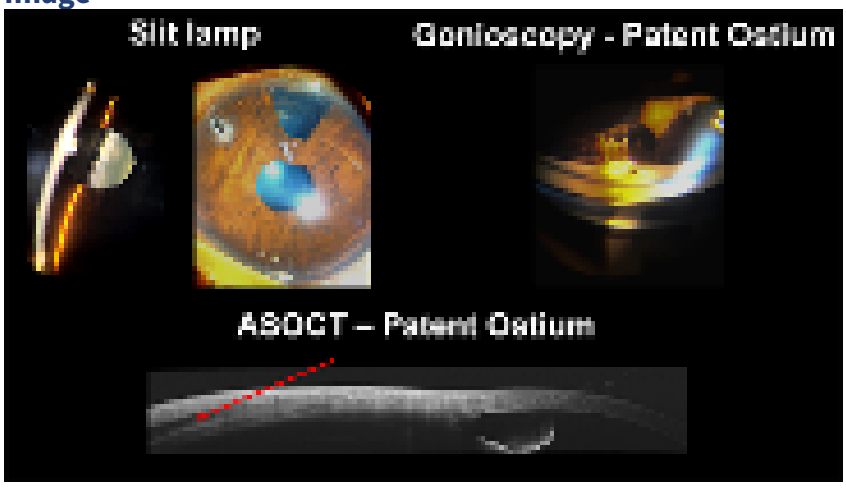
Methods

A 24-year-old male presented with defective vision in his left eye (OS) following phakic intraocular collamer lens (ICL) surgery in both eyes (OU) done elsewhere. On examination, OS had corneal edema with intraocular pressure (IOP) of 24 mm of Hg, despite maximum IOP lowering medications. He was diagnosed with secondary angle-closure glaucoma with pupillary block following ICL and was advised ICL explanation by them after the surgical peripheral iridectomy didn't work. However, on our examination with gonioscopy, he was re-diagnosed as secondary open-angle glaucoma with 360-degree dense pigment dispersion into the angles. Anterior segment optical coherence tomography (AS-OCT) supported the open-angle theory, revealing a deep anterior chamber and a patent peripheral iridectomy. Now, trabeculectomy seemed a better option than unilateral ICL explanation, as the patient had bilateral high myopia and ICL explanation may not recover the obstructed trabecular meshwork. The surgery was uneventful and the IOP decreased. The patient has been under good follow-up for 4 years now.

Results

The final follow-up revealed a best-corrected visual acuity (BCVA) of 20/20 with IOP in low teens in OU and a cosmetically happy patient.

Image



Conclusions

The pearl here is gonioscopy remains unparalleled in dictating the direction of glaucoma treatment.[1-3]

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P-857

RETROSPECTIVE ANALYSIS OF G1 ISTENT SURGICAL OUTCOME OVER 8 YEARS

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Purpose
This retrospective review evaluated the 8 year outcomes of iStent G1 at a tertiary centre in a series of complex glaucoma patients.

Methods
Sixty-five patients underwent iStent® (G1) implantation with or without cataract surgery between 2011 and 2013. Outcome measures included reduction in IOP, the number of glaucoma medications and need for further surgical intervention.

Results
The glaucoma diagnoses included primary open angle glaucoma (POAG) in 47% of patients (n= 31) followed by secondary glaucoma such as pseudoexfoliative syndrome (PXF) in 9% (n= 6), and uveitic glaucoma in 8% (n= 5). Fifty-two patients received 2 G1 istents and 13 received a single stent. Fifty-seven patients underwent combined surgery with phacoemulsification and eight patients underwent standalone surgery. Twenty-five patients required further surgical intervention during the follow-up and were excluded from the final analysis. Another fifteen were excluded as they were either deceased (n=7) or lost to follow-up (n=8). Twenty-five patients were included in the final analysis. At 8 years (or more) follow-up, the mean IOP of these patients was 14.32 ±6.20 SD (n=25) compared to 24.0mmHg ±7.06 SD (n=65) pre-operatively. There was a decrease in the number of glaucoma medications from a mean of 2.91 ±1.34 SD (n=65) pre-operatively to a mean of 2.3 ±1.15 SD (n=25).

Conclusions
This real-world analysis demonstrates the iStent® (G1) is efficacious and durable in lowering IOP in both primary and secondary complex glaucomas. Almost 50% (n=32) (25 with adequate follow-up and 7 deceased) of the patients did not require further complex surgical interventions during the 8 year follow-up period.

P-858
SMART MATERIALS FOR THE 3RD GENERATION IMPLANTS IN GLAUCOMA TREATMENT

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Purpose
Smart materials are materials that are manipulated to respond in a controllable and reversible way, modifying some of their properties as a result of external stimuli such as certain mechanical stress, pressure or a certain temperature, among others. Because of their responsiveness, smart materials are also known as active materials. The idea of a 3rd generation implant based on smart material is based on the use of a fibrous membrane composed of two materials with different properties. The core-shell fibers are made of polymers with properties that provide responses to changing pressure conditions in the eyeball. The core layer is a highly elastic and hydrophobic (PTFE-PVDF-PP) while the skin is an elastic and hydrophilic polymer, the durability of which can be adjusted by the degree of cross-linking (PVA). Due to its porosity and hydrophilic-hydrophobic properties, during the pressure change, the geometry of the pores (inter-fiber spaces) is altered, thus obstructing the outflow of the aqueous fluid.

Methods
Commercially available polymers were used to produce the fiber membranes: PTFE-PVDF-PP and PVP (Sigma-Aldrich). Core-shell fibers were fabricated by electrospinning using coaxial jets. The membranes were tested for *in vitro* durability, biocompatibility (ISO 10993). A test of mechanical properties was carried out by subjecting the membranes to work under pressure mimicking a glaucoma . Changes in the microstructure of loaded and unloaded membranes were observed under an electron microscope. Glaucoma simulations were performed using albumin-enriched liquid to determine membrane surface changes.

Results
Membranes with a thickness of 500um built from fibers with a diameter of no more than 1um were obtained. The porosity of the membrane in the unloaded version was 80% while in the loaded version it was about 90%. The membrane implants are characterized by high biocompatibility with the RAW 297.4 macrophage line. The induced glaucoma causes a widening of the inter-fiber spaces by about 10% with the fibers returning to their original alignment after the pressure is removed. The permeability of the membrane under static conditions increases over time while it remains the same under dynamic conditions.

Conclusions
Fibrous bi-polymer membranes that actively respond to pressure changes provide an alternative solution to existing NPDS-dedicated implants

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P-859

IOP REDUCTION IN BILATERAL CATARACT EXTRACTION WITH CONCOMITANT MIGS IN ONLY ONE EYE

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Purpose

Glaucoma and cataracts are two commonly comorbid progressive eye conditions that can lead to blindness. Cataract extraction alone has the ability to reduce IOP, thus itself being a therapeutic procedure for patients with glaucoma1.

Minimally invasive glaucoma surgery (MIGS) has risen in popularity in recent years. Surgically implanted devices like iStent (Glaukos) are designed to augment outflow of aqueous humor, and are commonly performed concomitantly with cataract surgery2. The relative contribution to net IOP reduction of each procedure is still undetermined. This study analyzes IOP control in patients who underwent bilateral cataract extraction (CE) without complication with MIGS in one eye only.

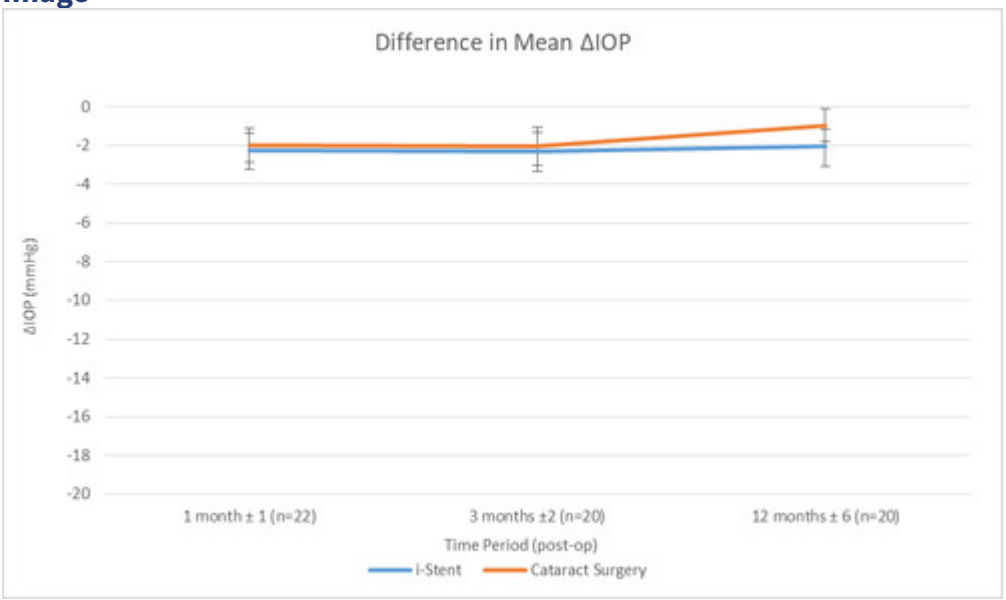
Methods

Paired-organ case-control study: 26 patients (17M, 9F; 73.9y ± 1.35) underwent bilateral phacoemulsification with concomitant MIGS in only one eye and no change in topical therapy pre- or post-op. Mean ΔIOP from baseline (pre-op) was calculated for each eye 0-2mo, 2-5mo, & 6-18mo post-op using clinically documented IOP measurements. Percentage change in ΔIOP was calculated for both groups. Paired t-test was applied to analyze if there was a statistically significant difference between the two paired-eye treatment groups' IOP reduction.

Results

All paired (26 CE; 26 CE+MIGS) eyes (n=52) were consistently topically medicated pre- and post-op (mean baseline IOP 17.4mmHg CE; 17.8mmHg CE+MIGS). Mean difference in ΔIOP between paired eyes never exceeded 1.1mmHg, and failed to reach statistical significance (p≤0.05) at any time interval. Mean IOP reduction in either treatment group never exceeded 13%.

Image



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Conclusions

AAO and EGS guidelines both indicate acceptable clinical efficacy for any glaucoma treatment should exceed 20% IOP reduction[3]. No statistical nor clinical significance in IOP reduction attributable to MIGS was observed among this cohort. Paired-organ studies typically substantially improve the prospects for identifying even minor degrees of bilaterally asymmetric therapeutic response. This approach eliminates nearly all sources of interindividual variability, thus substantially enhancing statistical power.

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P-860
OVER-FILTERING TRABECULECTOMY BLEB WITH HYPOTONY INDUCED MACULOPATHY

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Purpose
To present a case of an over-filtering trabeculectomy bleb with hypotony-induced maculopathy.

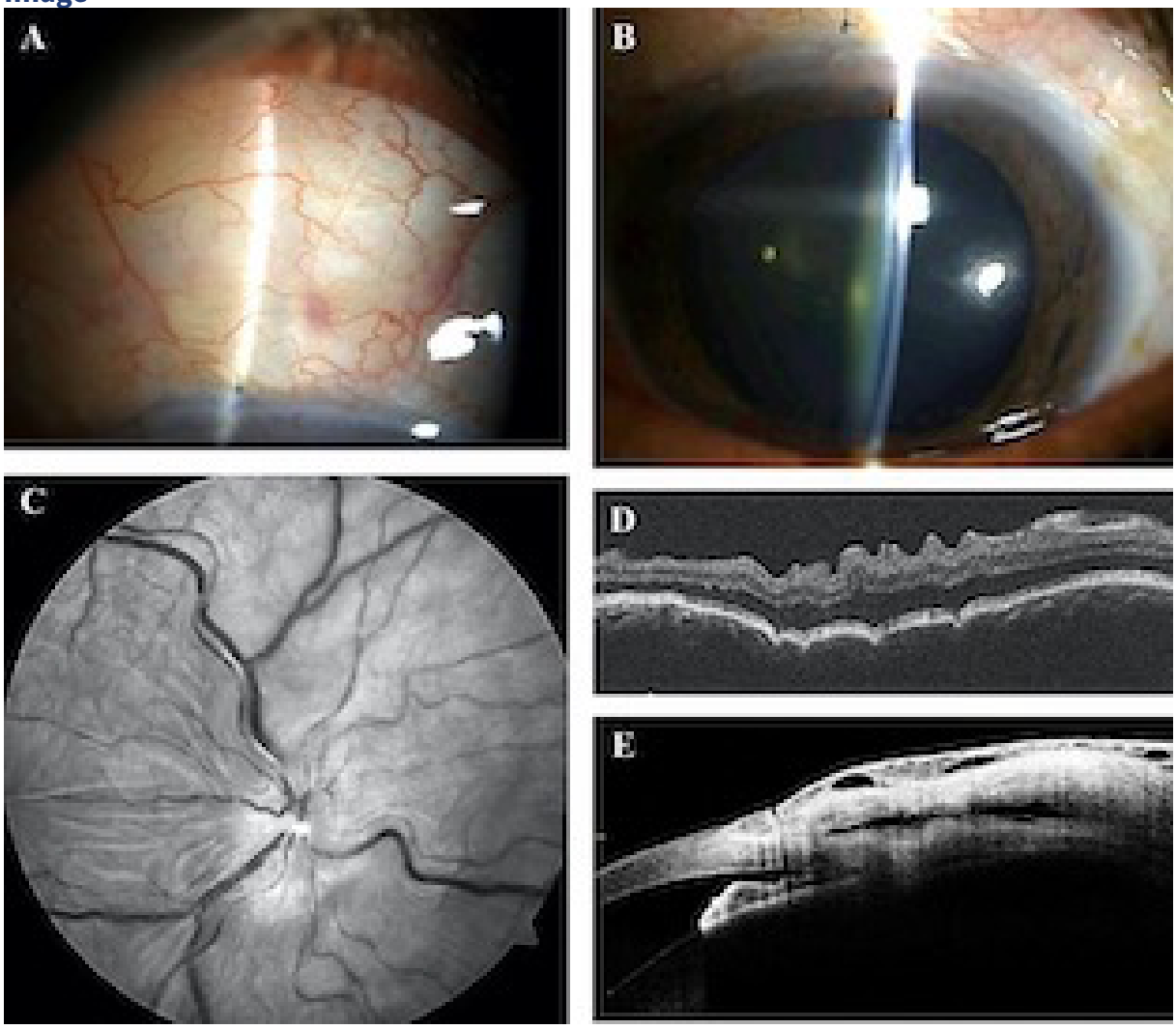
Methods
A case report

Results
The patient was a 35-year-old man who presented with bilateral painless and sudden loss of vision following trabeculectomy (performed elsewhere 1 month ago). At presentation, best-corrected visual acuity was 3/60 and intraocular pressures were exceedingly low—2 mm Hg in both eyes. The patient had a diffuse bleb of medium height with mild vascularity (Figure 1A), a shallow anterior chamber with peripheral irido-corneal touch (Figure 1B), and a negative Seidels test. Fundus examination revealed hypotony maculopathy with extensive blood vessel tortuosity, chorioretinal folds, and bilateral optic nerve head oedema (Figure 1C). Optical coherence tomography assessment of the macula revealed full-thickness folds in retinal layers involving both the neurosensory and retinal pigmented epithelium (Figure 1D). Both eyes trabeculectomy blebs had numerous microcystic spaces in the subconjunctival space and fluid under the scleral flap on the anterior segment optical coherence tomography (OCT) (Figure 1E).

A clinical diagnosis of hypotony-induced maculopathy with bilateral over-filtering bleb was made. Conservative therapy with topical and systemic steroids, as well as cycloplegic, did not produce any improvement. The definitive management was done with transconjunctival trabeculectomy bleb compression sutures in the right eye and external bleb revision with a scleral patch graft in the left eye. Intra-operatively, the source of over-filtration was found to be the thin scleral flap with a single loose suture closure.

At 1-month post-operative follow up, the anterior chamber was formed, retinal folds were resolved, and the patient's vision restored to 6/9 with an IOP of 10 mmHg.

Image



Conclusions

This case report shows the typical clinical features and management of an overfiltering bleb. Pre-operative in-vivo imaging with OCT is helpful in underlying scleral flap assessment and management planning. The timely management is crucial to prevent permanent vision loss due to fixed chorio-retinal folds. During trabeculectomy, careful closure of the scleral flap should be done, along with intraoperative titration of aqueous filtration, before final closure of the conjunctival flap.

P-861
CASE REPORT: PFEIFFER SYNDROME WITH SEVERE OPHTHALMIC MANIFESTATIONS

A Gabaidulina, D Saukenova, Z Baigabyl

Purpose
We would like to share a rare case of a child born with signs consistent with Pfeiffer syndrome type 2 with severe manifestations and ocular complications, and to talk about the difficulties in choosing a treatment strategy that we encountered.

Methods
Male child, full-term, weight 4110g, height 51cm, head circumference 36cm, Apgar score 5-7 points. Born from urgent surgical delivery.

Antenatally, according to the ultrasound, multiple congenital malformations of the central nervous system were diagnosed: encephalocele, hypertelorism, frontonasal dysplasia, scaphocephaly, ventriculomegaly. Diffuse keratoma. Exophthalmos. Congenital glaucoma. Hypoplasia of the nasal bone. It was recommended to terminate the pregnancy for medical reasons - the mother refused to terminate the pregnancy.

The child was admitted on the 14th day of life and clinically had features corresponding to type 2 Pfeiffer syndrome: craniostenosis of the skull in the form of a trefoil, shallow orbit, wide forehead, low-set ears, wide short thumbs and toes, varus deformity of the feet, ankylosis of the elbow joints, pronounced exophthalmos with dislocation of the eyeball, keratomalacia, chemosis on the right. Secondary ophthalmohypertension with signs of glaucomatous atrophy of the optic nerve.

Results
By the decision of the council, taking into account the severity of the condition of the right eye, the child underwent surgery OD Evisceration of the eyeball with blepharorrhaphy. OS blepharorrhaphy.

Fig. 1. Clinical photographs of Patient: (A,B) severe proptosis with exposure. (C,D) note broad thumb and big toe with varus deviation . (E) condition after enucleation of the right eye and blepharorrhaphy

Image



Conclusions

Важно оказать помощь своевременно, до возникновения серьезных осложнений, не теряя драгоценного времени. В нашем случае имело место более раннее возникновение тяжелых осложнений со стороны глаз, что и послужило неблагоприятным драматическим исходом экзофтальма. Для выбора успешной тактики лечения необходима тесная взаимосвязь врачей-офтальмологов и специалистов, занимающихся реконструктивной челюстно-лицевой хирургией. В связи с отсутствием возможности пластической реконструктивной хирургии для проведения операции необходимо привлечение иностранных специалистов.

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P-862

STEROID INDUCED ANGLE CLOSURE GLAUCOMA: A CHALLENGING CASE REPORT

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Purpose
To report a challenging case of unresponsive steroid induced glaucoma in Angle- Closure Glaucoma (ACG) and its management.

Methods
A case report of a southeast Asian female treated for steroid induce glaucoma from June 2022 to December 2022.

Results
Herein we present a female patient, 50 years old referred to our outpatient clinic with worsening eye pain and blurred vision since 2 weeks with history of topical steroid eye drop use from prior physician for 5 weeks due to red eye in right eye (RE). On examination RE VA light perception (LP) and IOP of 52 mmHg with slit-lamp (SL) examination showed mix injection, mid-dilated pupil, corneal edema, negative light reflex, shallow anterior chamber (AC) (Van Herick (VH) 1) and iris atrophy. Left eye (LE) VA 6/6 with IOP 16 mmHg, shallow AC (VH 2). Usage of steroid was halted and prescribed topical beta blocker, oral acetazolamide and potassium, patient refused hospital admission. 1 week follow-up in outpatient clinic RE IOP 28 mmHg, VA 1/300 and LE VA 6/6 with IOP 14 mmHg posterior segment of RE showed C/D ratio 0.6 and LE 0.3 respectively, patient continued medication and additional topical latanoprost for RE.

Patient returned 8 weeks later with no medication and RE VA LP, IOP 39,9 mmHg and worsening SL findings similar to her first visit. Trabeculectomy with iridectomy and hospital admission were done, 1 day post-operation RE VA 6/60 IOP 24 mmHg with conjunctival injection, diffuse bleb, releasable suture intact and iridectomy superior iris; discharged patient was kept on topical beta-blocker for RE.

2 weeks post-operation RE VA 6/20 pinhole 6/9, IOP 16 mmHg with diffuse bleb, released suture, iridectomy superior iris, LE VA 6/6, IOP 16 mmHg AS COA VH 2, patient was educated of the need for prophylactic LPI on LE. 3 months post-trabeculectomy RE VA 6/9, IOP 16 mmHg with diffuse bleb and C/D ratio 0.4., LE VA 6/6 with IOP 13 mmHg and C/D ratio 0.3,patient is scheduled for LPI on LE.

Conclusions
Steroid induced glaucoma commonly found in POAG is rare in PACG, definitive treatment includes halting steroid drugs in combination with PACG management. The presence of multifactorial obstacle in this patient hinders earlier treatment of PACG. Definitive surgical management finally stabilizes patient's clinical condition.

P-863

EFFECT OF LOW-COST AQUEOUS DRAINAGE DEVICE AND TRABECULECTOMY ON CORNEAL ENDOTHELIUM AND ANTERIOR CHAMBER FLARE: A PROSPECTIVE RANDOMIZED STUDY

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Purpose

The Aurolab Aqueous Drainage Implant (AADI) (Aurolab, Madurai, India) is a cost-effective substitute to the other commonly used non-valved shunts worldwide and has gained attention in developing countries. Though there have been multiple studies which explored the corneal endothelial changes associated with trabeculectomy, with other glaucoma drainage devices, there is minimal literature available on AADI.

Methods

Every participant underwent ophthalmic examination, Noncontact specular microscopy (TOMEY EM 4000) (readings taken from 5 corneal quadrants) and LFM (FM-600, Kowa). A total of 42 eyes were randomly allocated into AADI and Trabeculectomy groups. Postoperatively, readings were repeated on day 1, 7, 1st month and 3rd month.

Results

The mean cell density values measured in the AADI group significantly decreased till postoperative day 1 in all the quadrants from their respective baselines apart from the inferotemporal group ($p < 0.03$ in all quadrants). The mean LFM variation was statistically significant (0.00 p-value POD 30 and 0.013 p-value POD 3m). There was hexagonality loss in the AADI group superotemporal quadrant which persisted even at POD90.In the AADI group,Corneal cell count reading in the central quadrant correlated with the age. (p value:0.014) and the tube corneal endothelial distance (p value 0.003).

Conclusions

There was no significant variation in the CECD loss, IOP reduction, anterior chamber flare and complication rate between the two groups. The IOP reduction, failure rate, rise in flare from baseline, secondary procedure requirement and the requirement of antiglaucoma medication were significantly more in the trabeculectomy group. Thus, this low cost shunt device is a safe option.

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P-864

MANAGEMENT OF TRAUMATIC HYPOTONY DUE TO CILIARY BODY DETACHMENT FROM MEDICAL TREATMENT, LASER THERAPY TO SURGICAL APPROACH, A CASE REPORT

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Purpose
We present the case of a 40-year-old man with post-traumatic hypotony on his left eye.

Methods
On examination, induced myopia due to anterior displacement of the lens and shallow anterior chamber were observed. Gonioscopy revealed a closed angle from 7 to 11 hours, anterior segment optical coherence tomography (AS-OCT) revealed choroidal effusion and iridocyclodialysis from 7 to 11 hours with macular choroidal folds on posterior segment OCT.

Results
Initially, the patient was treated with topical cortisone and cycloplegia without change except for a slight deepening of the anterior chamber. After a month of conservative treatment, 4 cryocoagulation impacts were applied in the area of iridocyclodialysis without improvement.

Surgical treatment was chosen by a direct suturing of the ciliary body to the scleral wall and repositioning the iris root towards the scleral spur using intra-surgical gonioscopy and a 10-0 suture straight needle. One week after surgical treatment, the intraocular pressure was 12 mmHg with a deep anterior chamber, observing the iris root in place by gonioscopy and a normal position of the ciliary body in the AS-OCT images.

Conclusions
The treatment of traumatic hypotony due to detachment of the ciliary body depends on the degree of the hypotony and the extent of the cyclodialysis. Treatment can be conservative, ineffective in our case, or applying argon laser on the dialysis area that cannot be considered due to the lack of visibility of the angular structures. Transscleral cryotherapy has not been effective in our case either. Surgical suture cyclopexy was chosen, with anatomical success and resolution of the hypotony from the first week after surgery.

P-865
STUDY OF THE OCULAR SURFACE IN GLAUCOMA PATIENTS AFTER EXPRESS IMPLANTATION

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Purpose
Glaucoma is a chronic disease with long-term instillation of preserved eye-drops that can damage ocular surface after years of topical treatment, including symptomatic eye dryness and several degrees of squamous metaplasia. The purpose of this study is to evaluate how ocular surface condition may change in patients with glaucoma after Express Implant surgery and topical therapy abandon.

Methods
A prospective study of 40 eyes (20 patients) with long-term open-angle glaucoma was performed for 3 years for this study. Patients underwent an objective ophthalmic examination including Tear film break-up time (BUT), Schirmer test and ocular surface staining with Rose Bengal. Subjective evaluation was assessed by the Ocular Surface Disease Index (OSDI) questionnaire. Posteriorly, all patients had filtration surgery (Express Implant without phacoemulsification) in both eyes stopping topical medication, and after 1, 6 and 12 months, they were newly evaluated with the same procedure.

Results
All patients completed the study and had a significant reduction in intraocular pressure (IOP) after the filtration surgery. There was no statistically significant difference in the mean values of BUT and Schirmer test post surgery. There was a statistically significant decrease ($p<0.05$) in Rose Bengal staining and ocular surface disease index score at 6 and 12 months, indicating less severity of dry eye symptoms and significant reduction in ocular discomfort.

Conclusions
Filtration surgery allowed stopping topical treatment, decreasing IOP in all patients. It had no effect on postoperative values of BUT and Schirmer tests but improved subjective ocular surface symptoms in these patients in a period of 1 year study.

P-866

RISK OF SUDDEN LOSS OF VISION (WIPE-OUT) FOLLOWING FILTRATION SURGERY IN END-STAGE GLAUCOMA - DR SYBIL MESHRAMKAR

D Meshramkar

Purpose

To evaluate the effect of filtration surgery on visual acuity and IOP in patients with end – stage glaucoma during the post-operative period and to assess the risk of sudden visual loss (wipe - out).

Methods

Retrospective case series

The study was retrospectively done in a semi-rural area of India by a single surgeon. This study included patients with end – stage glaucoma who underwent trabeculectomy with mitomycin –C. Main outcome measures included change in BCVA and IOP. The incidence of pre-operative and post-operative complications was also recorded.

Results

Twenty one patients were enrolled in this study from the period of2020 to 2022. Out of the 84 trabeculectomies done by the surgeon 21 cases were picked up with end stage glaucoma. The study resulted in male predominance. The mean age was 55.38 +/-12.26. The mean of Pre – Operative IOP was seen to be 28.52 +/- 10.191. The study was seen to be normally distributed. Visual Acuity and IOP was compared between Pre – operative and post – operative (1st day and 40th day) using Paired t test. The comparison between pre - operative and 1st day post – operative visual acuity was seen to be insignificant with a value of 0.59 (P>0.001). The rest were seen to be highly significant. Comparison between rest of the variables had a significance value of 0.00 (P>0.001)

Conclusions

Our study showed that there was a significant improvement in Visual Acuity and IOP post operatively. There was no Wipe out seen in any of the cases since there was a significant improvement in Visual acuity.

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P-868

CLINICAL OUTCOMES OF COMBINED PARS PLANA VITRECTOMY WITH SCLERAL FIXATED IOL OR POSTERIOR CHAMBER FOLDABLE LENS USING 23 AND 25 GAUGE'S

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Purpose

To compare the clinical outcomes of combine pars plana vitrectomy with scleral fixated IOL or posterior chamber foldable lens using 23 and 25 Gauge's

Methods

Comparative study of 123 eyes (23-G group, 33 eyes and 25G group, 90 eyes) of 123 patients underwent uncomplicated pars plana vitrectomy for dislocated / subluxated lens, nucleus drop and posterior capsular rent cases. 7 patients were implanted with posterior chamber foldable lens and 116 patients with scleral fixated intraocular lens. All secondary causes of rise in intraocular pressure, post VR surgeries (Silicone oil, Scleral buckle) were excluded. BCVA, IOP and number of Antiglaucoma medications were compared on postoperative day 1, 15, 1 month, 3 and 6 months

Results

Mean value for Best corrected visual acuity for 23G was 1.05 ± 0.8 which improved to 0.46 ± 0.3 (P < 0.001) and for 25G it was 1.04± 0.7 to 0.39±0.3 (P < 0.001) at the end of 6 months. Mean value of IOP for 23G was 15.36±4.2 which reduced to 15.33 ±3.2 (P<0.001) and for 25G it reduced from 15.93±5.2 to 15.16±2.8 (P<0.001) at last visit. Average IOP was 15.16mmHg and 15.33mmHg for 25G and 23G respectively. Mean AGM for 23G was 0.12±0.5 which increased to 0.55±1.0 with P value 0.003 and for 25G, 0.12 ±0.4 to 0.34±0.7 by end of last follow up visit. 2 patients underwent SFIOL Haptic re-tucking for tilt.

Image

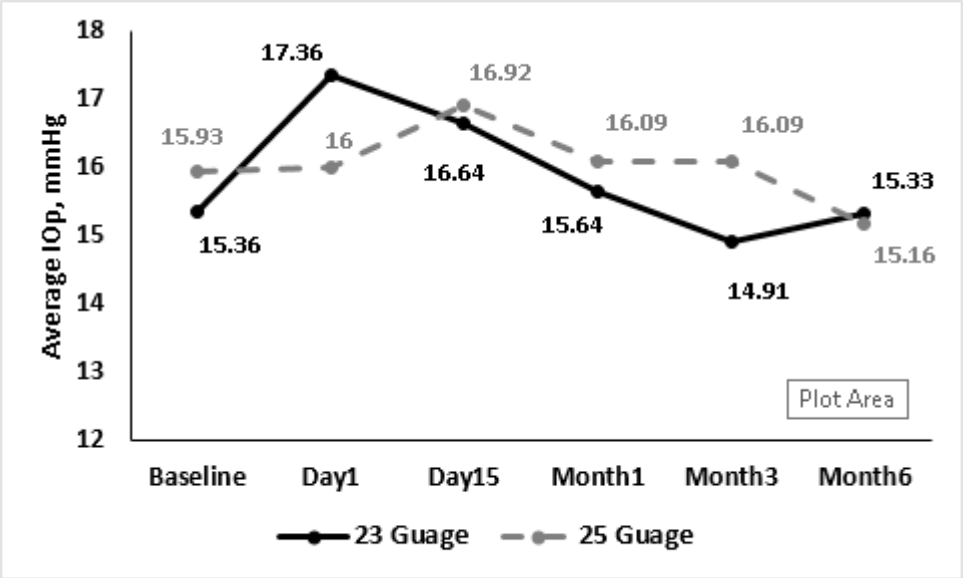


Figure1: Line graph showing the IOP trajectory over the visits

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Conclusions

The efficacy of 25Gvitrectomy port is much better and effective than 23G Gauge in terms of secondary IOP rise and IOP lowering reducing agents post pars plana vitrectomy procedures.

P-869

EVALUATION OF ISTENT COMBINED WITH CATARACT SURGERY IN OPEN-ANGLE GLAUCOMA

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Purpose
Evaluate the effectiveness and safety of iStent implantation in combination with cataract surgery in eyes with open angle glaucoma.

Methods
Retrospective, non-comparative, consecutive case series study. Glaucoma was classified on the basis of mean deviation (MD) of the preoperative automated perimetry into mild (MD>-6 dB), moderate (MD -6 to -12 dB), and severe (MD<-12 dB). The variables recorded during a minimum of 6 months of follow-up were: intraocular pressure (IOP) and the number of medications pre and post, adverse events, and success in patients with absence of additional glaucoma surgerys and IOP ≤18 mm Hg (complete success without medication, and relative with medication). Analysis of quantitative variables was performed with Student´s test for pair data. A p value ≤ 0.05 is considered statistically different.

Results
37 eyes from 26 subjects were analyzed (mean age 70.27±11.3 years). The mean number of pressure-lowering medications used by the patients fell from 1.65 ± 0.92 to 0.63 ± 1 (p< 0,0001). Mean IOP was reduced from 17.30 ± 4.43 mm Hg (pre) to 13.80 ± 3.41 mm Hg (p< 0,0001) at 6 months of follow up and to 15.42 ± 2.99 mm Hg (p=0.10) at 1 year. IOP from baseline was significantly reduced at 6 months and 1 year (p<0,001). Complete success at 6 months (37 eyes) was in 64.86% and relative success in 27.02%. Complete success at 1 year (26 eyes) was in 65.38% and relative success in 19.23%. No complications of surgery were observed.

Conclusions
Combined cataract surgery and iStent implantation seems to be an effective and safe procedure to treat coexistent open-angle glaucoma and cataract, as it significantly lowered the number of medications used and decreased IOP.

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P-870

PARTIAL THICKNESS GLYCEROL-PRESERVED CORNEAL TISSUE AS A PATCH GRAFT FOR PERSISTENT GLAUCOMA DRAINAGE TUBE EXPOSURE

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Purpose

Tube exposure remains a common complication after glaucoma drainage device (GDD) implantation. It poses a great challenge despite the different types of patch grafts available. Donor corneal tissue has been used as a patch graft in such cases. However, ideal graft thickness and long-term outcomes are still unclear. We present a case where a persistent tube exposure was covered by a glycerol-preserved, femtosecond-laser cut, partial thickness corneal graft.

Methods

A 65 year-old female patient with right eye advanced primary open-angle glaucoma, previously failed Ahmed valve implant (superotemporal quadrant), full thickness corneal transplant and recent Baerveldt tube implant (superonasal quadrant), developed simultaneous tube exposure of both GDDs. Given the simultaneous tube exposure and conjunctival insufficiency, a multilayered amniotic membrane translpant over the exposed areas and conjunctival closure was performed, along with aggressive ocular surface optimization. This achieved closure of the erosion over the superonasal Baerveldt tube, however the superotemporal exposed area persisted. A patch graft was then deemed necessary and therefore a glycerol-preserved corneal patch graft was performed.

Results

A donor cornea deemed unsuitable for corneal transplant, preserved in glycerol medium was used. An anterior lenticule of 8mm diameter and 300microns thickness was produced with a Ziemer Z6 femtosecond laser. The graft was sutured on the sclera of the posterior border of the exposed area with 10.0 nylon sutures, while the anterior part was cut free-hand in a “half-moon” shape to match the exposed part, while creating a smooth transition to the limbus. DIrect conjunctival closure with 9.0 Vicryl sutures and amniotic membrane transplant were performed. Post-operatively, anterior segment optical coherence tomograph (ASOCT- MS39, CSO) was used to detect and assess the thickness of the cornea graft over the tube. The graft remained stable with no further exposure, while the area appeared smooth and thin with overall improvement of the ocular surface state.

Conclusions

Partial thickness, glycerol-preserved corneal grafts are a viable option as a patch for GDD tube exposure. Optimal graft thickness is debatable. In our case a 300microns thickness femotsecond-laser cut lenticule, seemed to be sufficient to cover the exposed tube, thus avoiding thicker patches which could further compromise the ocular surface by increasing eyelid friction and tear film instability.

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P-871

BLEB REVISION WITH CONJUNCTIVAL AUTOGRAFT AFTER FIBROSIS POST-TRABECULECTOMY

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Purpose

To report one case of surgical bleb revision with conjunctival autograft after failed trabeculectomy, and to evaluate safety and effectiveness outcomes.

Methods

A 78-year-old Afro-Caribbean female patient with moderate primary open-angle glaucoma underwent surgical revision of a fibrotic bleb from a trabeculectomy performed six months ago. A marked cystic, avascular area with significant sweating was noted at the bleb site in a very posterior location. There were clear signs of encapsulation, as well as visible pass of topical fluorescein into the anterior chamber. Based on the unusual posterior location of the scarring response and the extensive area of avascularity, a bleb revision with conjunctival autograft was indicated. After dissecting the underlying fibrotic tissue, controlled aqueous outflow from the scleral flap was evident. A conjunctival autograft was obtained from the inferior conjunctiva of the same eye, in order to repair the remaining defect at the bleb site. A Vicryl 9-0 running suture was used to attach the graft, avoiding too much tension to preserve the anatomy of the bleb. The inferior harvest conjunctival defect was left open for secondary intention closure. No intraoperative complications were recorded.

Results

No complications were reported in the immediate postoperative course. At one month post-surgery, intraocular pressure remained well-controlled, the conjunctival graft was well-attached and the bleb showed a diffuse, mildly-raised profile, with no signs of leak. The inferior harvest conjunctiva was completely healed.

Conclusions

Bleb fibrosis is the most frequent long-term complication after trabeculectomy and can sometimes develop in unusual locations, making surgical revision and posterior conjunctival closure technically challenging. Bleb revision with conjunctival autograft may be a viable, safe and effective approach in cases of extensive scarring and avascularity after failed trabeculectomy.

P-872
ORIGINAL TECHNIQUE TO MANAGE AHMED VALVE TUBE EXPOSURE

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Purpose
To present an original technique of managing Ahmed Glaucoma Valve (AGV) tube exposure.

Methods
Case presentation of a 69 year-old male patient with neovascular glaucoma due to diabetic retinopathy who was submitted to AGV implant 10 years ago. Good intraocular pressure (IOP) control was achieved for the first 4 years after surgery and then the patient was lost to follow up for almost 6 years. When he was next reevaluated he presented with an IOP of 40mmHg that lowered to 25mmHg after eye massage. He was put on timolol+dorzolamide drops and eye massage was reccommended. On the next follow up visit he presented with an IOP of 24mmHg but had a large area of tube exposure due to friction. He was proposed for tube exposure repair surgery.

Results
After placing a clear corneal traction, the exposed tube was resutured to the sclera using 10.0 Nylon sutures. A conjunctival incision was made over the plate of the AGV. Extensive tenectomy with removal of the fibrous capsule overlying the plate was performed. The excised fibrous capsule was then used to cover the exposed tube. The conjunctiva was closed over the tube and fibrous capsule with single 10.0 Nylon stitches. At 4 months follow up the patient presents no signs of re-exposure and good IOP control (18mmHg).

Image


Conclusions
The use of the fibrous capsule overlying the AGV plate to cover an exposed tube is an original technique wich aims not only at covering the tube but also at better IOP control. The fibrous capsule is an easily accessible thick and resistant tissue that can minimize the risk of re-exposure. Moreover, this is an autologous graft which virtually has no risk of rejection.

P-873
OUTCOMES OF TRABECULECTOMY SURGERY IN SUDAN

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Purpose
To evaluate the outcomes of trabeculectomy surgery in glaucoma patients living in Sudan.

Methods
A retrospective chart review of patients that underwent trabeculectomy surgery performed between February and April 2022 at Makkah Eye Hospital (MEH), in Sudan. Patients were reviewed at Day one (D1), Week one (W1), One-month (M1) and 3 Months (M1). Data collected included patient' demographics, intra-ocular pressure (IOP), best corrected visual acuity (BCVA), number of medications at baseline and post operatively. Statistical analysis was conducted using SPSS with continuous variables presented as mean ± sd and categorical data as frequency (per cent).

Results
30 eyes of 27 patients, of which 16 (53%) males, with mean age of 53.8±12.40-year-old were included in the study. The commonest region of origin was Khartoum (n=18, 60%) followed by Om Durman and Port Sudan (n=3, 10% each). At baseline, mean IOP was 23.83± 9 mmHg, and BCVA was Count fingers (CF) or less in 7 % and 37% of operated and fellow eyes, respectively. Five patients (7%) underwent bleb needling in the operating room. The average postoperative IOP reduction was 53±16% and 43±21% at M1 and M3, respectively with 28 patients (93%) free of using glaucoma medications at 3 months. The most common complication was cataract (n= 7, 35%) followed by hypotony (n=2, 7%) that resolved spontaneously with conservative management. Visual field test was documented in only one patient (3.3%).

Conclusions
Trabeculectomy is an effective IOP lowering procedure despite the complexity and the severity of glaucoma in Sudan.

P-874

SPONTANEOUS SUPRACHOROIDAL HEMORRHAGE IN A PATIENT WITH MULTIPLE RISK FACTORS. MEDICAL MANAGEMENT AND SURGICAL APPROACH

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Purpose

We aim to expose a spontaneous suprachoroidal hemorrhage in a patient with disciform age-related macular degeneration (ARMD) who was undergoing low molecular weight heparin (LMWH) therapy due to recent knee fracture.

Suprachoroidal hemorrhage is a rare, and usually explosive, accumulation of blood within the suprachoroidal space typically as an intraocular surgery or trauma complication. Spontaneous cases are rare and associated with poor visual acuity (VA) prognosis. Risk factors include: old age, ARMD, arterial hypertension, anticoagulant therapy, chronic kidney disease.

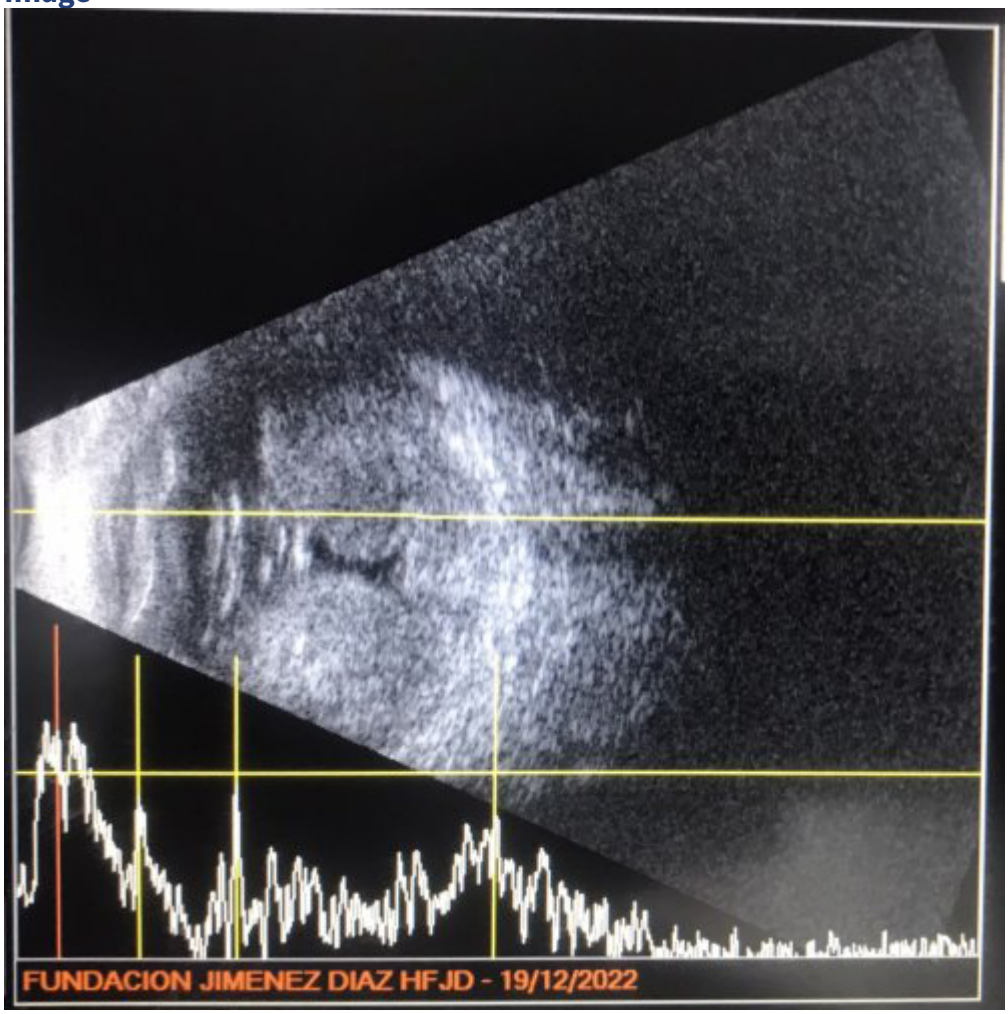
Methods

We present a 68-year-old woman with history of left disciform ARMD and right pseudophakia who referred decreased VA and severe left eye pain accompanied by nausea and vomiting for the last two hours. She had been prescribed LMWH therapy during the last two weeks due to knee fracture. Other systemic comorbidities included hypertension and 3B stage diabetic nephropathy.

Results

At this presentation, left eye VA was hand movement with non-reactive left mydriasis and intraocular pressure (IOP) up to 50 mmHg. Previous VA was counting fingers. Slit lamp revealed narrowed anterior chamber with forward displacement of the lens-iris diaphragm and corneal edema. Funduscopic and B ultrasonography revealed suprachoroidal hemorrhage that lead to hemorrhagic choroidal detachment and retinal kissing. Blood pressure was 115/77 mmHg. Laboratory coagulation parameters, which are not affected by LMWH, were normal. IOP levels and severe eye pain persisted despite maximum topical antiglaucomatous treatment and intravenous acetazolamide. Partial drainage was performed within 24 hours with pain resolution and reduction of IOP levels up to 9 mmHg.

Image



Conclusions

Spontaneous suprachoroidal hemorrhage is a rare condition with few cases reported and poor visual prognosis. It may present as acute angle-closure glaucoma inducing IOP elevation that cannot be relieved by patent peripheral iridotomy or medical treatment. Surgical drainage is indicated for lens-cornea touch, progressive IOP elevation and intolerable pain. Recurrent events are uncommon if surgery succeeds. Given its advantages, LMWH is increasingly used in clinical practice. Multiple risk factors in our patient combined with the recent introduction of LMWH therapy could have triggered the mentioned condition. This case highlights the importance of reducing risk factors, optimizing anticoagulant therapies and aggressively treating exudative ARMD in order to avoid this condition.

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P-875

FUNCTIONAL AND STRUCTURAL CHANGES AFTER ISTENT INJECT IMPLANTATION USING SPECTRAL DOMAIN OPTICAL COHERENCE TOMOGRAPHY

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Purpose

To analyze the long-term efficacy and changes in visual field mean deviation (MD) and circumpapillary retinal nerve fibre layer (cpRNFL) thickness after iStent inject implantation (Glaukos Corporation, Laguna Hills, CA) combined with phacoemulsification in patients with coexistent cataract and open-angle glaucoma.

Methods

A prospective, uncontrolled, nonrandomized, interventional case series study was conducted in patients with both mild or moderate open-angle glaucoma and cataract. Patients underwent cataract surgery along with the implant of two iStent

inject devices. Outcome measures were Intraocular pressure (IOP), amount of IOP-lowering medication, mean deviation (MD) using static Octopus and cpRNFL thickness were evaluated before during at least the first 24 months after surgery.

Results

26 patients were enrolled. Mean follow-up was 36.4 ± 10.46 months. Mean baseline IOP was 18.95 ± 3.71 mmHg with medication and mean end-follow-up IOP was 15.26 ± 1.98 mmHg. The mean number of medications was significantly reduced from 1.3 ± 0.66 to 0.75 ± 0.79 (P = 0.017). 28% of patients were medication-free by the end of follow-up. Mean deviation remain stable at the end of the follow up (5.81 ± 3.7 to 5.23 ± 2.8 dB; p= 0.541) meanwhile significant thinning on cpRNFL thickness was observed (85.90 ± 4.45 to 75.50 ± 6.50 microns; p= 0.001).

Conclusions

Conclusion. The iStent inject device combined with cataract surgery served to significantly reduce both IOP and medication use in the long term in patients with coexistent open-angle glaucoma and cataract, and to prevent functional glaucoma progression. However, changes on cpRNFL thickness are observable using OCT even with good IOP control.

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P-876

PRESEFLO MICROSHUNT REPLACEMENT SEVERAL MONTHS AFTER THE INITIAL SURGERY

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Purpose

After glaucoma filtering surgery with mitomycin-C, problems with the conjunctiva such as thinning or seidel are frequent. The Preserflo microshunt allows us to easily remove it from its initial insertion and reposition it in another location several months after the previous surgery, because it does not present fibrosis with adjacent tissues, unlike other implants such as Xen or Express.

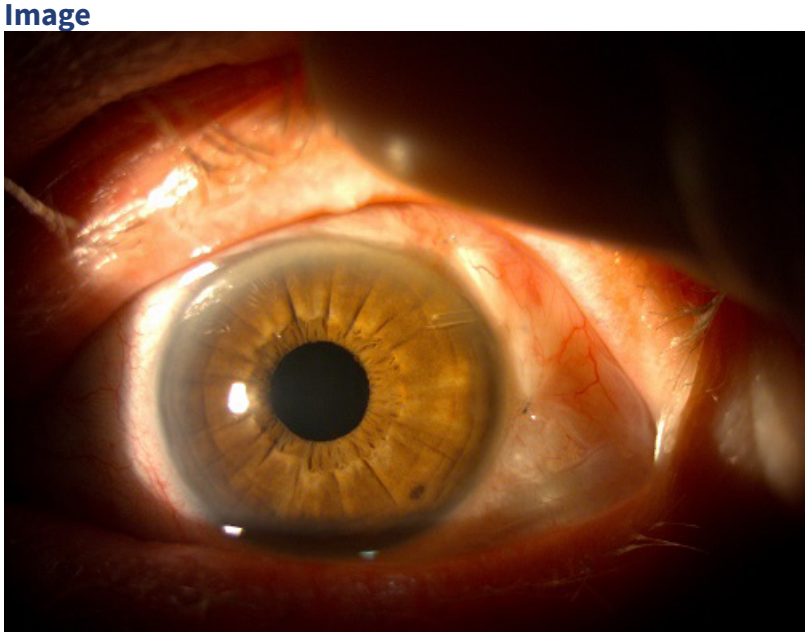
Methods

Two cases of easily extraction and reposition of the Preserflo microsunt several months after the initial surgery, with good functional results, are presented.

Results

After a 6-month follow-up, the reinterventions with the change of location of Preseflo Microsunt and limiting secondary application of mitomycinC, present excellent filtration blebs with good functional results.

Image



Conclusions

The Preserflo microshunt is an implant that does not generate fibrosis with the surrounding tissue. Therefore, can be easily removed and reimplanted in another area of the eye, if necessary. This is one of the advantages of this glaucoma surgery microshunt.

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P-877

12-MONTH OUTCOMES OF COMBINED PHACOEMULSIFICATION AND ISTENT INJECT W IMPLANTATION IN ASIAN EYES WITH NORMAL TENSION GLAUCOMA

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Purpose
To evaluate the efficacy and safety of combined phacoemulsification and iStent inject W implantation in Asian eyes with normal tension glaucoma (NTG), up to 12 months after surgery.

Methods
A retrospective study of consecutive eyes ("collective cohort") that underwent combined phacoemulsification and iStent inject W implantation at a single centre from August 2020 to December 2021. Data was obtained at post-operative day 1 (POD1), week 1 (POW1), month 1 (POM1), month 3 (POM3), month 6 (POM6), and month 12 (POM12). Analysis was performed on available clinical data at each time point. Outcome measures included reduction in intraocular pressure (IOP), number of glaucoma medications, and adverse events. Subgroup analysis was also performed for eyes with no missing data at all timepoints, up to POM12 ("consistent cohort").

Results
For the collective cohort, data from a total of 56 eyes from 51 subjects was collected. 36 (64.3%) eyes were from male subjects. Mean age of subjects was 73.8 ± 8.3 years. Pre-operatively, mean IOP was 13.7 ± 2.8 mmHg and mean number of medications was 1.2 ± 0.5. There was a significant decrease in IOP at POD1, POM3, POM6, POM12 but not at POW1 and POM1. For the consistent cohort, data from 19 eyes from 19 subjects was analyzed. 15 (78.9%) eyes were from male subjects. Mean age of subjects was 68.1 ± 9.3 years. Pre-operatively, mean IOP was 13.7 ± 2.9 mmHg and mean number of medications was 1.4 ± 0.7. At all timepoints, there was no statistically significant decrease in IOP, compared to baseline. However, in both cohorts, number of medications was significantly reduced at all timepoints compared to baseline. At POM12, the mean reduction of number of medications was 1.2 ± 0.7 (n=47; $p<0.001$) in the collective cohort and 1.2 ± 0.2 ($p<0.001$) in the consistent cohort. In the collective cohort, 2 of 56 (3.6%) eyes had gross hyphema at POD1 which resolved spontaneously; 2 of 55 (3.6%) eyes had partial stent occlusion and underwent laser iridoplasty. No sight-threatening intra- and post-operative complications were observed in any of the eyes throughout the follow-up period.

Conclusions
Combined phacoemulsification and iStent inject W implantation is a safe and efficacious procedure in Asian eyes with NTG, demonstrating a significant decrease in medication burden up to 12 months post-operatively.

P-879

THE CHALLENGES OF GLAUCOMA MANAGEMENT IN PETERS ANOMALY: A CASE REPORT

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Purpose

Peters anomaly is a rare entity characterized by central corneal opacity due to anterior segment dysgenesis. Approximately 50-70% of individuals with Peters anomaly have associated glaucoma, often unresponsive to medical treatment. Our purpose is to describe a clinical case of visual rehabilitation in an adult patient with Peter's anomaly type II and glaucoma.

Methods

Case report including past and current history, clinical findings, tests performed and surgical plan.

Results

A 61-year-old caucasian woman, previously independent in activities of daily living, with a history of Peter's anomaly type II, was referred to our Ophthalmology Department due to a recent decrease in visual acuity in her left eye and glaucoma. She presented with light perception on her right eye and counting fingers on her left eye. At biomicroscopy, the right eye showed complete corneal opacification and the left eye showed central corneal opacification, with iridocorneal synechiae, inferior iridotomy and nuclear cataract. Intra-ocular pressure was 22 mmHg in both eyes, under dorzolamide/timolol 2id, brimonidine 2id, latanaprost id and 250mg acetazolamide id. B-mode ophthalmic ultrasonography revealed no findings in the posterior segment. The patient was proposed to penetrating keratoplasty combined with cataract extraction of her left eye and later glaucoma drainage device (GDD) implantation.

Conclusions

High intraocular pressure in Peters anomaly may be related to trabeculodysgenesis and angle closure by iridocorneal adhesions. GDD appears to be the most effective procedure for controlling IOP in these cases. However, due to the particular anatomy of these eyes, tube implantation may require a prior corneal transplant and lensectomy. Placing the tube in the posterior segment also carries a risk of retinal detachment. It is impossible to establish a definite algorithm of treatment in these unique patients. A correct technique and timing may contribute to a good outcome.

P-881

EFFICACY OF XEN 45 DEVICE IN PROGRESSING GLAUCOMA IN DAILY CLINIC AND INTRAOPERATIVE OCT IMAGING UTILITY FOR TUBE IMPLANTATION

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Purpose
To evaluate the efficacy of XEN 45 device (Abbvie,North Chicago, Illinois, U.S.A) in progressing glaucoma and the benefits of intraoperative OCT.

Methods
We retrospectively reviewed 26 eyes of 25 patients who underwent Xen 45 device implantation between 2019 and 2022 at University Hospital Trias i Pujol, Barcelona. Surgery was assisted with intraoperative OCT in 8 patients. Intraocular pressure (IOP) reduction, postoperative complications, number of needlings and glaucoma medications required were registered up to 24 months after surgery. Localization of needle injector in trabecular meshwork, Xen gel implanted in subconjunctival or subtenon's space and visualization of implant in anterior chamber with OCT was registered.

Results
Mean IOP was reduced from 22.0±5.5 to 15,7±3.6 mmHg at the 12-month follow-up ($p<0,05$). Mean number of medications was reduced from 2.9±0,9 to 0,7±0,9 at the 12-month follow-up ($p<0,05$). Needling revision was performed in 7 patients (28%). In two patients we had to dissect conjunctiva during implantation due to extrusion. There were no cases of severe postoperative complications as hypotony, Xen extrusion or endophthalmitis. In two cases Xen was seen curved at 12 months follow up. In terms of intraoperative OCT analysis, in all cases we could visualize tip of the needle in trabecular meshwork and subtenon's space properly. All Xen gel were implanted subtenon's and in just 3 cases was possible to visualize it in the anterior chamber angle.

Conclusions
Xen Gel implant seems to be a safe and effective technique for uncontrolled glaucoma. The use of intraoperative OCT might help to improve implantation technique, visualizing area of injection, implant localization in the subconjunctival or intracameral space.

P-882

ADDITIONAL AHMED GLAUCOMA VALVE IMPLANTATION USING THE UPSIDE-DOWN TECHNIQUE ACHIEVED ADEQUATE IOP CONTROL IN A PATIENT WITH NEOVASCULAR GLAUCOMA

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Purpose

We previously described Ahmed glaucoma valve (AGV) implantation using upside-down technique is relatively effective alternative surgery in patients with the refractory glaucoma such as neovascular glaucoma (NVG) (Masuda et al., J Glaucoma 2021). Magnetic resonance imaging of the orbit using this technique is characterized by the identification of a large double bleb layer. This is presumably the result of avoidance of treatment-resistant encapsulated cysts, which tend to occur in NVG. We report a case of NVG with poor IOP control after a pediatric FP8 operation using the upside-down technique, in which an effective outcome was achieved with the addition of FP7 upside-down surgery.

Methods

An 81-year-old man was referred to our hospital complaining of left visual impairment and ocular pain after a cataract surgery. IOP in the left eye was 27mmHg with 5 glaucoma medication scores. Clinical examination revealed rubeosis iridis and proliferative diabetic retinopathy and the diagnosis was NVG. The patient underwent vitrectomy, panretinal photocoagulation, and pediatric FP8 AGV upside-down implantation in his left eye. Although the patients IOP was lowered to 18mmHg without any medications after the surgery, the IOP elevated to 34mmHg with 7 glaucoma medication scores in three months. The patient underwent an additional FP7 AGV upside-down implantation.

Results

IOP was lowered to 17 mmHg and glaucoma medication scores decreased to 4 in 8months after the second surgery. Additional implantation of a FP7 AGV using upside-down technique in patients with NVG resulted in adequate IOP control.

Conclusions

NVG is tend to higher frequency of encapsular formation and decreased breb volume in tube shunt surgery. Our case suggests that AGV with a larger plate may be recommended for the AGV upside-down technique for NVG.

P-883

SURGICAL OUTCOME AFTER LASER PERIPHERAL IRIDOTOMY AND CATARACT SURGERY IN ACUTE PRIMARY ANGLE CLOSURE PATIENTS

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Purpose

To report the outcome of intraocular pressure, visual acuity and antiglaucoma eyedrop requirement after laser peripheral iridotomy and cataract surgery in acute primary angle closure (APAC)

Methods

Retrospective study of 48 eyes of 45 patients with acute primary angle closure presenting to Hospital Selayang, Selangor Malaysia from 2018 to 2020

Results

Majority were Chinese (n=31, 64.6%) followed by Malay (n=12, 25%). There were 32 (66.7%) females and the mean age was 61 years old (range: 39 to 78 years old).

Mean intraocular pressure (IOP) at presentation was 50.4mmHg. Majority (n=38, 79%) were given immediate oral azetazolamide and average of 3 types of antiglaucoma medications. Thirty-nine (81.3%) subjects underwent peripheral iridotomy (PI). Mean IOP reduced significantly to 26mmHg and 17mmHg 1 hour and 4 weeks post-PI respectively ($p<0.0001$). The mean antiglaucoma medication requirement reduced to 1.2 after 4 weeks post-PI.

Thirty-nine (81.3%) patients underwent cataract surgery. Nine (23.1%) encountered intraoperative complication. Mean IOP was 15.4mmHg, 14.7 and 14.5mmHg at Week 1, 4 and 12 postoperatively. These were significant reductions in IOP compared to initial IOP ($p<0.001$). Mean logMAR visual acuity (VA) was 1.74 preoperatively, improving to 0.87, 0.84 and 0.65 at week 1, 4 and 12 postoperatively. On average, patients required 1.3 types of antiglaucoma eyedrops 3 months after cataract surgery. Two (4.2%) needed glaucoma filtration surgery and one (2.1%) had transscleral cyclophotocoagulation.

Conclusions

Significant reduction in IOP was seen in APAC patients after laser PI and cataract surgery. Improvement was also seen in logMAR visual acuity and antiglaucoma eyedrop requirement after cataract surgery.

P-884
LATE ENDOPHTHALMITIS IN PATIENTS WITH 20-YEAR-OLD TRABECULECTOMIES: A CASE SERIES

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Purpose
Evaluate the characteristics of patients with trabeculectomy-associated edophthalmitis 15 years after trabeculectomy surgery. With the results, compare the similarities between cases, diagnostic approach of the suspicion of endophthalmitis, as well as the management given to each of the cases.

Methods
Retrospective, longitudinal, observational, descriptive case series including the clinical records of patients with a diagnosis of late endophthalmitis. Characteristics including age, gender, type of glaucoma, baseline visual acuity (VA), previous surgeries, date of trabeculectomy (TBC),ophthalmological characteristics and past medical history were collected. Transurgical data like peritomy site, and Mitomycin C use characteristics were also reviewed. Endophthalmitis features: signs, symptoms VA, date, and years after surgery were collected at onset. Delay on treatment, resolution time, and final VA were considered. Information about: microorganism, and antibiotic treatment were recorded. The statistical analysis and results will be published as percentages with confidence intervals.

Results
Three cases of late onset endophthalmitis were indentifed. Most of them were male (n= 2, 66.6%) and had a mean age of 51.3 ± 7.3 years (range 43 -57 years). 66.6% of the patients had childhood glaucoma (ChG) and 33.3% had steroid-induced glaucoma. All of the eyes were left eye, were myopic m phasic and had MMC use. 66.6% had a fornix based trabeculectomy. Age at trabeculectomy surgery was 14.6 ± 11.2 years (range 5 - 27 years). Endophthalmitis visual acuity (VA) presentation was worse than hand movement 66.6% of the patients; mean IOP at onset was 25 ± 7.54 (range 18-33); all of the patients reported pain and low VA. Treatment delay after endophthalmitis onset was 7.3 ± 11.8 (range 0-21) days. In the endophthlamitis management 66.6% of the cases required surgery, and 33.3% solved with medical treatment. Resolution time was at 18.6 ± 3.51 (range 15-22) days. Final VA was better than 20/60 in 66.6%. The microorganisms reported were uncommon agents, and sensitive to conventional antibiotics. Each of the cases are described in detail.

Image

Case 1	Male	OS	Steroid induced glaucoma	-11.50-1945	27	33	Limbal	Yes	30/100	Surgical	Enterococcus faecium	33	20/60
Case 2	Female	OS	Congenital glaucoma	-	12	11	Fornix	Yes	LP	Medical	Staphylococcus warneri	15	HM
Case 3	Male	OS	Juvenile glaucoma	-4.50-5.0165	5	10	Fornix	Yes	HM	Surgical	Granulicatella adiacens	18	20/60

Abbreviations: HM: Hand movement, LP: light perception, MMC: Mitomycin C, OS: left eye, VA: Visual acuity

Conclusions

Clinical evaluation is crucial in the follow-up period of TBC, and it is important to highlight that it should be for the rest of the patient's life; emphasizing in the bleb localization, morphology, trasudation and thickness, and the antimetabolites. The risk factors should be individualized in each patient.

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P-885

SMALL EYE, BIG CHALLENGE: GLAUCOMA MANAGEMENT IN A PATIENT WITH NANOPHTHALMOS

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Purpose

To report the management of mixed pseudoexfoliative and narrow angle glaucoma in a patient with Nanophthalmos.

Methods

A 66-year-old female patient was referred to the glaucoma clinic for persistently elevated left eye IOP. Ophthalmic history was relevant for facoemulsification surgery 10 years prior, with placement of a +52.00D IOL OD and a +54.00D IOL OS. Best corrected visual acuity (BCVA) was 20/100 OS and IOP was 27mmHg OS under topical hypotensive treatment. On examination she was found to have pseudoexfoliation, small discs with a 0,1 C/D ratio, narrow AC angle with a steep peripheral iris, an axial length of ≈ 15.5mm, foveal hypoplasia and retinoschisis promting a diagnosis of Nanophthalmos with mixed pseudoexfoliative and narrow angle glaucoma. The patient maintained regular follow-up over the course of 3 years, with consistently elevated left eye IOP (25 - 35mmHg) and progressive visual field loss, despite treatment with maximum topical medical therapy, oral acetazolamide and repeat SLT. Surgery for combined pars plana vitrectomy (PPV) with placement of pars plana FP8 Ahmed glaucoma valve OS was planned.

Results

Surgery was complicated by intraoperative choroidal detachment which was later managed with suprachoroidal hemorrhage drainage surgery and creation of scleral windows for improved uveoscleral outflow. Post-operatively the patient presented with involutional entropion and an inferior corneal epithelial defect which were succesfully managed with lower lid botulinum toxin injection. Surgery was succesfull in lowering IOP (12 - 15mmHg) and BCVA OS was 20/200. Nonetheless, 6 months post-op, she refered binocular vertical diplopia. On examination left eye abduction limitation could be seen and an orbital MRI showed a tenon cyst above the Ahmed valve deviating the muscular band between the superior and lateral rectus muscles.

Conclusions

As noted in the present case report, glaucoma management in Nanophthalmos patients poses a continuous medical and surgical therapeutic challenge with the potential for serious and unexpected complications.

P-886

ATYPICAL CASE OF SECONDARY GLAUCOMA DUE TO CONGENITAL PUPILLARY SECLUSION. CASE REPORT

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Purpose
To report an atypical case of iris malformation and complete occlusion of the visual axis.

Methods
Case Report

An 18 - month -old female child was referred to us by the pediatrician because one pupil did not dilate.

Results
The binocular visual acuity was fix-and-follow. The Hirscberg test and ocular movements were normal. On slit-lamp examination, a point-sized miosis was detected on her left eye (LE). She presented pupillary seclusion and iris bombé. The fundoscopy of the LE was not visible and the fundoscopy of the right eye (RE) showed no abnormalities, the cup-disk ratio was 0.2.

The Anterior Segment Optical Coherence Tomography confirmed the presence of 360° synechiae and the iris configuration previously described. It showed a hyperechogenic material in the center of the lens attached to the iris which corresponded to the anterior capsule. Moreover, the ocular ultrasound was normal.

Therefore an exam under anesthesia with probable debridation and phacoemulsification on the same surgical time was indicated.

The following data was collected from this examination:

Axial length : RE: 20mm LE: 24 mm

Pachymetry : RE: 507 µm LE: 580 µm

Intraocular Pressure (IOP) : 10/18 mmHg

Corneal diameters:

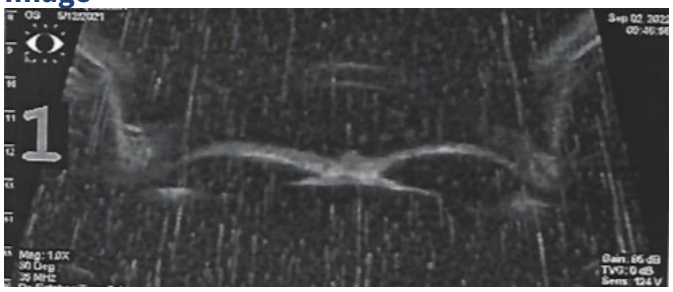
RE: Vertical: 12 mm Horizontal: 13 mm

LE: Vertical: 12mm Horizontal: 13 mm

During the surgery, when the sinechia was released, a congenital cataract was visible. The phacoemulsification was carried out without placement of IOL.

Ten days after the procedure, a new exam under anesthesia was carried out. LE´s IOP reduced up to 5 mmHg. The fundoscopy was normal, it showed a 0.2 cup-disk ratio.

Image



Conclusions

Our patient's vision was threatened first by the increase of IOP due to the pupillary seclusion with the resulting optic nerve damage. And secondly, by a possible deprivation amblyopia due to the congenital cataract discovered after the liberation of the synechiae.

Therefore, it must be highlighted the importance of early detection, patient referral and treatment of these types of cases.

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P-887

SEQUENTIAL TRABECULECTOMY AND CATARACT SURGERY IN FUNCTIONAL MONOPHTHALMOS PATIENTS

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Purpose

Present the outcomes after sequential filtering glaucoma procedure (trabeculectomy) and cataract surgery in patients with advanced primary open angle glaucoma (POAG) and functional monophtalmos.

Methods

A series of patients with advanced POAG in the single functional eye were referred to our department for urgent care. Demographics in our 8 eyes from 8 patients revealed a mean age=53+/-1 years, 7/8 males (87%). Mean pre-op vision was 0.78 logMAR and mean pre-op IOP was 31+/-7 mmHg (range= 22-53mmHg) under maximally tolerated medication (topical and systemic). In all patients the gonioscopy revealed widely open anterior chamber angle with no element of angle narrowing related to the lens anterior vaulting. Fundus examination revealed advanced, total excavation in all eyes (C/D ratio=1). As standard of practice in such phakic glaucoma patients we perform augmented trabeculectomy (MMC, 0.03%). If cataract became significant after the filtering surgery, after minimum 6 months from the trabeculectomy we performed cataract extraction and PC-IOL insertion in all eyes with visually significant lens opacities.

Results

IOP control after the trabeculectomy was very good, with a mean of 11.06 +/-3 mmHg in the immediate post-op interval and 11.4+/- 2 mmHg before the cataract surgery was needed and performed. Mean interval between trabeculectomy and cataract surgery was 7 months. No patient developed serious complications after trabeculectomy, despite the advanced disease. Surgical technique has been slightly modified to avoid sudden decompression of the eye/ wipe out (a quantity of OVD was left in the AC) and adjustable sutures were placed in all cases. The complications after cataract surgery were unremarkable, except one eye that developed CMO due to the topical PGA that had been kept in the post-op interval after cataract removal. Topical SSAID medication (nepafenac) resolved the CMO,OCT guidance.

Conclusions

Sequential filtering surgery (trabeculectomy) followed by cataract extraction and IOL insertion can be a challenge for the surgeon, both as technique and post-op management; a certain interval, is needed to avoid supplementary inflammation that might compromise a good filtering bleb while cataract surgery is considered/ performed; surgeon needs to anticipate potential serious threats for the vision and manage them appropriately if met in the view of a functional monophtalmic patient; also the realistic expectancies in this category of patients needs to be set.

P-888

ANTERIOR SEGMENT OCT IMAGING AFTER TRABECULECTOMY AND PRESERFLO MICROSHUNT: A MULTICENTRE, PROSPECTIVE, MASKED, QUANTITATIVE INTEROBSERVER STUDY

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Purpose

Scarring is the leading cause of glaucoma surgery failure. Clinicians suspect bleb scarring with a postoperative rise in intraocular pressure. Current bleb grading systems show indirect signs of scarring but omit internal bleb evaluation. Our hypothesis is that bleb measurements by anterior segment OCT (AS-OCT) can help predict the risk of developing scarring.

Methods

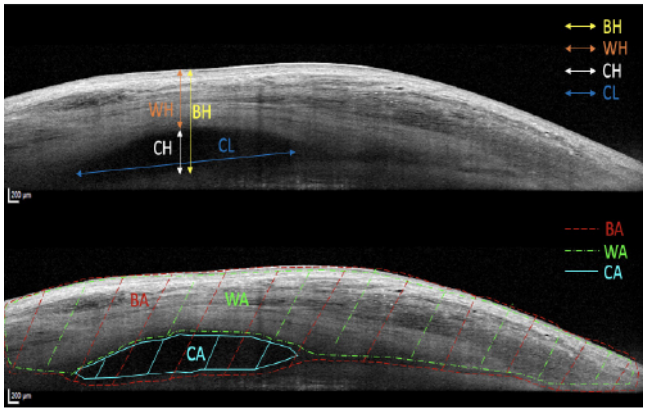
200 blebs (120 trabeculectomies, 80 PreserFlo, MMC 0.4 mg/ml) from 200 patients with primary open angle glaucoma were analysed by AS-OCT (Spectralis®, Heidelberg) at 4.0±0.1 months post-surgery in 7 tertiary hospitals in the UK following a standardised protocol: sclera mode, ART 9 frames, 20x10°, 278 µm each, obtaining 21 scans starting at the limbus. One scan per eye with the highest bleb height was measured by two analysts masked from the clinical data, obtaining 7 measurements: maximum bleb height (BH), maximum wall height (WH), maximum cavity height (CH), maximum cavity length (CL), total bleb area (BA), total wall area (WA), and total cavity area (CA) (Figure 1). A Cox proportional hazards model tested the effect of these measurements on the risk of bleb scarring during the first year, adjusting for ethnicity, gender and type of surgery.

Results

39.5% of eyes developed bleb scarring during follow-up. A bleb with a CL<600 µm was associated with 2.9 times the risk of developing scarring during the first 12 months post-surgery (HR=2.92, 95%CI=0.20-0.56, p<0.0001) compared with CL≥600 µm, after adjusting for covariates. CA<60x10^4 µm^2 (HR=2.6, 95%CI=1.68-4.27, p=0.0001) and BA<80x10^5 µm^2 (HR=2.17, 95%CI=1.37-3.46, p=0.0007) were associated with 2 times the risk of scarring when compared with their counterparts. When CA was <20% of the BA, the risk of scarring doubled in contrast to CA≥20% of BA (HR=2.16, 95%CI=0.26-0.80, p=0.027). Height measurements (BH, WH, CH) and WA were not associated with the occurrence of bleb scarring. Among covariates, only African ethnicity was associated with a higher risk of scarring (HR=2.4, 95%CI=0.45-1.37, p=0.001).

Image

Figure 1



Conclusions

Bleb assessment by AS-OCT is a non-invasive and rapid clinical exam that can predict the risk of scarring during the first year post-surgery. It should be included in routine bleb assessment to evaluate its inner structure and to inform patients on the risk of scarring and subsequent need for interventions.

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P-889

GONIOSCOPICALLY ASSISTED TRANSLUMINAL TRABECULOTOMY- A YEAR 2 ANALYSIS AND OUTCOMES

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Purpose

GATT is a minimally invasive, ab interno approach to creating a circumferential 360° trabeculotomy using an illuminated microcatheter. It lowers IOP by cleaving the trabecular meshwork, thereby improving aqueous outflow through the conventional pathway. It can be used as a stand-alone procedure or as an adjunct to cataract surgery. This is a retrospective analysis of 24- month outcomes in patients undergoing GATT surgery at The Birmingham And Midlands Eye Centre.

Methods

100 eyes with Primary Open Angle Glaucoma, Juvenile Glaucoma and Secondary Glaucomas were included with 24 month follow up. IOP was measured preoperatively and postoperatively on day 1, month 1,3,6, 9 ,12,18 and 24. Mean medication usage and IOP reduction were calculated.

Results

There were 60 male and 40 females of which 57 were Caucasian, 30 South East Asian and 13 African-Caribbean. Mean age of patients was 58 years (range 20-93). Mean pre-operative IOP was 31mmHg (SD+/- 10mmHg) with a post GATT IOP (mmHg) of 18 mmHg (day 1), 17.7mmHg (month 1), 16.5mmHg (month 3) ,16.2mmHg (month 6) and 14.2 (month 9) ,16.8mmHg (month 12), 16.5mmHg (18 months) and 16.6mmHg (24 months) (N=100). Percentage IOP reduction at 12 months was 40 %. Mean number of drops preoperatively was 3 (SD+/- 0.8) with a mean number of drops reduced to 1 at 12 months and 2 at 24 months follow up (N= 100 patients). 18 patients had a post procedural hyphaema which resolved spontaneously by week 4.

Conclusions

GATT is highly effective at lowering IOP certainly in the short to medium term with greatest IOP reduction by 18 months. Patient with secondary glaucomas and juvenile glaucoma do particularly well with some patients being able to cease all medical therapy. We therefore recommend this as an effective interim method for acute IOP lowering in cases where medical therapy is ineffective.

P-890

CHARACTERISTICS OF BLEBS THAT PREDICT INTRAOCULAR PRESSURE CHANGE AFTER CATARACT SURGERY IDENTIFIED VIA ANTERIOR SEGMENT OPTICAL COHERENCE TOMOGRAPHY

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Purpose

To identify the cross-sectional morphological features of filtering blebs that predict the intraocular pressure (IOP) change after phacoemulsification using swept-source three-dimensional anterior segment optical coherence tomography (3D AS-OCT).

Methods

Sixty-eight eyes with functioning filtering blebs of 65 Japanese patients who underwent phacoemulsification after primary trabeculectomy at Okayama Saiseikai General Hospital. Filtering blebs were examined using swept-source 3D AS-OCT and evaluated for quantitative parameters, including maximum bleb height, maximum bleb wall thickness, and the ratio of the hyporeflective space volume to the total bleb wall volume. Associations between the 3D AS-OCT bleb parameters before phacoemulsification and the IOP change after phacoemulsification were assessed with Spearman's rank correlation coefficient (r_s).

Results

The mean age was 66.7 ± 10.5 years. The mean interval between primary trabeculectomy and phacoemulsification was 570.9 ± 293.7 days. The mean IOP of 8.7 ± 3.3 mmHg before phacoemulsification increased significantly to 10.1 ± 3.3 mm Hg (P = 0.0001) at 1 year after phacoemulsification, while the mean number of glaucoma medications increased significantly from 0.18 ± 0.65 to 0.54 ± 1.03 (P = 0.005). The eyes showed a significant decrease in maximum bleb height (P < 0.001), maximum bleb wall thickness (P < 0.001), and the ratio of the hyporeflective space volume to the total bleb wall volume (P < 0.001) between pre-phacoemulsification and 1year post-phacoemulsification. The IOP change after phacoemulsification showed a significant positive correlation with maximum bleb height (r_s = 0.282; P = 0.020).

Conclusions

3D AS-OCT bleb parameter before phacoemulsification, namely maximum bleb height, may predict IOP change after phacoemulsification in eyes with functioning filtering blebs. Phacoemulsification is likely to have a greater negative impact on eyes with tall filtering blebs, which may lead to further IOP increase after phacoemulsification.

P-892

TRABECULECTOMY BLEB NEEDLING REVISION - OUTCOMES AND PREDICTIVE FACTORS FOR SUCCESS

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Purpose

Investigate outcomes of trabeculectomy bleb needling revision (BNR) looking for any predictive factors which might inform future practice.

Methods

Retrospective notes review of all BNR performed at an NHS ophthalmology department.

Inclusion criteria: BNR performed September 2015 to December 2019, availability of pre-operative data and at least 1 year follow up.

Success criteria: IOP ≤ 21mmHg, IOP reduction ≥ 20% from baseline, and no additional medications or procedures (besides further BNR).

Binary logistic analysis between final follow-up outcomes and the following factors performed: age, trabeculectomy to BNR time, pre-operative IOP, number of pre-operative IOP lowering agents, number of previous BNR, and week 1 post-operative IOP. Fisher's exact test analysed final follow-up outcomes with the following factors: ethnicity, pre-operative bleb morphology, type of BNR performed (type I – III), and timing of cataract extraction (before or after trabeculectomy).

Results

73 procedures were investigated (64 patients, 65 eyes). Average follow up was 4.4 (±1.4) years. Mean age was 67.6 (±13.8) years, with 38 females included; mean baseline IOP was 20.2 (±5.4) mmHg, with mean 0.7 (±1.1) pre-operative IOP-lowering medications.

42% patients achieved IOP ≤10mmHg at week 1 post-operative review, with mean IOP 13.2 (±8.4) mmHg. At 1 year follow up, 44.8% met the success criteria (total 69.9% including qualified successes). At 3 year follow up, 33.9% met the success criteria (total 56.6% including qualified successes).

Binary logistic analysis did not show any statistically significant relationships between final follow-up outcome and any factors analysed; week 1 post-operative IOP did not reach statistical significance (p=0.06) with final outcome, but was found to have a significant relationship with 1 year outcome (p=0.04).

Fisher's exact test analysis showed the timing of cataract extraction to be significantly related to final outcome (p=0.02); no statistically significant relationships were found between final outcome and the remaining factors analysed.

Conclusions

BNR improves IOP control with good 3-year success rate, independent of time passed since trabeculectomy, and any previous BNR. Week 1 post-operative IOP is predictive for 1 year outcome. BNR in patients who were pseudophakic before trabeculectomy have a greater chance of success.

P-893

CANALOPLASTY AND TRABECULOTOMY IN EYES WITH OPEN-ANGLE GLAUCOMA (OAG): TWO YEAR OUTCOMES FROM THE ROMEO STUDY

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Purpose
The ROMEO study provided the first multicenter data for circumferential canaloplasty + trabeculotomy (CP+TR) using the OMNI Surgical System (Sight Sciences, Menlo Park, CA, USA) and was the basis for the US FDA cleared indication for IOP reduction in primary OAG but was limited to 12 months. The present study provides extended safety and effectiveness follow-up for eyes treated with CP+TR who were included in the 12-month ROMEO study and were followed up to 3.5 years (mean 2.1 years).

Methods
Retrospective, multicenter, stratified, observational, IRB approved. Eligible eyes had mild-moderate glaucoma and were treated with CP+TR with cataract surgery or as a standalone intervention. Seven of 11 original ROMEO study sites participated in this study These centers were responsible for 86% of the original enrollment (111 of 129).

Results
8 surgeons at 7 centers contributed 72 patients (65% of the original 111 ROMEO patients from these sites) stratified by preoperative intraocular pressure (IOP); >18 mmHg (Grp1), ≤18 mmHg (Grp2). Mean follow-up of 2.1 years (min 1.4, max 3.5). Mean IOP at last follow up (SD) was 15.2 (3.2) mmHg (-6.7 mmHg, -31% from baseline) on 1.5 (1.2) medications (-0.6, -29%) for Grp1; 13.6 (3.9) mmHg (-1.1 mmHg, -7.5%) on 1.2 (1.2) medications (-0.8, -40%) for Grp2. There were no significant differences between the overall ROMEO patients (n= 129) and the long-term follow-up cohort (n=72) at any time point between baseline and Month 12 for IOP or medications. Mean IOP and medication usage at last follow-up was similar to 12 months for all subgroups. No device related adverse events occurred during extended follow-up; 6 eyes (8.3%) required additional surgical or laser intervention for IOP control.

Conclusions
The present study demonstrates continued durable and stable control of IOP, medication usage significantly lower than pre-surgical baseline, with no emergent safety concerns for 2 years or more.

P-894

CORNEAL ENDOTHELIAL SAFETY PROFILE OF THREE DIFFERENT MINIMALLY INVASIVE GLAUCOMA SURGERY STENTS

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Purpose
To compare the effect of cataract surgery (CS) and iStent inject, Hydrus micro-stent, or CyPass micro-stent on corneal endothelial cell density (ECD) and endothelial cell loss (ECL) vs CS alone.

Methods
Mean ECD and percent of eyes with clinically significant endothelial cell loss (ECL) >30% versus CS controls were extracted from pivotal trial publications and a pivotal trial extension study for these three micro-invasive glaucoma surgery (MIGS) devices. The same specular microscopy reading center (Cornea Image Analysis Reading Center, CIARC, University Hospitals Eye Institute, Cleveland, OH) was used for all three devices.

Results
Baseline mean ECD was similar in all groups. Mean 5-year change in ECD was -14.3% (iStent), -18.6% (Hydrus), and -20.4% (CyPass), vs. -14.8%, -12.7% and -10.1% in respective CS controls. At 5 years, the proportion of eyes with clinically significant ECL (>30%) was 9.4% (iStent), 20.8% (Hydrus), and 27.2% (CyPass), compared to 6.3%, 10.6%, and 10.0% in respective CS controls. Relative to control, this was 1.49X for iStent, 1.96X for Hydrus, and 2.72X for Cypass. This loss was primarily around the time of surgery for Hydrus, and it was progressive beyond 3 years for CyPass.

Conclusions
Amongst the 3 MIGS devices studied in pivotal trials, iStent inject demonstrated the most favorable endothelial safety profile with no statistical difference compared to cataract surgery alone at all time points up to 5 years postoperatively. Both CyPass and Hydrus showed significant differences in ECL and proportion >30% from baseline compared to cataract surgery alone. CyPass showed progressive ECL beyond 3 years implying a device-related mechanism of loss. Hydrus had initial ECL likely from intraoperative surgical trauma during implantation but showed an ECL rate comparable to the control cataract surgery group (aging loss) beyond 3 months implying device tolerability.

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P-895

THE EFFECT OF BLUE-LIGHT FILTERING INTRAOCULAR LENSES ON THE DEVELOPMENT AND PROGRESSION OF GLAUCOMA

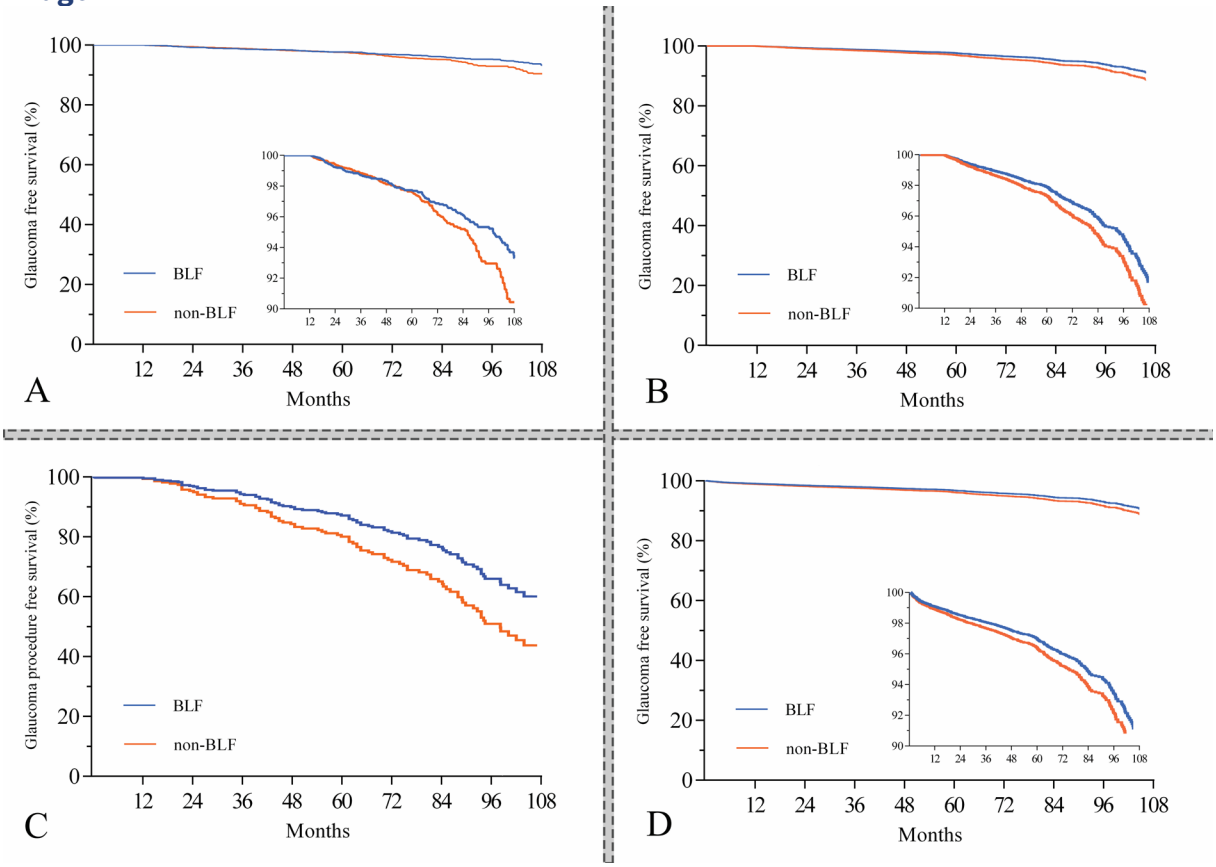
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Purpose
To assess the effect of blue-light filtering (BLF) intraocular lenses (IOL) on the development and progression of glaucoma following cataract surgery.

Methods
A retrospective cohort study of patients who underwent uneventful cataract surgery between 2007 and 2018 at Kymenlaakso Central Hospital, Finland. Survival analyses for the overall risk of developing glaucoma or undergoing glaucoma procedures were assessed between subjects who received a BLF IOL (SN60WF) and a non-BLF IOL (ZA9003 and ZCB00). A separate analysis was performed on patients with pre-existing glaucoma.

Results
Included were 11,028 eyes of 11,028 patients with a mean age of 74.9±8.9 years (62.4% female). The BLF IOL was used in 5,188 eyes (47.0%) and the non-BLF IOL in 5,840 eyes (53.0%). During the follow-up (mean: 54.6±33.6 months), 316 cases of glaucoma were diagnosed. Glaucoma free survival rates showed an advantage to the BLF IOL (p=0.036). In a Cox regression analysis controlling for age and gender the use of a BLF IOL was again associated with a lower ratio of glaucoma development (HR:0.778; 95%CI: 0.621–0.975). Furthermore, glaucoma procedure free survival analysis, revealed an advantage to the BLF IOL (HR:0.616; 95%CI: 0.406–0.935). Among 662 cases which already had glaucoma at the time of surgery, no significant differences were seen in any outcome.

Image



Conclusions

Among a large cohort of patients who underwent cataract surgery, the use of BLF-IOLs was associated with favorable glaucoma outcomes compared to the use of non-BLF IOLs. Among patients with pre-existing glaucoma, no significant advantage was seen.

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P-896

FREQUENCY AND TYPE OF POSTOPERATIVE INTERVENTIONS FOLLOWING PRIMARY TRABECULECTOMY IN THE TREATMENT OF ADVANCED GLAUCOMA STUDY (TAGS)

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Purpose

To report frequency and types of postoperative interventions undertaken in patients having a primary trabeculectomy in the Treatment of Advanced Glaucoma Study (TAGS) and assessing their success in terms of intraocular pressure (IOP) and need for drops outcomes.

Methods

The types of post-operative intervention, frequency and timings are described. Paired t-tests were used to assess the differences in IOP outcomes at 24 months between those who had and did not have interventions

Results

There were 208 primary trabeculectomies undertaken in 27 centres, Post-operatively, 116 patients received at least one of the following interventions: massage (n=72), needling (n=32), 5-FU injection (n=22), steroid injection (n=19), adjustment suture manipulation (n=5), suture lysis (n=43) and releasable suture manipulation (n=65). The median times between surgery and first intervention were 11.4, 49.5, 28.5, 24, 22, 43 and 22 days, respectively. No significant difference in the IOPs between those receiving and not receiving any intervention was observed at 24 months. Drops requirements were greater in patients who had received a post-operative intervention (34%), compared to those who had not (21%). Patients requiring drops had a significantly higher mean IOP than those not (p=0.0001).

Conclusions

TAGS was representative of standard care trabeculectomy practice in the UK. The most common post-operative interventions in TAGS were massage and suture manipulation. Patients requiring postoperative intervention required more IOP lowering drops at 24 months

P-897

COMPARISON OF PHACOEMULSIFICATION COMBINED WITH HYDRUS TRABECULAR MESHWORK BYPASS MICROSTENT ALONE OR IN COMBINATION WITH CANALOPLASTY

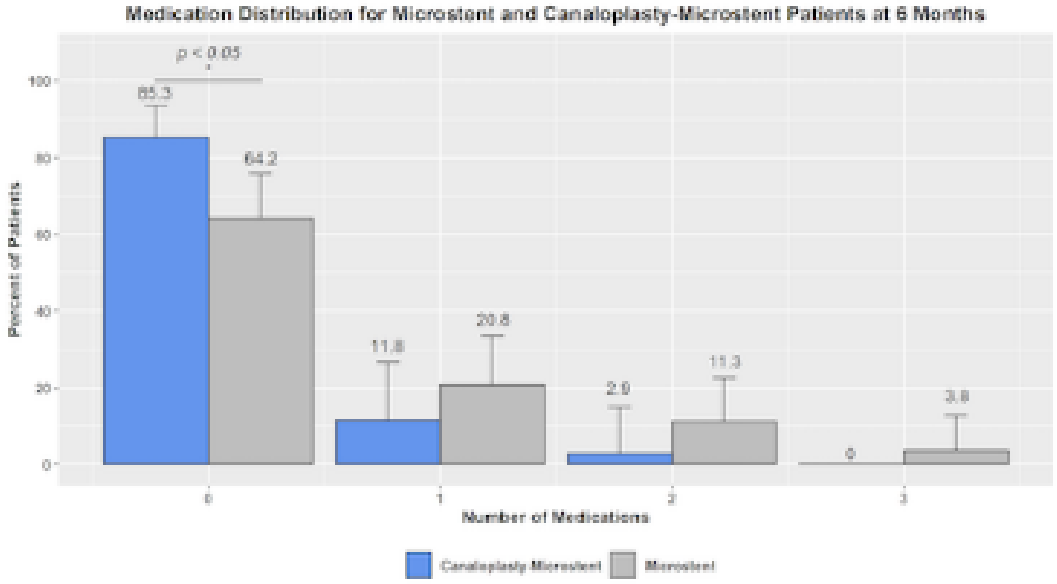
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Purpose
To compare the outcomes of phacoemulsification combined with Hydrus Microstent (Alcon, Inc) implantation alone or in combination with canaloplasty (OMNI Surgical System, Sight Sciences, Inc) in primary open-angle glaucoma (POAG).

Methods
Retrospective cohort study of patients with mild-to-moderate POAG who underwent phacoemulsification with Hydrus implantation alone (microstent alone, 42 eyes of 42 patients) or in combination with ab-interno canaloplasty using OMNI (canaloplasty-microstent, 32 eyes of 32 patients) from 2020 to 2022 at the Wilmer Eye Institute. Mean number of ocular hypotensive medications and intraocular pressure (IOP) were assessed preoperatively and postoperatively at 1 week; 1, 3, and 6 months. Complications and secondary surgical interventions (SSIs) were also recorded. Surgical success was defined as reaching target IOP without additional medications or SSIs. Surgical success was assessed using Kaplan-Meir event-free survival analysis and compared across groups using log-rank testing.

Results
There were no significant differences between groups for baseline demographics and ocular characteristics, excluding sex and ocular laterality ($P < 0.05$). For the microstent alone and canaloplasty-microstent groups, 90.5% and 81.3% were on ocular hypotensive glaucoma medications preoperatively. Mean IOP at 6 months was 14.1 ± 3.5 mmHg (13% reduction) after microstent alone and 13.6 ± 3.1 mmHg (17% reduction) after canaloplasty-microstent. Mean medications at 6 months were 0.57 ± 0.9 (67% reduction) after microstent alone and 0.16 ± 0.4 (88% reduction) after microstent with canaloplasty ($P < 0.05$). At 6 months, 64.3% of microstent alone and 87.3% of microstent with canaloplasty eyes were off all medications ($P = 0.02$). Success probabilities at 6 months were 44.5% for microstent alone and 70.0% for microstent with canaloplasty ($P = 0.04$). No SSIs occurred in either group.

Image



Conclusions

Phacoemulsification combined with canaloplasty-microstent resulted in significantly greater reductions in ocular hypotensive medications and more eyes off all medications compared to microstent alone. Moreover, our findings with the canaloplasty-microstent group demonstrate a greater percentage of patients off medications compared to those off medications at 12 months in the HORIZION study.[1] A randomized controlled trial with a longer-term follow-up is warranted to determine whether the benefit of combining canaloplasty with microstent outweighs the cost burdens.

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P-898

LONG TERM FOLLOW-UP MORE THAN 10 YEARS AFTER TRABECULECTOMY: OUTCOMES AND FACTORS FOR VISUAL FIELD PROGRESSION

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Purpose

To report 10-year treatment outcomes of trabeculectomy and to identify the risk factors for visual field progression after trabeculectomy

Methods

The medical records of 121 eyes of 94 patients(99 primary open angle glaucoma eyes, 12 uveitic glaucoma eyes, 10 normal tension glaucoma eyes) were reviewed retrospectively. They underwent mitomycin C augmented trabeculectomy with or without phacoemulsification, from 2007 to 2012. Those who had history of any incisional intraocular surgery were excluded. All patients had been followed up for at least 10 years.

Surgical success was defined using 4 criteria, with or without adjunctive medication: (A) IOP≤21mmHg; (B) IOP≤18mmHg; (C) IOP≤15mmHg; and (D) intraocular pressure (IOP) reduction of 30%. Failure of trabeculectomy was based on: 1) the IOP-related criteria, 2) the additional glaucoma surgery, and 3) the loss of light perception. Kaplan-Meier survival methods were used to determine the cumulative probability of success for each criterion.

Multivariate logistic regression analysis was used to identify risk factors for visual field progression after trabeculectomy. Visual field progression was defined as mean deviation decrease of ≥3dB for 10 years.(1) The following factors were evaluated: age, change of RNFL thickness, preoperative cup-to-disc ratio, advanced glaucoma, complications, reoperation, preoperative IOP, mean IOP during follow-up, IOP fluctuation. IOP fluctuation was defined as standard deviation of IOP during treatment.

Results

The cumulative probabilities of success was 81.0%(Criteria A), 73.6%(Criteria B), 57.9%(Criteria C), and 66.1%(Criteria D) at postoperative 5 years, and 70.2%(A), 64.5%(B), 46.3%(C), and 60.3%(D) at postoperative 10 years.

When patients with advanced glaucoma(n=91, 75.2%) were compared with non-advanced glaucoma patients(n=30, 24.8%), cumulative probabilities of success was higher in non-advanced glaucoma patients(70.0% vs 57.1%). Logistic regression analysis indicated that advanced glaucoma (p=0.03), change of RNFL thickness (p=0.01), and IOP fluctuation (p<0.01) were significantly associated with visual field progression.

Image

Multivariate logistic regression analysis of the risk factors for visual field progression

	Odds rate	95% CI	*P*-value
Age[+]			0.26
Change of RNFL thickness*	1.08	1.02-1.14	0.01*
Preoperative cup-to-disc ratio[+]			0.53
Advanced glaucoma*	4.38	1.13-17.01	0.03*
Complications[+]			0.21
Reoperation[+]			0.11
Preoperative IOP[+]			0.49
Mean IOP during follow-up[+]			0.19
IOP fluctuation*	1.34	1.07-1.68	<0.01*

CI: confidence interval. *$P < 0.05$

[+]: variables not significant in multivariate analysis (those exempted from the equation)

Conclusions

Trabeculectomy provides acceptable long-term effect in patients with POAG, UG, and NTG. Advanced glaucoma, change of RNFL thickness, IOP fluctuation were factors associated with visual field progression. Therefore, after trabeculectomy, close monitoring of these factors is necessary to prevent visual field progression.

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P-899

CORNEAL ENDOTHELIAL CELL DENSITY LOSS AFTER GLAUCOMA SURGERY ALONE OR IN COMBINATION WITH CATARACT SURGERY: A SYSTEMATIC REVIEW AND META-ANALYSIS

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Purpose

To assess corneal endothelial cell density (ECD) loss in glaucoma surgery alone or in combination with cataract surgery.

Methods

Glaucoma filtration surgery or microinvasive glaucoma surgery (MIGS) in participants with ocular hypertension, primary and secondary open-angle glaucoma, normal-tension glaucoma, and angle-closure glaucoma were included. Electronic databases searched in December 2021 included MEDLINE, Embase, Cochrane Central Register of Controlled Trials, ClinicalTrials.gov, the International Prospective Register of Systematic Reviews, Food and Drug Administration (FDA) Premarket Approval, and FDA 510(k).

Results

A total of 39 studies were included in quantitative synthesis. Twelve months after suprachoroidal MIGS, mean ECD loss was 282 cells/mm2 (95% confidence interval [CI], 220 to 345; P < 0.00001; chi-square = 0.06; I2 = 0%; 2 studies; very low certainty). Mean ECD loss after Schlemm's canal implantable devices was 338 cells/mm2 (95% CI, 185 to 491; P < 0.0001; chi-square = 0.08; I2 = 0%; 2 studies; low certainty) at 12 months. Mean ECD loss was 64 cells/mm2 (95% CI, 21 to 107; P = 0.004; chi-square = 4.55; I2 = 0%; 6 studies; low certainty) after Schlemm's canal procedures (without implantable devices) at 12 months. At 12 months, the mean ECD loss after trabeculectomy was 33 cells/mm2 (95% CI, 38 to 105, P = 0.36, chi-square = 1.17; I2 = 0%; moderate certainty). At 12 months, mean ECD loss was 121 cells/mm2 (95% CI, 53 to 189; P = 0.0005; chi- square = 3.00; I2 = 0%; 5 studies; low certainty) after Express (Alcon) implantation. When compared with the control fellow eye, aqueous shunt surgery reduced ECD by 5.75% (95% CI, 0.93 to 12.43; P = 0.09, chi- square = 1.32; I2 = 0%; low certainty) and 8.11% ECD loss (95% CI, 0.06 to 16.16 P = 0.05; chi-square = 1.93; I2 = 48%) at 12 and 24 months, respectively.

Conclusions

Overall, there is low certainty evidence to suggest that glaucoma surgery involving long-term implants has a greater extent of ECD loss than glaucoma filtration surgeries without the use of implants. The results of this review support follow-up beyond 36 months to assess ECD loss and corneal decompensation after implantation of glaucoma drainage implants.

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P-900

BLINDNESS AND PROGNOSTIC FACTORS IN LONG-TERM FOLLOW-UP AFTER TRABECULECTOMY WITH MITOMYCIN C IN OPEN-ANGLE GLAUCOMA

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Purpose

Little is known about the long-term risk of blindness in glaucoma patients after trabeculectomy (TLE) with intraoperative mitomycin C (MMC). Therefore, we assessed the postoperative long-term blindness avoidance (survival) rates and prognostic factors in patients with open-angle glaucoma.[1-3]

Methods

We identified 2097 eyes of 1353 patients with primary open angle glaucoma or exfoliation glaucoma, who underwent TLE with intraoperative MMC at Gifu University Hospital, Gifu, Japan, between November 1990 and January 2016, retrospectively. The cases with a postoperative follow-up period of at least 5 years and not meeting the preoperative blindness criteria were included. We defined blindness according to the World Health Organization (WHO) criteria.[3] One eye per case was used for analysis.

Results

Five hundred and twenty-five eyes of 525 patients were selected. 281 were male. The age at surgery (mean ± standard deviation) was 55.8 ± 14.0 years. Preoperatively, the corrected visual acuity (logMAR) was 0.09 ± 0.29, and the intraocular pressure (IOP) was 20.3 ± 6.9 mmHg, and the mean deviation (MD) with Humphrey Field Analyzer (Carl Zeiss Meditec, Dublin, CA) program Central 30-2 was -16.31 ± 7.28 dB. The follow-up period was 12.7 ± 6.5 years, and the mean postoperative IOP reduction rate was 41.5 ± 19.5 %. At the last observation, 64 eyes (12.2%) met the criteria for blindness. The survival analysis showed the 10-year and 20-year cumulative survival rates were 89.8 ± 1.4 % and 84.0 ± 2.1 %, respectively. The analysis of prognostic factors for blindness demonstrated that the multivariate hazard ratios for preoperative corrected visual acuity, preoperative MD, and mean postoperative IOP reduction rate were 6.34, 0.93, and 0.97, respectively, which were statistically significant ($P < 0.001$ for each; Cox proportional hazards model).

Conclusions

The 10-year and 20-year cumulative survival rates after TLE with intraoperative MMC were 89.8% and 84.0%, respectively. Poor preoperative visual acuity, severe preoperative visual field loss, and unsustained IOP-lowering effect will be the independent prognostic factors leading to blindness.

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P-901

A SYSTEMATIC REVIEW AND META ANALYSIS OF EFFICACY AND SAFETY OF GONIOSCOPY ASSISTED TRANSLUMINAL TRABECULOTOMY AFTER ONE YEAR

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Purpose
To review the evidence for efficacy and safety of treating OAG with GATT critically.

Methods
Electronic databases of Cochrane, Web of Science, PubMed, Medline, EMBASE and Clinical-Trials.gov were searched for eligible studies by two individuals independently. The last date of database searching was October 16, 2021. Mean Intra Ocular Pressure (IOP) reduction, Mean number of anti glaucoma medication reduction and surgical success rate after one year were analyzed to determine aggregate efficacy of GATT. Furthermore reported complications of GATT were summarized to review the safety

Results
Twenty case serieses from ten countries that have been reported between year 2015 and 2021 were systematically reviewed and meta analized. Data from eighteen (90%) of the twenty studies were analyzed retrospectively by chart review while in the remaining two studies participants were followed prospectively. A total of 1207 eyes of 1167 people with primary open angle glaucoma, ocular hypertension, pseudoexfoliative glaucoma, post inflammatory glaucoma and juvenile open angle glaucoma were studied in this review. In four studies (20%) GATT was done alone. In the remaining sixteen studies GATT was accompanied in either all or part of study subjects with Phacoemulsification. In addition, in six studies all or part of study subjects had had some sort of incisional glaucoma surgeries prior to GATT.

One study was not included in quantitative analysis for data on key variables after 01 year of follow up were not reported. The pooled mean IOP reduction after GATT was -11.19 mmhg (95% CI: -9. 77 to -12. 66 mmHg) at one year. The reduction was significant (P < 0.00001). Similarly after a year, the number of mean anti glaucoma medication required decreased by 2.1 (95% CI: 1.90 – 2.31, P< 0000.1), Surgical success was maintained in 79% of study eyes and repeat of glaucoma surgery was required in 10% of the eyes. Hyphema was the most frequent complication reported ranging from 1% to 100%. No vision threatening complication was reported.

Conclusions
GATT is shown to achieve significantly lower post operative IOP and reduced glaucoma medication number with lesser surgical complications. The effect is maintained for at least one year. It can be combined with cataract surgery without significant compromise in surgical outcome. GATT can also be called in eyes with prior failed filtering surgeries where a repeat additional filtration surgery is known to be associated with higher failure rate.

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P-902

DEFINING THE ANATOMICAL LEVEL OF FAILURE IN TRABECULECTOMY AND DEEP SCLERECTOMY SURGERY

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Purpose

Glaucoma filtration surgery has a reported failure rate of over 30% at five years. Identifying the anatomical level of aqueous resistance and fibrosis can demonstrate mechanisms of failure and guide subsequent surgical intervention.

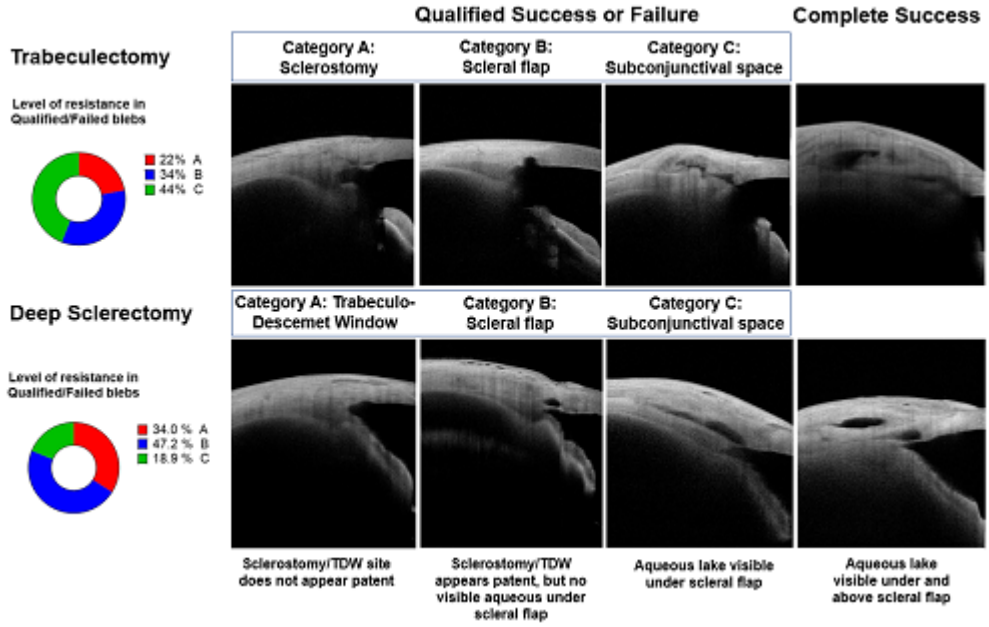
Methods

Cross-sectional study of 166 blebs of 98 patients who had undergone prior Trabeculectomy (Trab, n=81) or Deep Sclerectomy (DS, n=85) surgery at least one year prior for glaucoma. Swept source anterior segment-optical coherence tomography (AS-OCT, Anterion®, Heidelberg Engineering) was used to capture internal bleb structures—sclerostomy/Trabeculo-descemet window (TDW), scleral flap and subconjunctival space using raster slices in sagittal and coronal planes. Aqueous flow was mapped out using image analysis software (Matlab, Mathworks). In qualified success and failed blebs, the identified anatomical level of aqueous resistance was classified into three categories—A: sclerostomy/TDW, B: scleral flap, C: subconjunctival space; Figure 1).

Results

The proportion of complete success (S; IOP ≤18mmHg with no medications), qualified success (IOP ≤18 with medications) and failure (IOP>18mmHg) in the Trab and DS cohorts were 38.3% vs 37.7%, 37.0% vs 32.9%, and 24.7% vs 29.4% respectively, with a mean post-operative follow up of 8.4 years (IQR 3.0-9.1 years). In qualified success and failed blebs, the level of initial aqueous resistance was 22.0% and 34.0% in A, 34.0% and 47.2% in B, and 44.0% and 18.9% in C in Trab and DS cohorts respectively. The level of resistance was associated with bleb age, with blebs displaying sclerostomy and flap fibrosis (A & B) significantly older than those with subconjunctival fibrosis (C) as well as unqualified success blebs (S). [A vs B vs C vs S in Trab: 16.1 vs 22 vs 7.4 vs 7.2 years ($p<0.001$); DS: 7.6 vs 7.3 vs 3.9 vs 3.3 years ($p<0.001$)]. Intraoperative-Mitomycin C use was also significantly higher in blebs with subconjunctival fibrosis (C) compared to those with sclerostomy and flap fibrosis (A &B).

Image



Conclusions

The subconjunctival space accounts for aqueous resistance in the majority of partially functioning/failed Trabeculectomy blebs, while the TDW and scleral flap accounts for this in Deep Sclerectomy blebs. Imaging the anatomical level of bleb aqueous resistance can guide subsequent intervention such as needling, revision, or second-site surgery.

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P-903

ONE-YEAR RESULTS OF A MULTICENTER STUDY: COMBINED PHACOEMULSIFICATION, GONIOSYNECHIALYSIS AND GONIOTOMY FOR ADVANCED PACG WITH CATARACT

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Purpose

To evaluate the intraocular pressure (IOP)-lowering effect of the combination of phacoemulsification with intraocular lens implantation (PEI), goniosynechialysis (GSL), and goniotomy (GT) in eyes of advanced primary angle-closure glaucoma (PACG) with cataract.

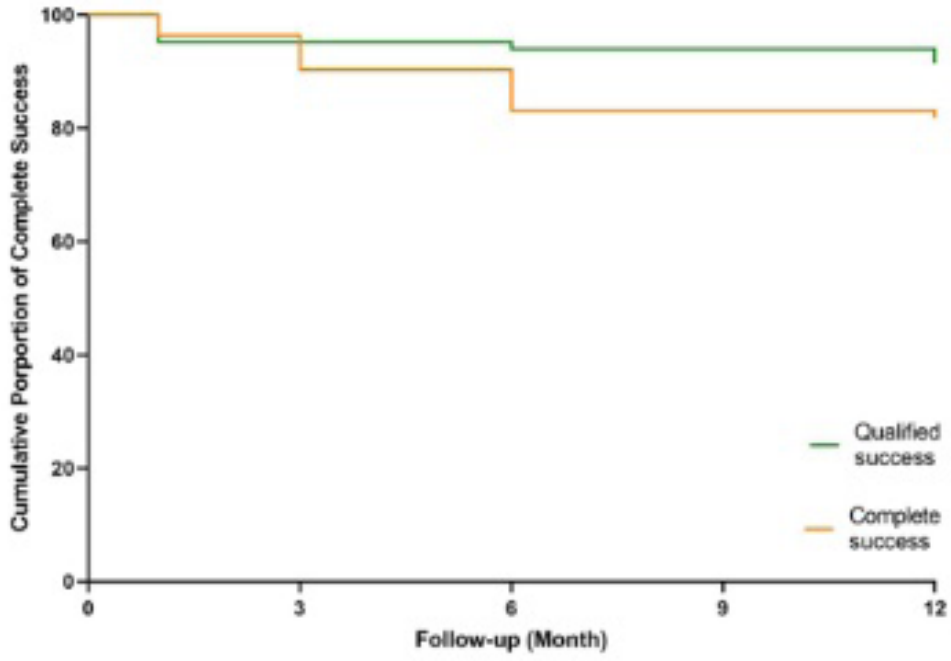
Methods

Multicenter observational study. We enrolled 83 eyes of 83 patients with advanced PACG who received combined PEI+GSL+GT at eight ophthalmic institutes. Each patient was assessed before treatment and 1 day, 7 days, 1 month, 3 months, 6 months, and 12 months post-surgery. The criteria for complete success were IOP within 6–18 mmHg and at least 20% reduction in IOP from baseline without ocular hypotensive medications or reoperation. The definition of qualified success was similar to that of complete success, except for the need for ocular hypotensive medications. The potential prognostic factors for surgical success were investigated using a multivariate logistic model.

Results

All participants completed 1 year of follow-up. Complete and qualified success were achieved in 74 (89.1%) and 79 (95.2%) of 83 eyes, respectively (Fig A). The mean preoperative and postsurgical IOPs were 27.4±7.3 mmHg and 14.2±2.6 mmHg, respectively, and achieved a steady decline during a one-year period. Participants used an average of 2.0 and 0.3 types of ocular hypotensive medications before and after surgery respectively. The chief complications included hyphema (n=9), IOP spike (n=9), and corneal edema (n=8). None of the eyes required reoperation or developed vision-threatening complications. Multivariate analysis showed that older age was associated with a higher probability of complete success (OR=1.13, 95%CI: 1.02–1.25, P=0.020).

Image



Conclusions

The 1-year results of combination of PEI+GSL+GT in treating advanced PACG cases with cataract appear to be safe and effective. Further large-scale multi-nation and multi-center studies are warranted.

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P-904

REAL-WORLD OUTCOMES OF THE PRESERFLO MICROSHUNT IN FROM A LARGE SINGLE-CENTRE RETROSPECTIVE STUDY

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Purpose

The Preserflo Microshunt is a minimally invasive shunt which lowers intraocular pressure (IOP) through the formation of a filtering bleb. 1 This study aims to both quantify the efficacy of the Preserflo in lowering IOP and evaluate its safety profile.

Methods

A retrospective, single-centre cohort study of 100 consecutive eyes followed up for at least 3 months post Preserflo implantation within a period of two years. The primary outcome measures were IOP control with or without the need for IOP-lowering medication and surgical success rates as per the World Glaucoma Association guidelines.2 Secondary outcome measures were the incidence of complications and reinterventions to determine the safety profile of the procedure.

Results

A total of 100 procedures were performed in 94 patients, of which 46.8% were female. The mean patient age was 72.5 ± 13.6 years. The ethnic breakdown of the population was 84% of Caucasian descent, 15% of South Asian descent, and 1% of East Asian descent. Primary open angle glaucoma (POAG) was the main cause of glaucoma, accounting for 62% of cases. The right eye was operated on in 50% of cases. Preserflo implantation was performed solely in 53% of cases and combined with phacoemulsification in 47%.

From the pre-op cohort's baseline IOP of 30.2 ± 12.1 mmHg, 57 eyes were followed up to one year, achieving a significant reduction in IOP to a mean of 14.4 ± 6.41 mmHg ($p<0.01$). 63.2% of patients met the complete success criteria and 87.7% achieved qualified successes. The use of antiglaucoma medication was reduced significantly from 3.10 ± 0.94 to 0.81 ± 1.14 ($p<0.01$). Complications encountered were eight hyphaemas, four cases of hypotony, two cases of corneal oedema, four cases of macular oedema, one vitreous haemorrhage, two cases of scarring and one shunt extruding through the conjunctiva. The following surgical reintervention were performed: 19 bleb revisions, five bleb needlings, four stent manipulations, three YAG capsulotomies, one trabeculoplasty, two trabeculectomies, two anti-VEGF injections, and two Baerveldt tube insertions

Conclusions

The Preserflo Microshunt is an effective and minimally invasive option for managing glaucoma surgically. The procedure was successful in achieving significant reductions in IOP and reducing the need for antiglaucoma medication in the majority of patients. While there were some complications and reinterventions required in a minority of cases, the overall safety profile of the procedure is very strong.

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P-905

LONG-TERM OUTCOMES OF DESCEMET STRIPPING AUTOMATED ENDOTHELIAL KERATOPLASTY IN EYES WITH AN AHMED GLAUCOMA VALVE

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Purpose
To evaluate the long-term outcomes of Descemet Stripping Automated Endothelial Keratoplasty (DSAEK) in eyes with endothelial failure, following Ahmed glaucoma valve (AGV) implantation.

Methods
Retrospective review of the clinical charts of eyes submitted to DSAEK between 2010 and 2020, in Centro Hospitalar Universitário do Porto, a tertiary referral center in Portugal, due to endothelial failure in the setting of prior AGV implantation. Eyes submitted to corneal surgeries before AGV implantation were excluded. Number of previous surgeries, graft survival time and need for other corneal procedures was evaluated.

Results
Between 2010 and 2020, 227 eyes were submitted to AGV implantation in our center, and 15 eyes (6.6%) developed endothelial failure. Of these, 10 eyes (9 patients) were submitted to DSAEK, a median time of 3 [0-7] years after AGV implantation. Mean age at the time of DSAEK was 68±13 years old. The median number of surgeries before DSAEK (phacoemulsification, glaucoma surgery and vitrectomy) was 4 [1-6]. In 9 eyes, the tube was originally placed in the anterior chamber, and in 1 eye, in the ciliary sulcus. Before DSAEK, 5 eyes had the tube replaced to the ciliary sulcus. The median follow-up time after DSAEK was 4 [2-7] years. In 1 eye, corneal transparency was not achieved with DSAEK, and a penetrating keratoplasty was performed, after 6 months. Three eyes maintained a transparent cornea until the last follow-up visit (3, 5 and 7 years). Two eyes developed corneal edema, 7 and 22 months after DSAEK, that resolved with steroids. Endothelial failure developed in other 2 eyes, 9 and 21 months after DSAEK, but as the visual potential was low, a new surgery was not proposed. Two eyes developed corneal opacification, without indication for a new surgery. Corneal edema after DSAEK developed in 3 (75%) of the eyes with the tube in the anterior chamber and 2 (33%) of the eyes with the tube in the ciliary sulcus. The number of surgeries before DSAEK was not associated with development of corneal edema after surgery (p=0.421).

Conclusions
Endothelial failure after AVG implantation is infrequent. DSAEK allowed 50% of our patients to maintain a transparent cornea, at the last follow-up visit, without other corneal procedures.

P-907

ASSESSMENT OF ANTERIOR CHAMBER ANGLE AND INTRAOCULAR PRESSURE CONTROL AFTER PHACOEMULSIFICATION IN PRIMARY ANGLE CLOSURE WITH DIFFERENT MECHANISMS

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Purpose
To investigate the relationship between the anterior chamber angle (ACA) characteristics, as measured by swept-source anterior segment optical coherence tomography (SS AS-OCT), and intraocular pressure (IOP) control after phacoemulsification in primary angle closure (PAC) eyes with different angle-closure mechanisms.

Methods
Retrospective, clinical cohort study. Participants were classified into 3 groups according to angle-closure mechanisms using baseline SS AS-OCT images; pupillary block (PB), plateau iris configuration (PIC), exaggerated lens vault (ELV). ACA parameters were measured using SS AS-OCT. IOP was measured preoperatively and for 6 months after surgery. Postoperative IOP reduction and fluctuation were calculated, and their correlations with SS AS-OCT parameters were analyzed.

Results
Eighty-five eyes of 85 subjects of angle-closure were included. Thirty-four eyes (40%) were classified as PB, 23 eyes (27%) as PIC, and 28 eyes (33%) as ELV. Anterior chamber depth (ACD) was the shallowest and lens vault (LV) was the largest in the ELV, followed by PB, and PIC, in order. Postoperative IOP reduction was significantly associated with preoperative AS parameters in the ELV and PB, but was associated with postoperative AS parameters in the PIC. Preoperative and change of ITC parameters before and after phacoemulsification were significantly correlated with postoperative IOP reduction in both the PB and ELV, but not in the PIC. Postoperative ITC parameters showed a significant correlation with postoperative IOP fluctuation only in the PIC.

Conclusions
IOP control after phacoemulsification was different among PAC eyes with different angle closure mechanisms, which should be considered in determination of lens extraction in PAC eyes.

P-908

ANGLE-BASED MINIMALLY INVASIVE GLAUCOMA SURGERY IN NORMAL TENSION GLAUCOMA – A PILOT SYSTEMATIC REVIEW AND META-ANALYSIS

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Purpose
The safety and efficacy angle-based minimally invasive glaucoma surgery (MIGS) in the treatment of primary open angle glaucoma is well-established. However, it is also being increasingly performed in normal tension glaucoma (NTG). This pilot systematic review and meta-analysis examines available literature to report the efficacy and safety of angle-based MIGS in NTG, up to 12 months after surgery.

Methods
A comprehensive search of databases including Medline, Embase, PubMed, CINAHL, Cochrane Library was conducted, from inception until 20 December 2022. Pilot, cohort, observational studies, and randomised controlled trials including at least 5 subjects undergoing angle-based MIGS (including trabecular bypass device implantation, excisional trabeculotomy, goniotomy and canaloplasty procedures) for NTG, with or without cataract surgery, were included for review. Preliminary meta-analysis of continuous outcome using the meta routine in R version 2022.12.0+353 was performed for subjects who had combined phacoemulsification and iStent/iStent inject implantation, to determine pooled mean intraocular pressure (IOP) and anti-glaucoma medication (AGM) reduction, at both 6 and 12 months after surgery.

Results
Of a total of 848 studies initially identified on literature search, 25 studies were included for final systematic review. The majority of studies (18 out of 25) included subjects which underwent iStent/iStent inject implantation. Meta-analysis was performed for a subset of six studies, with a pooled total of 281 eyes, which underwent combined phacoemulsification and iStent/iStent inject implantation. There was significant IOP reduction ($p<0.05$) at both 6 months and 12 months postoperatively, with a mean decrease of 2.28 mmHg (95%CI: 0.71 – 3.85) and 2.07 mmHg (95%CI: 0.47 – 3.67) respectively. There was also a significant decrease in AGM use ($p<0.05$) at both 6 months and 12 months, with a mean decrease of 1.22 AGM (95%CI: 1.03 – 1.42) and 1.30 AGM (95%CI: 0.91 – 1.69) respectively. Postoperative complications for angle-based MIGS were few and transient, and included transient hyphema, IOP spike and stent occlusion. Adverse events were rare.

Conclusions
Angle-based MIGS appears to be efficacious for eyes with NTG. Reductions in IOP and number of AGM were significant for combined phacoemulsification and iStent/iStent inject implantation at both 6 and 12 months after surgery.

P-909

ONE-YEAR OUTCOMES OF PRESERFLO MICROSHUNT IMPLANTATION VERSUS TRABECULECTOMY FOR PSEUDOEXFOLIATION GLAUCOMA

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Purpose
To compare the safety and efficacy of Preserflo MicroShunt (Microshunt) implantation augmented with Mitomycin C (MMC) and trabeculectomy (TET) augmented with MMC in patients with pseudoexfoliation glaucoma (PEXG).

Methods
In this retrospective, single centre, interventional study, 60 eyes of 54 patients with PEXG underwent glaucoma surgery. 31 eyes of 28 patients received MicroShunt implantation and 29 eyes of 26 patients received TET. Definition of failure was an intraocular pressure (IOP) lower than 5 or higher than 17mmHg at one year of follow-up, the need of surgical revisions, secondary procedures or loss of light perception. Outcome was rated as complete success if achieved without medication, otherwise as qualified success. Furthermore, postoperative complications and interventions were compared between the two groups.

Results
Mean IOP dropped from 20.8±5.9mmHg (MicroShunt) and 22.3±6.5mmHg (TET) at baseline to 12.4±2.8mmHg ($p<0.0001$) and 11.1±3.7mmHg ($p<0.0001$), respectively, at one year. Mean number of medications were reduced from 2.7±1.2 to 0.2±0.7 for MicroShunt patients ($p<0.0001$) and from 2.9±1.2 to 0.3±0.9 for TET patients ($p<0.0001$). At one year of follow-up 83.3% of MicroShunt patients achieved complete success and 90.0% qualified success. In the TET group rates were 82.8% and 93.1%, respectively. Patient demographics differed between the two groups regarding age (MicroShunt 77.3±7.7 vs. TET 71.3±8.3; $p=0.001$) and baseline visual field mean deviation (MicroShunt -8.7±6.8 vs. TET -13.6±8.7; $p=0.04$). Postoperative complications were comparable between both groups.

Conclusions
MicroShunt implantation demonstrated non-inferiority regarding efficacy and safety profile compared to TET in PEXG at a follow-up of 12 months.

P-910

BLEB VESSEL DENSITY AS A PREDICTIVE FACTOR FOR SECONDARY SURGICAL INTERVENTIONS AFTER SANTEN PRESERFLO MICROSHUNT IMPLANTATION

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Purpose

Filtration bleb vascularization after glaucoma filtration surgery is a commonly used predictor of surgical outcome in clinical practice. Most classification systems use the subjective slit-lamp appearance for vascularization assessment (*e.g.* Moorflield´s Bleb Grading System). Anterior segment optical coherence tomography (VA-OCTA) enables objective bleb vessel imaging and quantification. The aim of this study was to identify VA-OCAT based predictive factors for bleb function after Santen Preserflo Microshunt implantation

Methods

Twenty one patients with open-angle glaucoma (OAG) were included. 1, 2, 4, 8, 12 and 24 weeks after Preserflo Microshunt implantation, VA-OCTA images of the bleb were taken using Plex Elite OCTA (Carl Zeiss Meditec, Jena, Germany). Images were exported into ImageJ, artifact removal and binarization were performed and the bleb vessel density (BVD) was calculated in a circular area (Ø 400 pixels) centered around the posterior edge of the scleral pocket where the implant passes the sclera. Intraocular pressure (IOP), medication and surgical treatment (needling, revision surgery) were recorded.

Results

Mean IOP and number of medication required preoperatively were 23.3 (+- 7.67) mmHg and 2.9 (+- 1.14). One week postoperatively mean IOP was 8.2 (+- 2.19) mmHg and 0 (+-0) medication. The mean postoperative BVD at this time was 49.43 (+- 9.54) % and further reduced to 43.20 (+-9.11), 35.02 (+-8.94), 27.55 (+-6.17), 29.93 (+-8.37) and 25.74 (+-5.68) % after 2,4,8,12 and 24 weeks of implantation. In patients who needed surgical interventions in the future, at 2 and 4 weeks after Preserflo implantation, BVD was significantly increased compared to patients without the need of surgical interventions (2W: 49.19 (+-7.04) vs 39.97 (+-8.68), p=0.0232; 4W: 42.12 (+-5.21) vs 31.15 (+-8.23), p= 0.0037)).

Conclusions

To the best of our knowledge, the present study represents the first VA-OCTA based examination of bleb vessels after Preserflo Implantation. Patients who needed further interventions, showed a significant higher BVD compared to patients with persistently good drainage function at 2 and 4 weeks after implantation, These results show that BVD may be a promising predictive factor for the assessment of bleb function after Preserflo Microshunt implantation.

P-911

IMPACT OF DIFFERENT MITOMYCIN-C APPLICATION METHODS DURING TRABECULECTOMY ON BLEB MORPHOLOGY AND FUNCTION

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Purpose
To evaluate the impact of different mitomycin-C (MMC) application methods (subconjunctival injection/sponge application) during trabeculectomy on bleb morphology and surgical results, using optical coherence tomography angiography (OCTA).

Methods
The eyes that underwent trabeculectomy with MMC as the first glaucoma surgery between November 2021 and September 2022 were included in the study. All patients underwent complete ophthalmological examination in each visit and OCTA was performed at the postoperative 3rd month. Bleb wall thickness (BWT) and bleb height (BH) were measured and density of microcysts were recorded, from the OCTA images. Bleb vascularization density (BVD, %) and complete avascular area (CAA, %) were calculated using ImageJ software. Correlation of OCTA findings with clinical findings and the effects of different MMC application methods on surgical outcomes were analyzed.

Results
The median age of 32 patients (F:5/M:27) was 65 (20-79) years. MMC was applied as subconjunctival injection (SCI) in 16 eyes (50%, 0.1 mg/ml) and with sponge in 16 eyes (50%, 0.2 mg/ml-2 min) during the operation. In SCI group, the mean postoperative intraocular pressure (IOP) was 17.6±8.3 mmHg, BVD was 17.9±5,5, CAA was 12±12 %, BWT was 441.3±180.9 µm and BH was 448.4±182.1 µm; whereas in sponge group, mean IOP was 15.9±7.8 mmHg, BVD was 17.9±6,4, CAA was 13±12.7 %, BWT was 339.4±141.9 µm and BH was 371.7±136 µm (p=.57 , p=.79 , p=.92, p=.08, p=22, respectively). Needling was required in 3 (18.8%) patients in the SCI group and in 5 (31.3%) patients in the sponge group(p=.68). Bleb height (r=-0.51), microcyst density (r=-0.87) and complete avascular area (%) (-0.87) were negatively correlated, whereas bleb vascularization density was positively correlated (r=0.76) with postoperative IOP. The percentage of complete avascular area in OCTA was found to be correlated with microcyst density (r=0.81).

Conclusions
Different application methods of MMC during trabeculectomy does not change the bleb function and morphology and seems not to have an impact on surgical success.

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P-912

SIX MONTHS SURGICAL OUTCOMES OF THE PRESERFLO MICROSHUNT WITH MITOMYCIN C IN MODERATE TO ADVANCED GLAUCOMA: REAL WORLD DATA

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Purpose
To evaluate the efficacy and safety of the PreserFlo MicroShunt with Mitomycin C in moderate to advanced glaucoma

Methods
All consecutive patients who had Preserflo micro shunt with mitomycin-C (MMC) 0.5 mg/mL from January 2021 to July 2022 Southend University Hospital NHS Foundation Trust.

The primary outcome measured was complete success off medication at 6 months.Qualified success was defined as complete success with use of added antiglaucoma medication at 6 months. Failure was defined as intraocular pressure >21 mmhg; <20% reduction of IOP; IOP ≤5 with more than 2 lines loss of vision on 2 consecutive visits; revision or re-operation for glaucoma or loss of perception of light. Secondary outcomes were IOP, number of medications, best corrected visual acuity, interventions, re-operations, and complications. Cases were identified from the glaucoma surgical data, electronic and written medical records. Identifiable patient data were anonymized and analysed using Excel.

Results
105 patients (105 eyes) had standalone Preserflo with MMC during this period. The mean age of the patients 73.35 years (range 37 to 88 years). Data available from 86 patients at 6 months. Complete success at 6 months was 83.72% (N=72) qualified success was 3.48% (N=3). Failure happened in 12.79% (N=11).

We observed a significant reduction in intraocular pressure from 25.59mmHg (SD 8.70, N=86) to 12.36mmHg (SD 4.74, N=86)(p<0.00001) at 6 months. Use of antiglaucoma medication also decreased from 2.81 (SD 0.90. N=86) to 0.11 (SD 0.11. N=86) at six months.

Early complications observed were hypotony (13.95%; N=12), choroidal detachments (6.97%; N=6), hyphaema (5.81%; N=5) and bleb leak (2.32%; N=2). Needling and 5-fluorouracil injections were performed in 4.65% (N=4) and 2.32% (N=2), respectively, and 3.48% (N=3) required revision surgery

Conclusions
The PreserFlo MicroShunt with MMC 0.5 mg/mL is a safe procedure with an overall success rate of 87.20% at 6 months, which also showed a significant reduction in IOP and antiglaucoma medication required. The few early adverse effects had been resolved before the 6 month review.

P-913

RETROSPECTIVE COMPARISON OF POSTOPERATIVE PRESSURE REDUCTION: PRESERFLO MICROSHUNT VS. TRABECULECTOMY

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Purpose

The aim of this study is to compare the postoperative IOP Reduction after Preserflo Microshunt and Trabeculectomy at the Medical University of Graz from 2018-2021.

Methods

Single center retrospective study. Patients who recieved a Preserflo Microshunt Implantation or Trabeculectomy at the Medical University of Graz between 2018 and 2021 where included in the study. The parameters examined were the intraocular pressure (IOP), the number of IOP-lowering medications, visual acuity and the number of follow-up treatments required within the first year.

Results

207 Eyes were evaluated, 105 (50.5%) underwent Trabeculectomy, in 102 age and gender matched Eyes Preseflo Microshunt was implanted. Average baseline IOP was 29.4 mmHg (± 8 mmHg) on 2.6 (± 1.1) IOP-lowering medications in the Trabeculectomy group and 25.4 mmHg (± 8.3mmHg) on 2.1 (± 1.2)in the Preserflo Microshunt Group.After 12 months of follow-up, the mean IOP in the Trabeculectomy group was 15.0 (± 5.3) (n=59, mean reduction of 51%) on 0.9 (± 1.5) IOP-lowering medications and 15.8 mmHg (± 6.9) (n=75, mean reduction of 62%) on 0.7 (± 1.2) IOP-lowering medications in the Preserflo group.38 Eyes (36%) in the Trabeculectomy Groupe and in 55 Eyes (53.4%) in the Preserflo Group required at least one followup treatment (Needling or Suturlysis). 8 Eyes (7.6%) in the Trabeculectomy Group and 9 Eyes (8.7%) in the Preserflo Group were referred to revisional surgy.

Conclusions

Our results show a significant reduction in intraocular pressure and number of iop lowering medications in both groups with a higher rate of follow-up procedures in the Preserflo Microshun Group.

P-914

COMPARISON OF EFFICACY AND SAFETY BETWEEN THE VALVED (AGV) AND NON-VALVED (BGI AND PGI) GLAUCOMA DRAINAGE DEVICES AFTER SIX MONTHS OF FOLLOW-UP

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Purpose

To evaluate efficacy and complications along the 6-month midterm after the implantation of the two most used types of glaucoma drainage devices [GDDs]: valved (Ahmed Glaucoma Valve [AGV]) and non-valved (Baerveldt Glaucoma Implant [BGI] and the new Paul Glaucoma Implant [PGI]); also, to explore the differences in these outcomes between the non-valved implants.

Methods

Unicenter, observational, retrospective cohort study. Participants: 115 glaucoma adult patients who required an implant of a GDD (AGV, BGI or the new PGI) at the Clinic Hospital of Barcelona, Spain, because of uncontrolled intraocular pressure [IOP] despite the best medical treatment, between January 1, 2020, and March 19, 2022, 56 eyes received AGV, 36 PGI and 23 BGI; all cases had a minimum of 6 months follow-up after surgery. Main outcome measures: IOP; the success was defined as IOP >5 mmHg or <21 mmHg with (relative success) or without (absolute success) adjunctive hypotensive glaucoma medication at 6 months; and complications.

Results

Non-valved implants had lower IOP (mean ± standard error [SE]) at months 1, 3 and 6 (15.4±0.7, 15.5±0.8, 13.6±0.6 mmHg) than the AGV group (18.7±0.9, 17.7±0.9, 16.3±0.8 mmHg) with statistically significant difference. Furthermore, non-valved group had a significantly lower medication requirement at 6 months (0.86±0.15) compared with 1.48±0.15 in AGV (P<0.01). PGI needed the lowest use of hypotensive medication at 6 months (0.58±0.13 PGI/1.30±0.29 BGI; P=0.01), without differences in IOP with BGI. The success rate (absolute/relative) was 100% (61.1/38.9%) in PGI and 95.7% (47.8/47.8%) in BGI; compared with 91.1% (26.8/64.3%) in AGV (P=0.01). There were no statistically significant differences in intraoperative and early complication rates between GDDs. Hypotony was the most common one for non-valved devices, with a fewer rate in PGI (26% BGI/6% PGI and 0% AGV; P=0.04).

Conclusions

As previous studies have shown (ABC, ABV), BGI provides a greater decrease in IOP than AGV. AGV tends to cause more fibrosis while non-valved implants have a greater tendency towards hypotony. The novel PGI is a promising choice for patients who require GDD surgery. In our study it showed efficacy comparable to BGI, with a greater reduction in hypotensive medication, a higher success rate with a lower cumulative probability of reoperations to control IOP and a spectrum of complications similar to AGV, with a lower rate of hypotony than BGI.

P-915

PATIENTS WITH SMALLER ANGLE PARAMETERS MAY NEED FASTER OPERATION: COMPARISON OF ANGLE AND INTRAOCULAR PRESSURE DIFFERENCE AFTER CATARACT OPERATION

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Purpose
The purpose of this study was to calculate the difference of angle parameters after cataract operation and investigate factors that may influence the intraocular pressure (IOP) change. We hypothesized that there will be differences in angle parameters not only among open and closed angle but also among various factors that consist the anterior chamber.

Methods
This study randomly included 188 eyes of patients who underwent cataract operation at Yonsei University Severance Hospital between January 2019 and December 2019. We compared the difference of angle parameters (AOD, ARA, TISA, TIA) before and after the operation. In addition, IOP changes were compared before operation and 1, 2, and 6 months after operation. Using linear regression model, we investigated factors that may influence the IOP change.

Results
After the operation all angle parameters were significantly improved. (P<0.05) Patients with smaller angle parameters resulted in more significant IOP reduction at 6months postoperatively. (P-value: AOD, ARA, TISA, TIA;<.0045, 0.0077, 0.0072, 0.0019, respectively)

Conclusions
Patients with smaller angle parameters had more significant IOP reduction after cataract operation. As so, patients with smaller angle parameters may need more early surgery in case of glaucoma as they may have a better chance for IOP normalization effect after cataract operation.

P-917

ANTERIOR SEGMENT OPTICAL COHERENCE TOMOGRAPHY (AS-OCT) IMAGING FOLLOWING SUPRACILIARY MINIJECT IMPLANTATION IN OPEN-ANGLE GLAUCOMA

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Purpose

To evaluate the MINIject (MJ) position, cleft size, presence and size of supraciliary and suprachoroidal space (SC) on anterior segment optical coherence tomography (AS-OCT).

Methods

The operated eyes were imaged post-operatively at 1 day, 1 week, 1 month, 3 months, and 6 months by AS-OCT (ANTERION, Heidelberg Engineering, Germany) according to a pre-defined protocol. Implant depth (ID) which determines the position of the MJ with reference to Schwalbe's line and implant position (IP) in the anterior chamber, were graded from 1 to 3. Cleft width (CW) and presence and extent of posterior suprachoroidal fluid (SCF) were graded from 0 to 4. The cleft size (CS) was further measured in clock hours and angle degrees.

Results

MINIject implantation was performed successfully in 29 eyes with a mean baseline IOP of 23.1±8.4 mmHg and 15±2.0 at 6 months. Post-operatively, the mean grade for SCF was 2.9±0.9 on day 1 and 1.6±0.5 at 6 months, and 2.8±0.4 on day 1 and 3.3±0.9 at 6 months for CW. On average, 3.6±0.5 quadrants displayed SCF at 1 day versus 2.5±1.7 at 6 months.

For the ID with respect to Schwalbe's line, 25% were located anterior to it, 31.3% were found at the same level, and 43.8% were behind it. Furthermore, 18.2% of the implants were directed close to the cornea, 71.7% toward the anterior chamber, and 9.1% close to the iris. The implant's depth and position did not change during the 6 months follow-up. The average cleft size was 41.6±3 degrees (1.4 clock hours) on day 1 and decreased to 27.1±4.6 degrees (0.92 clock hours) at 6 months.

Conclusions

AS-OCT is a non-invasive tool to image the supraciliary and suprachoroidal space after MINIject implantation. Establishing a grading system will allow to quantify and further understand the dynamics around SC devices and correlate them with IOP and surgical success.

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P-919

COMPARATIVE TRIAL ON EFFECTIVENESS OF COMBINED TRABECULOTOMY AND TRABECULECTOMY VERSUS GATT IN THE MANAGEMENT OF PCG

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Purpose

To compare the efficacy of 180-degree Gonioscopic assisted transluminal trabeculotomy (GATT) versus combined trabeculectomy and trabeculectomy (CTT) surgery in the management of Primary congenital glaucoma (PCG) children.

Methods

We conducted a prospective interventional comparative study on the children with non-severe PCG who had a clear corneal view presenting to our center between October 2021-October 2022. The children were classified as severe or non-severe PCG based on age of onset, corneal diameter, axial length, and corneal haze. Each were given a score of 1 and a score <3 was considered as non-severe PCG. All of our recruited children had a score of <3. The children were followed up for at least 6 months. The median intra-ocular pressure (IOP) reduction, the requirement for glaucoma medications after surgery for IOP control, and the need for repeat surgery were analyzed.

Results

A total of 26 eyes were randomized into GATT (group 1, 13 eyes) and CTT (Group 2, 13 eyes) and were followed up for 6 months. The median Pre-op IOP in group 1 was 20 (range: 16-34 mmHg) and in group 2 was 26 (range:14-49 mmHg); P:0.2. The mean corneal diameter of group 1 was 13 mm (range:10 mm-14 mm) and Group 2 was 14.25 mm (range:12 mm-18 mm), p: NS. The median IOP at the 6th month follow-up for group 1 was 12 (range: 8-19 mmHg) and for group 2 was 13 (range: 4-40 mmHg); (inter-group p:0.07; test). There was no statistical difference in the total number of medications required after surgery between both the groups (0.12 ±0.35 in group 1 vs 1.21 ±1.4 in group 2; p:0.08). IOP of >18mmHg was seen in 1 eye in the group and 5 eyes in group 2. Re-surgery was required in 2 eyes in group 1 and 3 eyes in group 2, p:0.7

Conclusions

GATT is at least as efficacious in reducing IOP as CTT in children with moderate PCG with at least some corneal clarity. Thus, ab interno angle surgeries can be used as a first line of therapy for the management of non-severe PCG.

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P-920

MEDIUM-TERM SAFETY AND EFFICACY OF PRESERFLO™ MICROSHUNT IN GLAUCOMA PATIENTS: FURTHER FOLLOW-UP FROM A MULTICENTRE RETROSPECTIVE COHORT STUDY

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Purpose

To report two-year follow-up outcomes from a previously published one-year cohort of patients undergoing PreserFlo®-Microshunt (PMS) implantation for primary open-angle and pseudoexfoliation glaucoma from three multinational glaucoma clinics.

Methods

Retrospective review of the same previously published one-year data from consecutive patients undergoing PMS surgery at the Departments of Ophthalmology in Düsseldorf, Germany; Manchester, UK; and Madrid, Spain from 01/2020 to 12/2020. These surgeries include the very first PMS implantations in the participating centres and represent real-life experiences and outcomes. Data analysed included preoperative clinical features and detailed follow-up regarding IOP, BCVA, IOP-lowering medication, further interventions and complications. Statistical analyses were performed with SPSS Statistics version 27.0.0 (IBM Corporation, New York).

Results

75 eyes of 75 patients were included. Mean IOP decreased from 24.03 mmHg (14 - 54 mmHg) to 13.84 mmHg (7–24 mmHg) (reduction of 38.1%) after 24 months with a reduction of IOP-lowering agents from 2.57 (1-5) to 0.68 (0 – 3). Visual acuity preoperatively was 0.23 logMAR and 0.28 logMAR after 2 years. Qualified and complete success rates were 78.7% and 56% for Criterion A (IOP≤21 mmHg), 72.0% and 53.3% for Criterion B (IOP≤18 mmHg), 38.7% and 33.4% for Criterion C (IOP≤15 mmHg) and 22.2% and 17.3% for Criterion D (IOP≤12 mmHg) respectively. 3 patients (4.0%) needed an additional glaucoma surgery (2 patients (2.6%) a trabeculectomy and 1 patient (1.3%) a glaucoma drainage device) during the postoperative course, 6 patients (8.0%) needed a revising surgery, 5 patients (6.6%) a needling with antimetabolites and 3 patients (4%) received a flushing of the PMS. 6 patients (8.0%) developed complications during the postoperative course, including conjunctival perforation (1, 1.3%), disc splinter hemorrhage (1, 1.3%), postoperative uveitis (2, 2.6%), iris plugging of the PMS (1, 1.3%) and choroidal detachment due to hypotony that resolved without further interventions (1, 1.3%).

Conclusions

PMS implantation is a safe and effective procedure for reducing IOP and pressure-lowering therapy. The number of patients requiring a second intervention after PMS implantation is relatively low whilst some patients may need a revising surgery during the postoperative course. The results originally seen at one year seem to persist at the two-year mark.

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P-921

LONG-TERM OUTCOMES OF MITOMYCIN-C AUGMENTED TRABECULECTOMY USING SUBCONJUNCTIVAL INJECTIONS VERSUS SOAKED SPONGES: A RANDOMIZED CONTROLLED TRIAL

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Purpose
To compare the Long -Term safety & efficacy of subconjunctival injection of Mitomycin C(MMC) with sponge-applied MMC during trabeculectomy.

Methods
This prospective, randomized, interventional study was conducted on consecutive patients with uncontrolled glaucoma. 137 patients were recruited and the patients were randomized into an Injection group(Group 1 ,n=66) and a sponge group(Group 2,n=71). Trabeculectomy was performed in all cases and the patients were followed up on days 1, 15, 30, 3 months,6 months,1 year,2 year & 3 year postoperatively. Baseline & follow-up visits were compared to find out the significant difference in the number of antiglaucoma medications (AGM), Intraocular pressure(IOP), and Best Corrected Visual Acuity(BCVA). A p-value <0.05 was considered statistically significant.Interventions: For Group 1, the surgeon used MMC 0.4 mg/mL, diluted 0.1 mL of MMC (40 µg) in 0.1 mL of lidocaine (1:1, total volume of 0.2 mL). Half of that solution (0.1 mL of MMC: lidocaine [20 µg]) was used.For Group 2,two separate semicircular surgical sponges (7mm corneal light shield cut in half) soaked with MMC solution of 0.4 mg/mL was inserted subconjunctivally

Results
Mean preop IOP was 34.21±13.3mmHg& 34.17±10.6mmHg in group 1&2 respectively-,which reduced to 11.34±3.7& 12.57±4.7mmHg(6 months),11.97±4.2& 13.60 ±5.3mmHg(1year),12.42±4.4& 11.77±2.8 mmHg(2years)&11.25±3.2&11.81±3.2mmHg at final visit(P<0.001 in both groups)with no significant difference between the groups.The mean number of preoperative AGM was 2.32±0.7&2.32±0.8 in group1&2 respectively which reduced to 0.78±0.9(p<0.001)&1.13±1.1(P=0.930)at 3 years. Complete &overall success rates were 59.1%&61.6% in grp 1& 47.6%&60.0% in group 2 at 3 years. Log-rank test was used to test the success Kaplan-Meier curve between groups and there was no significant difference(p=0.512). Postoperative complications and the final post-operative visual outcomes were similar between the groups.

Image

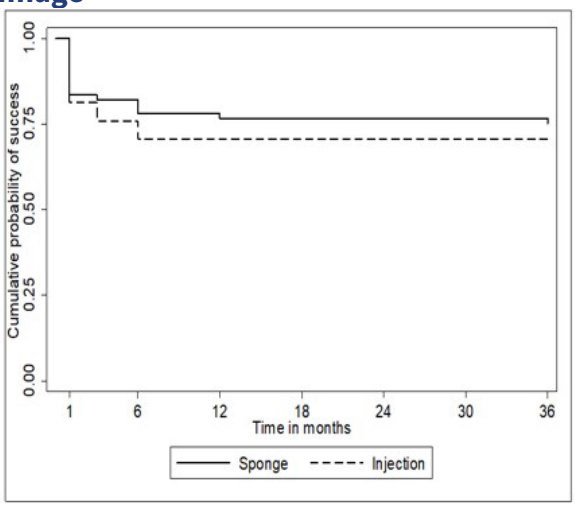


Fig1: Kaplan-Meier survival curve showing the cumulative probability of success between sponge and injection group

Conclusions

Subconjunctival Injection of MMC is as safe and effective as sponge application with comparable surgical outcomes and complications in the long term.

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P-922

MIGS: ARE THEY SAFE & WHAT HAPPENS NEXT? LONG-TERM SAFETY PROFILE AND FURTHER PROCEDURE DATA FROM THE REAL-WORLD SPECTRUM HYDRUS® MICROSTENT REGISTRY

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Purpose

Safety concerns are central to assessing new technologies, however detailed information from a non clinical-trial setting can be scarce. The SPECTRUM Global Registry for patients implanted with the Hydrus® Microstent provides a true Real-World clinical setting, with over 2500 eyes from 18 countries and post-operative follow-up now over 5 years. Registry data was reviewed for the largest patient cohort, POAG, for safety profile indicators including complications, indications for and type of further procedures required.

Methods

Registry data was analysed for patients who met eligibility criteria of age ≥ 18 years, with a diagnosis of POAG and no prior history of incisional glaucoma surgery. All received Hydrus Microstent implantation either standalone or in combination with cataract surgery. Only patients with a minimum of 6 months post-operative follow-up were included. Data was analysed for Intra-operative and Post-operative Adverse Events (AEs) and subsequent interventions.

Results

The SPECTRUM Registry comprised 2787 eyes with Hydrus Microstent implantation, of which 2528 (71%) were diagnosed with POAG and therefore eligible for this analysis. Intra-operative AEs included: device malposition (1%), cataract surgery related (0.3%), hyphema (0.3%) and corneal complications (0.1%). All other intra-operative AEs were < 0.1%. Post-operative AEs included: IOP elevation > 10 mmHg (1.1%), peripheral anterior synechiae (1.1%), device malposition (0.2%), device obstruction (0.2%), hyphema (0.2%), hypotony (0.1%), cyclodialysis, ciliary body damage (0.1%) and BCVA decrease > 2 lines (0.1%). All other post-operative AEs < 0.1%. A total of 291 eyes (11.5%) required additional IOP lowering procedures through to 5 years. These interventions were trabeculectomy (3.3%), SLT (2.3%), GDD (1.6%), Xen (1.1%), cilioablative (0.7%), CyPass (0.4%), replacement Hydrus (0.4%), bleb revision (0.4%) and canaloplasty (0.1%). All other procedures were < 0.1%.

Conclusions

The SPECTRUM Registry analysis suggests that Hydrus Microstent implantation in eyes with POAG in a Real-World clinical setting has a favourable Safety Profile, whether surgery is carried out Standalone or in Combination with cataract surgery. Further procedures were required for POAG control in 11.5% of patients at 5 years and reflected the full spectrum of alternative IOP lowering procedures available. Registry analyses can provide clinicians with critical Real-World data to help in assessing MIGS as a therapeutic option for their patients.

P-923

IMPACT OF INCORPORATING INTRAOCULAR SURGERY TRAINING IN A HIGH-VOLUME OPHTHALMIC SURGERY CENTER WITH A NEW RESIDENCY PROGRAM

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Purpose

To compare surgery times between residents and consultants performing class-1 ophthalmological surgeries (at least 50% of the case) in a high-volume ophthalmic surgery center. Surgical training in ophthalmology has traditionally been a role of university-based residency programs around the world. However, intraocular surgery training in such residency programs is essentially nonexistent in Germany due to the alleged increased risk of complications and the fear of university-based surgeons creating their own competition. To make up for the scarcity of competent ophthalmic surgeons, ophthalmic surgery centers have now established programs that mirror US residency training by including a standardized surgical curriculum.

Methods

A retrospective study was conducted on 26 consecutive patients who underwent trabectome surgery (T) for the treatment of glaucoma. There were 13 T in the resident surgeon group ($T_{res)}$ and 13 T in the expert surgeon group (T_{exp}). We also studied 100 cataract patients (C) with equal numbers in the resident (C_{res}: n=50) and the expert group (C_{exp}: n=50). The length of surgery and complications were noted.

Results

The surgical time was 254±130 seconds (s) for Tres and 158±38 s for Texp (faster by 96 s, p=0.01). No complications occurred. The surgical time was 1076±571 s for Cres and 493±98 s for Cexp (faster by 582 s, p<0.001). One posterior and one anterior capsule tear occurred in Cres.

The difference between Tres and Texp was not clinically relevant. Surgical competence without the need for direct supervision was achieved after 25 training cases. The impact on surgery times in C, with normally up to 26 cases per room and day, was modest and provided residents with 5 cases per day, thereby reducing the total caseload to 20 per room and day.

Regular training could be incorporated into two days per week. This allowed providing two residents with more than 100 cases per year, resulting in the competency to operate without direct supervision already by the end of one year. Training for two additional residents was added six months after launching the first two.

Conclusions

This study demonstrates that effective intraocular surgical training can be integrated into a busy OR schedule with a minimal impact on workflow. At the Artemis Eye Centers of Frankfurt, it was possible to train two eye surgeons, followed by two additional residents, within the first year of launching the new residency training.

PLB-029

MODIFIABLE SURGICAL PARAMETERS ASSOCIATED WITH MEDICATION-FREE SUCCESS IN TRABECULECTOMY SURGERY

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Purpose

Wide variations in surgical technique exist in Trabeculectomy surgery with varying degrees of reported success. This study aims to identify modifiable surgical parameters associated with medication-free success.

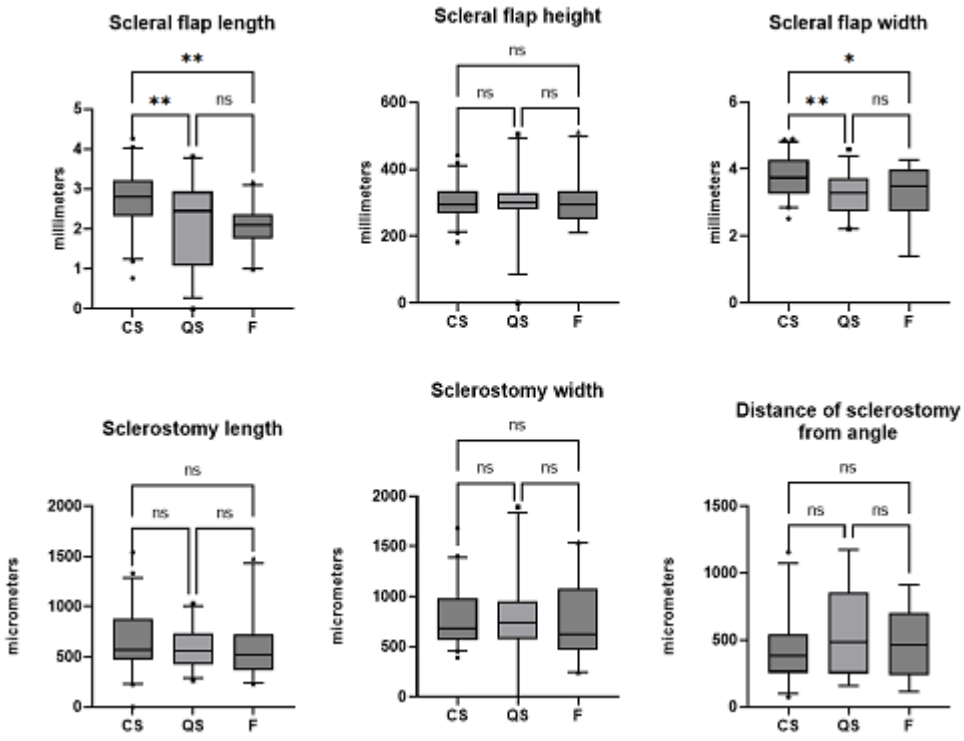
Methods

Cross-sectional study of 100 blebs of 65 patients who had undergone prior Trabeculectomy surgery with/without intraoperative Mitomycin-C at least one year prior for Glaucoma. Swept source anterior segment-optical coherence tomography (AS-OCT, Anterion®, Heidelberg Engineering) was used to capture scleral flap dimensions (length, height and width), sclerostomy dimensions (length and width) and distance of sclerostomy from iridocorneal angle. Image segmentation and analysis was performed using Matlab (Mathworks).

Results

The proportion of complete success (CS; IOP ≤18mmHg with no medications), qualified success (QS; IOP ≤18 with medications) and failure (F; IOP>18mmHg) was 45%, 33%, and 22% respectively, with a mean post-operative follow up duration of 10.7 years. Intra-operative Mitomycin-C use was significantly greater in the CS group (85.4% vs 51.6% vs 36.8% in CS vs QS vs F, p = 0.0003). Scleral flap length as measured from the iridocorneal angle was significantly longer in the CS group (2.76 vs 2.15 vs 2.08mm in CS vs QS vs F, p = 0.001). Scleral flap width was significantly wider in the CS group (3.76 vs 3.24 vs 3.25mm in CS vs QS vs F, p = 0.003). The other parameters were not significantly different across groups.(Figure 1)

Image



Conclusions

A longer and wider scleral flap and intraoperative Mitomycin-C use is associated with greater complete surgical success in Trabeculectomy patients at a mean follow up duration of 10 years.

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PLB-030

OUTCOMES OF EARLY VERSUS DELAYED TRABECULOTOMY FOR PRIMARY CONGENITAL GLAUCOMA

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Purpose
In patients with primary congenital glaucoma (PCG), elevated intraocular pressure IOP causes abnormal eye growth. This study compared the outcomes of children with PCG who underwent ab externo trabeculotomy (TROC) at age ≤6 months (early TROC) and of those who underwent TROC at age >6 months (delayed TROC).

Methods
IOP, horizontal corneal diameter (HCD), central corneal thickness (CCT), and axial length (AL) were compared before TROC and at 1-, 3-, 6-, and 12-month follow-up visits between the groups of children who underwent TROC until or after 6 months of age. The ALs of these groups were also compared with age-matched eyes examined under the same conditions.

Results
TROC was performed in 43 children: 18 (33 eyes) aged 6 months (group 1) and 25 (37 eyes) aged >6 months (group 2); the mean ages were 86.56±53.64 and 504.48±448.14 days, respectively. The mean pre- and 12-month postoperative IOP values were 15.97±4.78/16.62±4.85 and 9.77±2.88/10.93±4.83 mmHg, respectively. Delayed TROC was associated with abnormal AL in 31 (88.6%) out of 37 eyes, while after early TROC, only 13 (41.9%) out of 33 eyes had abnormal AL (chi-square, 8.00; P=0.03). In multivariable analysis, each 1-mmHg increase in preoperative IOP was associated with a 0.25-mmHg increase at 12 months (P=0.04). On average, the mean IOP of the delayed TROC group was higher than that of the early TROC group by 3.72 mmHg at postoperative month 12 (95% CI=0.44 to 6.99; P=0.02).

Conclusions
Compared with delayed TROC, early TROC is associated with reduced IOP and substantially reduced incidence of abnormal AL at postoperative month 12.

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PLB-031

EFFICACY AND SAFETY OF HIGH FREQUENCY DEEP SCLEROTOMY (HFDS) IN PATIENTS WITH OPEN-ANGLE GLAUCOMA AND CATARACTS

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Purpose
To compare phacoemulsification alone versus combined phaco +HFDS in medically uncontrolled open angle glaucoma with coexisting cataract.

Methods
Prospective randomized clinical trial. 32 medically uncontrolled OAG patints (64 eyes) with coexisting cataract. Recruited patients were randomized into group 1 (combined phaco+HFDS) or group 2 (phacoemulsification alone). Postoperatively, patients were reviewed every 3 months for 2 years. Main outcome measures: Postoperative complication, intraocular pressure (IOP) and requirement for topical glaucoma drugs.

Results
23 OAG patients eyes were randomized into group 1, and 23 eyes those patients were randomized into group 2. Combined phaco +HFDS resulted in lower mean postoperative IOP than phacoemulsification alone at 3 months (19.2 vs. 20.4 mmHg, P = 0.01), 12 months (19.5 vs. 23.1 mmHg, P = 0.02), 18 months (20.6 vs. 26.6 mmHg, P = 0.002) and 24 months (21.5 vs. 23.3 mmHg, P = 0.002) . Combined phaco+HFDS resulted in 0.32 fewer topical glaucoma drugs (P<0.001) in the 24-month postoperative period, compared with phacoemulsification alone. Combined surgery was associated with more postoperative complications (P<0.001) compared with phacoemulsification alone.

Conclusions
Combined phaco +HFDS is more effective than phacoemulsification alone in controlling IOP in medically uncontrolled OAG eyes with coexisting cataract.

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PLB-032

OUTCOMES OF GONIOSCOPY-ASSISTED TRANSLUMINAL TRABECULOTOMY (GATT) COMBINED PHACOEMULSIFICATION SURGERY IN PATIENTS WITH OPEN ANGLE GLAUCOMA

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Purpose
To report outcomes of gonioscopy-assisted transluminal trabeculotomy (GATT) surgery alone and combined with phacoemulsification, in patients with open angle glaucoma (GAA)

Methods
57 eyes with open angle glaucoma were included, who underwent GATT surgery alone or combined with phacoemulsification (FG) and IOL implantation, in a third level hospital, between 2019 and 2022. Main outcome measures included surgical success rate (Intra Ocular Pressure(IOP) decrease >20% or Number of Antiglaucoma Medications(NAM) decrease ≥2), changes in IOP, NAM, best corrected visual acuity (BCVA), postoperative complications and follow-up. Surgery was divided in four groups: GATT alone(G), GATT combined with phacoemulsification(FG), HemiGATT alone(HG), and HemiGATT combined with phacoemulsification(HFG).

Results
In 57 eyes(42 patients), success rate was 70% in G, 88.5% in FG, 55.6% in HG and 75% in HFG. IOP decreased from 21.10 mmHg on 2.5 medications preoperatively to 12.60 on 0.90 medications postoperatively in G, from 18.69mmHg on 2.35 medications preoperatively to 13.42 mmHg on 0.74 medications postoperatively in FG, from 27.67 mmHg on 2.78 medications preoperatively to 18.67 mmHg on 1.78 medications postoperatively in HG, and from 24 mmHg on 2.42 medications preoperatively to 15.67 mmHg on 1 medication postoperatively in HFG. Mean NAM decrease was 1.6(G), 1.92(FG), 1(HG) and 1.73(FHG).

Conclusions
GATT combined with cataract surgery is a safe and effective treatment for decreasing IOP and NAM in patients with glaucoma and cataract. FG has better success rate and is more effective decreasing NAM, than G.

PLB-033
GATT IN SILICON OIL GLAUCOMA

P Jansari

Purpose
To study the efficacy and safety of GATT (Gonioscopy assisted Transluminal Trabeculotomy) in Eyes with Silicon Oil Glaucoma

Methods
Twenty two eyes with silicon oil glaucoma whose Intraouclar pressure was uncontrolled medically underwent GATT procedure under local anesthesia by a single surgeon over a period of six months. The preoperative and post operative intraouclar pressure of every visit were noted. Intraoular pressure below 22 mmHg was considered as succesful outcome with or without antiglaucoma medications. Postoperative complications and additional surgical interventions were noted.

Results
In the twenty two eyes studied, the preoperative IOP ranged from 22 to 45 mm Hg. Age ranged between 32 years and 74 years. sixteen patients were male and six patients were female. The pre operative IOP in all the eyes was above 22 mmHg with maximum antiglaucoma medications. After surgery twenty out of 22 eyes reached the target IOP of below 22 mmHg with or without topical anti glaucoma medications(AGM), where fourteen eyes did not require any topical AGM giving complete success in 70% of eyes which reached target IOP and six eyes reached target IOP with one or more topical AGM giving qualified success in 30% of eyes acheiving the target IOP. In two eyes oral AGM were needed to keep IOP below 22 mmHg apart from topical maximum medical anti glaucoma therapy. In post operative period, 17 eyes had hyphema on first post op day, which cleared by second post op visit on 7th day in 15 eyes, while in 2 eyes the hyphema cleared in three weeks, all by conservative therapy. In one eye, silicon oil was found in anterior chamber on second post op visit done on 7th day, which required silicon oil removal from AC in OT in the same visit. There were no complications related to retina like retinal detachment. There were no other minor or major postoperative complications in any of the eyes.

Conclusions
Gonioscopy assisted transluminal trabeculotomy GATT is extremly effective in reducing the intraocular pressure in secondary open angle glaucoma caused by silicone oil in the eye after retinal surgery, with very good success rate and no major complications during six months follow up. Further long term studies are needed to understand the sustained IOP lowering efficacy of the procedure.

PLB-034

OUTCOMES OF GONIOSCOPY-ASSISTED TRANSLUMINAL TRABECULOTOMY (GATT) SURGERY IN PATIENTS WITH GLAUCOMA

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Purpose
To report outcomes of gonioscopy-assisted transluminal trabeculotomy (GATT) surgery in patients with glaucoma.

Methods
A retrospective review was performed for all patients who underwent GATT surgery in a third level hospital. Main outcome measures were IOP, number of glaucoma medications and IOP reduction.

Results
80 eyes (58 patients) were treated, with a mean follow-up of 18.58 months (0-47 months). The mean age was 70.8 years (13.38 standard deviation). 66.3% of surgeries were performed in males. Most procedures were performed during 2022 (38.8%) and 2019 (28.7%). GATT surgery was performed, most frequent in patients with open angle glaucoma (71.3%) and angle-closure glaucoma (18.8%).

For all eyes, the mean preoperative intraocular pressure (IOP) (SD) was 22.85 (8.54) mm Hg, and 2.66 (0.7) glaucoma medications. Mean postoperative IOP was 15.03 (4.69). Mean percentage reduction of IOP was 31.7% (20.25). There were just 4 complicated cases (1 hyphema, 1 descemet detachment, 1 hemovitreous, and 1 uveitis).

Conclusions
GATT is a safe and successful surgery for different types of glaucoma, especially in open angle glaucoma. GATT offer an important IOP decrease in patients with glaucoma.

INDEX

INDEX

RP-001
VALIDATING TREND-BASED ENDPOINTS FOR NEUROPROTECTION TRIALS IN GLAUCOMA 2

RP-002
MACHINE LEARNING DERIVED VISUAL FIELD PATTERNS ARE ASSOCIATED WITH GLAUCOMA POLYGENIC RISK SCORE IN THE OCULAR HYPERTENSION TREATMENT STUDY 4

RP-003
GLAUCOMA RISK PREDICTION IN OCULAR HYPERTENSION: A COHORT STUDY USING ELECTRONIC MEDICAL RECORDS TO VALIDATE A RISK PREDICTOR: GRIP STUDY 6

RP-004
A DEEP LEARNING APPROACH TO PREDICT VISUAL FIELD USING RETINAL NERVE FIBER LAYER OPTICAL TEXTURE ANALYSIS MAPS 8

RP-005
GLAUCOMAI - THE FIRST IN CLASS, INTELLIGENT DECISION SUPPORT SYSTEM FOR GLAUCOMATOUS OPTIC NEUROPATHY RISK DIAGNOSTICS 10

RP-006
GENOME WIDE DISCOVERY VIA FEATURE SPACE MAPPING OF DEEP-LEARNING DERIVED CLINICAL OCT PHENOTYPES TO THE UK BIOBANK 12

RP-007
RACIAL DIFFERENCES IN PREVALENCE AND RISK FACTORS OF SHALLOW ANTERIOR CHAMBER DEPTH: THE MULTIETHNIC OPHTHALMOLOGY COHORTS OF CALIFORNIA STUDY 14

RP-008
ELUCIDATING THE ROLE OF PRIMARY ANGLE CLOSURE GLAUCOMA (PACG) SUSCEPTIBILITY GENES, EPDR1 AND PLEKHA7 IN PACG PATHOGENESIS 16

RP-009
ALTERED LEVELS OF SOLUBLE IMMUNE FACTORS IN TEARS OF EYES WITH EXFOLIATION GLAUCOMA 17

RP-010
ROLE OF CELL ORIGIN IN INDUCED PLURIPOTENT STEM CELL DIFFERENTIATION FOR TRABECULAR MESHWORK RESTORATION IN PRIMARY OPEN-ANGLE GLAUCOMA 20

RP-011
LOXL1 AND ITS REGULATING MIRNAS IN PSEUDOEXFOLIATION GLAUCOMA 21

RPLB-001
A STUDY ON THE ANTI-FIBROTIC EFFECT OF GLAUCOMA IMPLANTS WITH HYDROGEL THAT RELEASES ANTI-FIBROTIC AGENTS 22

RP-012
THE IMPACT OF PRE-TREATMENT INTRAOCULAR PRESSURE ON TREATMENT RESPONSE IN THE LIGHT TRIAL: SELECTIVE LASER TRABECULOPLASTY COMPARED TO MEDICATION 25

RP-013
GLAURIOUS, A MULTICENTRE, RANDOMISED, CONTROLLED TRIAL OF DIRECT SELECTIVE LASER TRABECULOPLASTY IN OPEN ANGLE GLAUCOMA 27

RP-014
COMPARISON OF IOP AND SYSTEMIC EFFECTS OF CONVENTIONAL VS. 10 ML TIMOLOL EYE DROPS 29

RP-015
EXTENDED DURATION OF IOP LOWERING WITH BIMATOPROST IMPLANT IN A PHASE 3 EXTENSION STUDY 30

RP-016
VIDEO-RECORDED ASSESSMENT IDENTIFIED NOVEL FACTORS ASSOCIATED WITH TOPICAL MEDICATION INSTILLATION FAILURE IN GLAUCOMA PATIENTS: VRAMS-QPIG STUDY 31

RP-017
RATES OF CHANGE OF VISUAL FIELD SENSITIVITY IN PATIENTS WITH GLAUCOMA IN ASIA – A PILOT REPORT FROM THE ASIAN GLAUCOMA REGISTRY 32

RP-018
PRESERFLO® MICROSHUNT - MIGS: COMPARISON OF EFFICIENCY, SAFETY, AND POSTOPERATIVE MANAGEMENT WITH INTRAOPERATIVE USE OF 0.02% MMC VS. 0.04% MMC 33

RP-019
PERFORMANCE OF A SUPRACILIARY DRAINAGE DEVICE IN GLAUCOMA PATIENTS WITH VARIOUS STAGES OF DISEASE SEVERITY 34

RP-020
IMPACT OF DIFFERENT LITERATURE-BASED HYPOTONY FAILURE CRITERIA ON SUCCESS RATES OF GLAUCOMA SURGERY 36

RP-021
A MULTI-CENTRE STUDY OF A SUPRACILIARY GLAUCOMA DRAINAGE DEVICE IN PATIENTS WITH OPEN ANGLE GLAUCOMA: 1-YEAR FOLLOW-UP RESULTS 38

RP-022
INHIBITORY EFFECT OF SUNITINIB COMBINED WITH A-TOCOTRIENOL ON THE PROLIFERATION AND ACTIVATION OF HUMAN TENON'S FIBROBLASTS *IN VITRO* 39

RP-024
LONG-TERM VISUAL ACUITY OUTCOMES OF DEEP SCLERECTOMY IN PEDIATRIC GLAUCOMA 40

RP-025
INTERMEDIATE SAFETY AND EFFICACY OUTCOMES OF THE NOVEL 63MM GELATIN MICROSTENT VERSUS THE CONVENTIONAL 45MM GELATIN MICROSTENT 42

RPLB-002
COMBINED CATARACT AND STAND-ALONE SUPRACILIARY DRAINAGE DEVICE SURGERY: SHORT-TERM RESULTS 43

P-001
VALIDATION OF ANTERIOR SEGMENT OCT IN DETECTING ANGLE DYSGENESIS IN GLAUCOMA USING ARTIFICIAL INTELLIGENCE 46

P-002
MACHINE LEARNING APPROACHES FOR PREDICTING GLAUCOMA PROGRESSION USING MULTICENTER ELECTRONIC HEALTH RECORDS: THE SIGHT OUTCOMES RESEARCH COLLABORATIVE 47

P-003
THE ROLE OF ARTIFICIAL INTELLIGENCE IN PREDICTING THE PROGRESSION OF INTRAOCULAR HYPERTENSION TO GLAUCOMA 49

P-004
GLAUCOMA SCREENING MADE POCKET FRIENDLY ON YOUR SMARTPHONE! 51

P-005
FEW SHOT LEARNING BASED DIAGNOSIS OF GLAUCOMA USING WIDE-FIELD OCT ANGIOGRAPHY 52

P-006
A FUSION LEARNING METHOD FOR THE GLAUCOMA DIAGNOSIS BASED ON MULTIPLE SOURCES OF OPHTHALMIC DIGITAL IMAGES 53

P-007
CANNY EDGE ALGORITHM PERFORMANCE FOR AUTOMATIC OPTIC NERVE DISC MARGIN DETECTION IN SD-OCT 56

P-008
RELATIONSHIP BETWEEN ORAL HEALTH AND GLAUCOMA IN THE UNITED KINGDOM 58

P-009
MODELLING AND MITIGATING ANNOTATIONS WITH HUMAN-IN-THE-LOOP MACHINE LEARNING FOR MULTIMODAL ASSESSMENT OF ANTERIOR CHAMBER ANGLES IN GLAUCOMA PATIENTS 59

P-010
PREDICTION OF PERIMETRIC PROGRESSION IN OAG PATIENTS BASED ON HIGH-SPEED IMAGING (CORVIS ST) MEASUREMENTS USING ARTIFICIAL INTELLIGENCE (XGBOOST) 61

P-011
VISUAL ACUITY PREDICTION IN PRIMARY CONGENITAL GLAUCOMA WITH MACHINE LEARNING MODELS 62

P-012
USE OF MACHINE LEARNING TO PREDICT SUCCESS & EFFECTIVENESS OF SELECTIVE LASER TRABECULOPLASTY (SLT) IN OCULAR HYPERTENSION/ OPEN ANGLE GLAUCOMA 63

P-013
COMPARISON BETWEEN CLINICAL OBSERVATION AND ARTIFICIAL INTELLIGENCE: STAGING OF PERIPHERAL ANTERIOR CHAMBER DEPTH 65

P-014
DEEP LEARNING AS CLINICAL DECISION SUPPORT SYSTEM IN GLAUCOMA SCREENING WITH EYE FUNDUS 67

P-015
EVALUATION OF AN AUTOMATED SYSTEM THAT RUNS OFFLINE ON A SMARTPHONE-BASED FUNDUS CAMERA FOR SCREENING CHILDHOOD GLAUCOMA: PILOT STUDY 68

P-016
INTER-OBSERVER VARIABILITY OF HUMAN OPTIC DISC EVALUATION ON FUNDUS PHOTOS AND IMPLICATIONS FOR AI-RESEARCH 69

P-017
DEVELOPMENT OF A DEEP LEARNING (DL) SYSTEM TO ESTIMATE THE 52-POINT RAW VISUAL FIELD (VF) DATA FROM FUNDUS PHOTOGRAPHS 70

P-018
ARCHETYPE ANALYSIS AND POTENTIAL PREDICTOR PATTERNS IN VISUAL FIELDS FOR EARLY-STAGE GLAUCOMA DETECTION 71

P-019
REDDIT USERS' QUESTIONS AND CONCERNS ABOUT GLAUCOMA 73

P-020
EARLY GLAUCOMA DETECTION BY USING STYLE TRANSFER TO PREDICT RETINAL NERVE FIBER LAYER THICKNESS DISTRIBUTION ON THE FUNDUS PHOTOGRAPH 75

P-021
REDUCING RED DISEASE IN GLAUCOMA DIAGNOSIS USING OCT REFERENCE DATABASES GENERATED BASED ON ANATOMICAL FEATURES 77

P-022
CLINICAL ASSOCIATIONS OF UNSUPERVISED DEEP LEARNING-DERIVED MACULAR OCT PHENOTYPES 79

P-023
SMART AI APP TO PREDICT BEST POSSIBLE MIGS SOLUTION 81

P-024
EVALUATING LANDMARK AND ARTEFACT DETECTION IN OCT IMAGES WITH DEEP-LEARNING BASED OBJECT DETECTION FRAMEWORKS 82

P-025
PERFORMANCE OF AN AUTOMATED, OFFLINE ARTIFICIAL INTELLIGENCE TOOL ON A SMARTPHONE-BASED FUNDUS CAMERA IN SCREENING VARIOUS STAGES OF GLAUCOMA SEVERITY 83

P-026
DEEP LEARNING TO PREDICT PERSONALIZED NEAR-NORMAL RETINAL NERVE FIBER LAYER THICKNESS 84

P-027
SYSTEMIC FACTORS ASSOCIATED WITH 10YEAR GLAUCOMA PROGRESSION IN SOUTH KOREAN POPULATION: A SINGLE CENTER STUDY BASED ON ELECTRONIC MEDICAL RECORDS 86

PLB-001
PERFORMANCE EVALUATION OF CHATGPT AND GOOGLE BARD FOR FREQUENTLY ASKED GLAUCOMA-RELATED QUESTIONS 87

PLB-002
AUTOMATED CLASSIFICATION OF ANGLE CLOSURE MECHANISMS BASED ON ANTERIOR SEGMENT OPTICAL COHERENCE TOMOGRAPHY IMAGES VIA DEEP LEARNING 89

P-028
EVALUATION OF ALLOSTATIC LOAD IN PATIENTS WITH PRIMARY OPEN ANGLE GLAUCOMA 91

P-029
PREVALENCE OF ANGLE CLOSURE GLAUCOMA IN TAMALE, GHANA 93

P-030
SMOKING AND PROGRESSIVE VESSEL DENSITY CHANGE IN GLAUCOMA 94

P-031
ASSOCIATION OF STATIN USE AND DIAGNOSED OPEN ANGLE GLAUCOMA: A NATIONWIDE MATCHED CASE-CONTROL STUDY IN TAIWAN, 2002-2016 96

P-032
THE PREVALENCE AND RISK OF DEVELOPING SUBSEQUENT GLAUCOMA IN ALZHEIMER AND VICE VERSA: A TEMPORALITY-BASED META-ANALYSIS OF PREVALENCE AND COMPARISON 97

P-033
SLEEP QUALITY ASSESSMENT IN GLAUCOMA PATIENTS USING THE PITTSBURGH SLEEP QUALITY INDEX 99

P-034
THE EFFECT OF BODY MASS INDEX REDUCTION ON INTRAOCULAR PRESSURE IN A LARGE PROSPECTIVE COHORT OF APPARENTLY HEALTHY INDIVIDUALS IN ISRAEL 100

P-036
ASSOCIATION BETWEEN ALCOHOL CONSUMPTION PATTERNS AND GLAUCOMA: A LARGE SCALE CASE-CONTROL STUDY IN JAPAN 101

P-038
RISK OF ANGLE CLOSURE GLAUCOMA WITH BISPHOSPHONATE USE IN PATIENTS WITH OSTEOPOROSIS 102

P-039
“QUALITY OF LIFE IN GLAUCOMA PATIENTS: COMPARISON OF MEDICAL THERAPY, TRABECULECTOMY AND GLAUCOMA DRAINAGE DEVICE” 104

P-040
DRUG UTILIZATION, ADHERENCE AND PREDICTORS OF DRUG-CHANGES AND DISCONTINUATION OF GLAUCOMA DRUG THERAPIES 105

P-041
EXPLORING LATE PRESENTATION OF GLAUCOMA AND PATIENT MOTIVATIONS IN HONG KONG 106

P-042
QUALITY OF LIFE IN PEOPLE LIVING WITH PRIMARY OPEN-ANGLE GLAUCOMA: A NEGLECTED BUT WORRYING SITUATION IN A CAMEROONIAN ENVIRONMENT 107

P-043
INCREASED RISK OF OPEN-ANGLE GLAUCOMA IN NON-SMOKING WOMEN WITH OBSTRUCTIVE PATTERN OF SPIROMETRIC TESTS 109

P-044
EVALUATING THE EFFECTIVENESS OF COMBINED CATARACT AND MINIMALLY INVASIVE GLAUCOMA SURGERIES ON GLAUCOMA-SPECIFIC QUALITY OF LIFE 111

P-046
SURVIVAL OF PATIENTS WITH NEOVASCULAR GLAUCOMA AFTER MICROPULSE TRANSSCLERAL LASER THERAPY (MP-TLT) 112

P-047
NATIONWIDE PREVALENCE OF CONTRAINDICATED PRESCRIPTION OF BRIMONIDINE TARTARATE FOR KOREAN CHILDREN 114

P-048
ADMINISTERING THE GLAUCOMA COMPUTERIZED ADAPTIVE TEST (GLAUCAT) IN A GLAUCOMA CLINIC 116

P-049
BUILDING BACK BETTER: IMPROVED PATIENT PATHWAY FOR NEW GLAUCOMA PATIENT REFERRALS TO HOSPITAL EYE SERVICES IN THE UK 117

P-050
MYOPIA CORRELATION WITH OPEN-ANGLE GLAUCOMA: A SYSTEMATIC REVIEW AND META-ANALYSIS 118

P-053
RISK OF ANGLE CLOSURE GLAUCOMA IN ATTENTION-DEFICIT / HYPERACTIVITY DISORDER PATIENTS USING METHYLPHENIDATE, AMPHETAMINES, OR ATOMOXETINE 119

P-054
GLAUCOMA VIRTUAL MONITORING CLINIC – DEVELOPMENT AND IMPLEMENTATION IN A PORTUGUESE PUBLIC HOSPITAL 120

P-055
COMPARISON OF EFFECT OF SURGICAL AND MEDICAL MANAGEMENT OF GLAUCOMA ON QUALITY OF LIFE 121

P-056
CLINICAL AND EPIDEMIOLOGICAL PROFILE OF CHILDREN TREATED AT A TERTIARY CARE CENTER FOR CHILDHOOD GLAUCOMA IN A DEVELOPING COUNTRY 123

P-057
COST-UTILITY OF SLT TREATMENT COMPARED WITH MEDICAL TREATMENT AND SURGERY IN PATIENTS WITH PRIMARY OPEN-ANGLE GLAUCOMA 125

P-058
LATE-ONSET GLAUCOMA IN PATIENTS RECEIVING VITRECTOMY: A NATIONWIDE POPULATION-BASED COHORT STUDY 128

P-059
ASSOCIATION BETWEEN ACUTE MYOCARDIAL INFARCTION AND THE RISK OF GLAUCOMA DEVELOPMENT: A 12-YEAR NATIONWIDE COHORT STUDY 129

P-060
IMPROVING GLAUCOMA PATIENT TREATMENT COMPLIANCE WITH A NEW UPRIGHT EYEDROP DELIVERY DEVICE 130

P-061
EYE TRACKER READING PATTERNS IN GLAUCOMA PATIENTS VS. CONTROL PATIENTS 131

P-062
IMPACT OF COVID-19 PANDEMICS IN PATIENTS SUBMITTED TO GLAUCOMA SURGERY: A 3-YEAR COMPARATIVE REPORT OF A PORTUGUESE OPHTHALMOLOGY DEPARTMENT 133

P-063
GLAUCOMA SUSPECT FINDINGS IN THE MANHATTAN VISION SCREENING AND FOLLOW-UP STUDY (NYCSIGHT) 134

P-064
A QUESTIONNAIRE-BASED RISK ASSESSMENT FOR IDENTIFYING GLAUCOMA IN PRIMARY CARE OFFICES 135

P-065
PROGNOSTIC FACTORS FOR PREDICTING PROGRESSION OF PRIMARY OPEN ANGLE GLAUCOMA IN ADULTS: A COCHRANE PROGNOSTIC REVIEW 137

P-066
FACTORS ASSOCIATED WITH SELF-PERCEPTION AS A BURDEN IN GLAUCOMA PATIENTS 138

P-067
MODELING THE QUALITY OF LIFE EVALUATION IN GLAUCOMA: A PATIENT-CENTERED APPROACH 140

P-068
THE ASSOCIATION OF CAROTID ARTERY STENOSIS AND OPEN ANGLE GLAUCOMA: A POPULATION-BASED STUDY 142

P-069
VISION-RELATED QUALITY OF LIFE FOLLOWING COMBINED CATARACT AND MINIMALLY INVASIVE GLAUCOMA SURGERY OR CATARACT SURGERY ALONE IN GLAUCOMA PATIENTS 143

P-070
INTRA-OCULAR PRESSURE CHANGE WITH AGE IN EARLY ADULT LIFE 144

P-072
PRESENTATION PATTERN AND VISUAL IMPAIRMENT AT PRIMARY PHACOTRABECULECTOMY IN ADVANCED PRIMARY OPEN ANGLE AND ANGLE CLOSURE GLAUCOMAS IN CENTRAL INDIA 145

P-073
THE EPIDEMIOLOGY OF FIELD OF VISION DISORDERS STUDY - EFOVID - CREATION OF A POPULATION BASED DATABASE 146

P-074
ASSOCIATION OF GLAUCOMA AND OCULAR HYPERTENSION IN PARS PLANITIS. A RETROSPECTIVE STUDY 148

P-075
IOP LEVELS AND ANGLE-CLOSURE PREDISPOSITION IN PATIENTS TREATED WITH DIFFERENT NEURO-PSYCHOTROPIC MEDICATIONS IN AZERBAIJAN 150

P-076
POSNER-SCHLOSSMAN SYNDROME RELAPSE FOLLOWING INACTIVATED COVID-19 VACCINATION IN CHINA 152

P-077
PREVALENCE AND RISK FACTORS OF GLAUCOMA IN SRI LANKA 153

P-078
MANAGEMENT OF GLAUCOMA PATIENTS IN WARTIME REALITY. TOUGH TIMES CREATE SMART DECISIONS 156

P-079
SYSTEMATIC REVIEW OF INSTRUMENTS FOR THE ASSESSMENT OF PATIENT-REPORTED OUTCOMES AND QUALITY OF LIFE IN CHILDREN AND ADOLESCENTS WITH GLAUCOMA 157

P-080
INTERNATIONAL REPRESENTATION ON FILM: THE WORLD GLAUCOMA CONGRESS 158

P-081
MANAGEMENT AND GLAUCOMA PRÉVALENCE IN SUB-SAHARA AFRICA: A LOOK ON THE GUINEAN CASE 159

P-082
A SIMPLE AND EASILY ACCESSIBLE PATIENT REPORTED OUTCOME MEASURE (PROM) INSTRUMENT TO GAUGE SATISFACTION OF A SURGICAL GLAUCOMA SERVICE 160

P-083
INCIDENCE OF GLAUCOMA FOLLOWING CATARACT SURGERY IN PEDIATRIC POPULATION A REFERENCE CENTER IN MEXICO 161

P-084
PRESERVED GLAUCOMA MEDICATIONS : IMPACT ON OCULAR SURFACE AND PATIENTS QUALITY OF LIFE 163

P-085
PREVALENCE OF GLAUCOMA AND CHARACTERISTICS OF OCULAR MANIFESTATION OF PATIENTS WITH THE NEVUS OF OTA: A LASER FLARE-CELL PHOTOMETRIC EXAMINATION 164

P-086
GLAUCOMA AND ASSOCIATED SYSTEMIC DISEASES 166

P-087
ASSESSMENT OF QUALITY OF LIFE IN GLAUCOMA WITH RESPECT TO SEVERITY OF DISEASE 167

P-088
DIETARY NITRATE AND IRON INTAKE IN A HIGH-RISK PRIMARY OPEN ANGLE GLAUCOMA POPULATION 168

P-089
PRIMARY CONGENITAL GLAUCOMA: AN EXPERIENCE AT BIRATNAGAR EYE HOSPITAL 169

P-090
DEMOGRAPHIC AND CLINICAL PROFILE OF JUVENILE OPEN ANGLE GLAUCOMA (JOAG) IN SAUDI ARABIA: A TERTIARY HOSPITAL STUDY 171

P-091
STEROID INDUCED GLAUCOMA – A STUDY OF PREVALENCE AND RISK FACTORS AS NOTED IN WESTERN MAHARASHTRA, INDIA 172

P-092
THE CLINICAL FEATURES IN PATIENTS WITH NEWLY DIAGNOSED PSEUDOEXFOLIATIVE GLAUCOMA IN SERBIA 174

P-093
PREVALENCE OF HIGH-RISK FEATURES IN UNITED KINGDOM COMMUNITY OPTOMETRY GLAUCOMA ELECTRONIC REFERRALS TO HOSPITAL EYE SERVICE 177

P-094
EVALUATION OF ADHERENCE TO GLAUCOMA TREATMENT AT A SOUTHERN BRAZILIAN HOSPITAL 179

P-095
EVALUATION OF ADHERENCE TO GLAUCOMA TREATMENT AT A SOUTHERN BRAZILIAN HOSPITAL 180

P-096
PREVALENCE OF ANXIETY AND DEPRESSION AND THEIR IMPACT ON QUALITY OF LIFE OF PATIENTS WITH GLAUCOMA IN A REFERRAL HOSPITAL IN MEXICO 181

P-097
GLAUCOMA PATIENT PRIORITISATION AUDIT 183

P-099
IMPACT OF THE COVID-19 PANDEMIC ON THE CHARACTERISTICS OF PATIENTS NEWLY ADMITTED TO THE GLAUCOMA DEPARTMENT 184

P-100
PIGGYBACKING GLAUCOMA SCREENING AND MANAGEMENT IN RURAL NORTHEAST NIGERIA 188

P-101
THE IMPACT OF THE FINANCIAL BURDEN OF HEALTHCARE AND INSURANCES ON ACCESS TO GLAUCOMA CARE IN SWITZERLAND 190

P-102
LEVEL OF AWARENESS AND KNOWLEDGE ABOUT GLAUCOMA DISEASE IN GLAUCOMA PATIENTS AND THEIR FAMILIES BALI INDONESIA 191

P-103
RISK FACTORS FOR NON-COMPLIANCE OF PATIENTS WITH OPEN-ANGLE GLAUCOMA IN THE CENTRAL PART OF SERBIA 193

P-105
OCULAR PARAMETERS ALTERATIONS AFTER HEMODIALYSIS IN PATIENTS WITH CHRONIC KIDNEY DISEASES UNDERGOING HEMODYALISIS 194

P-106
PREVALENCE AND RISK FACTORS FOR GLAUCOMA IN CHINESE AMERICANS: THE CHINESE AMERICAN EYE STUDY 195

P-107
EFFECT OF NON-OVERLAPPING VISUAL FIELD DEFECTS ON VISION RELATED QUALITY OF LIFE IN GLAUCOMA 196

P-108
EVALUATION FOR THE EFFECTIVENESS OF HOME-BASED IOP MONITOR COMBINED WITH DIGITAL DISTANCE INTERVENTION GLAUCOMA DISEASE MANAGEMENT MODEL 197

P-109
ASSESSING QOL BY DISEASE SEVERITY USING THE GLAUCAT 198

PLB-003
EFFECTS OF VISUAL SEARCH ON DRIVING PERFORMANCE IN GLAUCOMA PATIENTS AT A DRIVING ASSESSMENT CLINIC 199

PLB-004
SECONDARY GLAUCOMA SURGERIES AND SUBJECTIVE SIGNS IN EVERY DAY LIFE 200

PLB-005
GLAUCOMA AND PERIODONTAL DISEASE, A SYSTEMATIC REVIEW AND META-ANALYSIS 202

PLB-006
ACUTE PRIMARY ANGLE CLOSURE CONCURRENT WITH CORONAVIRUS DISEASE 2019 RECURRENCE IN CHINA: A MULTI-CENTER STUDY 203

PLB-007
RISK FACTORS FOR GLAUCOMA AND THEIR PROGNOSTIC SIGNIFICANCE IN WEST-AFRICAN ADULT GLAUCOMA PATIENTS 204

PLB-008
THE IMPACT OF COVID-19 ON THE WAIT TIMES AND SEVERITY OF SURGICAL GLAUCOMA CASES EVALUATED AT A TERTIARY EYE CENTER 206

PLB-009
GLAUCOMA IN A DIFFERENT SCENE: PRIMARY CARE, POVERTY AND ILLITERACY 207

P-110
PHARMACOGENETIC MARKERS OF RESPONSE TO LATANOPROST TREATMENT IN PATIENTS WITH PRIMARY OPEN-ANGLE GLAUCOMA AND OCULAR HYPERTENSION 210

P-111
NON-INVASIVE INFRARED SPECTROSCOPY OF AQUEOUS HUMOUR SAMPLES IN GLAUCOMA COMPARED TO CONTROLS 211

P-112
PERFORMANCE OF POLYGENIC RISK SCORES FOR GLAUCOMA IN AFRICAN POPULATIONS 213

P-114
ACCURACY OF CLINICAL EXOME SEQUENCING FOR NON-ACQUIRED GLAUCOMA 214

P-115
DESCRIPTION OF THE MOLECULAR SPECTRUM IN A MEXICAN COHORT OF PATIENTS WITH HEREDITARY PEDIATRIC GLAUCOMA 216

P-116
BRAIN-DERIVED NEUROTROPHIC FACTOR IN THE SERUM AND AQUEOUS HUMOR OF GLAUCOMA PATIENTS 218

P-117
A NOVEL BIOMARKER IN PRIMARY GLAUCOMA: AQUEOUS HUMOR AND SERUM LEVELS OF ISCHEMIA MODIFIED ALBUMIN (IMA) 219

P-118
GENOTYPIC SPECTRUM OF IRIDOGONIODYSGENESIS WITH GLAUCOMA 221

P-119
PHARMACOGENETIC MARKERS OF RESPONSE TO SELECTIVE LASER TRABECULOPLASTY IN PATIENTS WITH PRIMARY OPEN-ANGLE GLAUCOMA AND OCULAR HYPERTENSION 222

P-121
ANGLE CLOSURE GLAUCOMA IN A NANOPHTHALMIC PATIENT WITH MFRP AND BEST1 MUTATIONS 223

P-123
STUDY OF THE DISTRIBUTION FREQUENCY OF MUTANT ALLELES OF THE FII, FV GENES IN PATIENTS WITH NEOVASCULAR GLAUCOMA 225

P-124
EFFECT OF TXNRD2 RS35934224, FOXC1 RS2745599 AND RS984253 GENETIC POLYMORPHISMS COMBINATIONS ON THE DEVELOPMENT OF POAG 226

P-125
GENETIC VARIANTS ASSOCIATED WITH A HISTORY OF GLAUCOMA SURGERY IN JAPANESE PATIENTS WITH PRIMARY OPEN-ANGLE GLAUCOMA 227

P-126
LTBP2 GENE MUTATION IN TWO SIBLINGS WITH JUVENILE-ONSET OPEN ANGLE GLAUCOMA 228

P-127
PREDICTING THE OCCURRENCE OF PRIMARY OPEN-ANGLE GLAUCOMA DEPENDING ON THE GENETIC POLYMORPHISM ENDOTHELIAL NO SYNTHASE GENE 229

P-128
“THROUGH THE EYES OF A CHILD” A FOX C1 GENE-RELATED PRIMARY CONGENITAL GLAUCOMA A CASE REPORT 231

P-129
INVESTIGATION OF THE ASSOCIATION BETWEEN INTERLEUKIN-18 POLYMORPHISM AND NORMAL TENSION GLAUCOMA 234

P-130
PAPILLORENAL SYNDROME : A NEW MUTATION 235

P-132
PHENOTYPE – GENOTYPE CORRELATION IN PRIMARY CONGENITAL GLAUCOMA (PCG) IN SAUDIA ARABIA 236

P-133
PRIMARY CONGENITAL GLAUCOMA: WHEN THE PHENOTYPE IS CONCLUSIVE BUT THE GENOTYPE IS NOT: IMPLICATIONS FOR MANAGEMENT AND GENETIC COUNSELING 237

P-134
EVALUATION OF POLYGENIC RISK SCORE AND VALIDATION OF DIAGNOSTIC CODES OF PRIMARY OPEN-ANGLE GLAUCOMA IN ELECTRONIC HEALTH RECORD-LINKED BIOBANKS 239

P-136
CAUSAL ASSOCIATION OF THE USE OF CALCIUM CHANNEL BLOCKERS ON PRIMARY OPEN-ANGLE GLAUCOMA: A TWO-SAMPLE MENDELIAN RANDOMIZATION STUDY 241

P-137
HIGHER TESTOSTERONE IS ASSOCIATED WITH OPEN-ANGLE GLAUCOMA IN WOMEN: A GENETIC PREDISPOSITION? 243

P-138
MITOCHONDRIAL TXNRD2 AND ME3 GENETIC RISK SCORES ARE ASSOCIATED WITH SPECIFIC PRIMARY OPEN-ANGLE GLAUCOMA PHENOTYPES 244

P-139
ARCUATE FIELD DEFECTS DO NOT SUPPORT THE LAMINA CRIBROSA AS THE PRIMARY SITE OF INJURY IN CHRONIC GLAUCOMA 247

P-140
INTEREYE COMPARISON OF LAMINA CRIBROSA CURVATURE BETWEEN EYES WITH ASYMMETRICAL SEVERITY IN TREATMENT NAÏVE BILATERAL NORMAL-TENSION GLAUCOMA PATIENTS 249

P-141
IOP DIURNAL & NOCTURNAL FLUCTUATION - GAINING MORE INSIGHT IN CLINICAL PRACTICE 251

P-142
DIURNAL CHANGE OF RETINAL VESSEL DENSITY RELATED TO HEMODYNAMIC VARIATION IN TREATMENT-NAÏVE LOW-TEENS NORMAL-TENSION GLAUCOMA 253

P-143
INTRAOCULAR PRESSURE INDICATORS IN PATIENTS WITH TYPE 1 DIABETES MELLITUS 254

P-144
A NOVEL CHRONIC GLAUCOMA MODEL IN MOUSE BY A SINGLE INTRACAMERAL INJECTION PHOTO-CROSS-LINKED METHACRYLATE-MODIFIED SERICIN HYDROGEL 256

P-145
PROGRESSION TO BILATERALITY IN UNILATERAL PRIMARY CONGENITAL GLAUCOMA 257

P-146
A NEW COMBINE MECHANISM OF NORMAL TENSION GLAUCOMA WITH PRIMARY ANGLE CLOSURE? A CASE CONTROL STUDY 259

P-147
THE EFFECT OF UNILATERAL APPLICATION OF TIMOLOL 0.5% ON SYSTEMIC AND OCULAR BLOOD PRESSURE AND PERFUSION 261

P-148
EVALUATION OF INTRAOCULAR PRESSURE IN THE EYES AFTER KERATOREFRACTIVE SURGERY - FEMTO-LASIK VS PRK 263

P-149
NEW CONVEX APPLANATION TONOMETER FOR MYOPIC PATIENTS AFTER LASER REFRACTIVE SURGERY 264

P-150
INTRAOCULAR PRESSURE DYNAMICS AFTER WATER DRINKING TEST AND DIURNAL VARIATION TEST IN GLAUCOMA SUSPECTS 265

P-155
INTRAOCULAR PRESSURE IN HEMIFACIAL SPASM MEASURED BY TRANSPALPEBRAL TONOMETER DIATON® 266

P-157
VALIDATING TARGET IOP FOR DIFFERENT SEVERITIES OF GLAUCOMA 267

P-158
CHANGES TO OPTIC NERVE HEAD BLOOD FLOW INDUCED BY ISOMETRIC EXERCISE: OPTICAL COHERENCE TOMOGRAPHY ANGIOGRAPHY FINDINGS IN HEALTHY CONTROLS AND NTG 268

P-160
INTRAOCULAR PRESSURE (IOP) IN PRETERM INFANTS WITH AND WITHOUT RETINOPATHY OF PREMATURITY, AND THE EFFECT OF NON-SURGICAL TREATMENT ON THE IOP 269

P-161
24-HOUR TELEMETRIC IOP MONITORING IN RABBITS 270

P-162
LONG TERM EFFECT OF PHACOEMULSIFICATION ON INTRAOCULAR PRESSURE IN GLAUCOMA PATIENTS - A RETROSPECTIVE ANALYSIS FROM SOUTH INDIA 272

P-163
EFFECT OF WEARING A SURGICAL MASK ON INTRAOCULAR PRESSURE DURING COVID-19 PANDEMIC 273

P-164
A NEW METHOD FOR MEASURING INTRAOCULAR PRESSURE USING THE DYNAMIC CHARACTERISTICS OF THE EYEBALL 275

P-165
THE ASSOCIATION BETWEEN MENSTRUATION PERIOD AND IOP IN HEALTHY POPULATION: THE KOREA NATIONAL HEALTH AND NUTRITION EXAMINATION SURVEY 2010-2011 277

P-166
IMMEDIATE RISE IN INTRAOCULAR PRESSURE AFTER SINGLE INTRAVITREAL INJECTION OF BEVACIZUMAB 279

P-167
COMPARISON OF INTRAOCULAR PRESSURE MEASUREMENT BETWEEN A NEW HAND HELD(HAWK EYE) MOUNTED GOLDMANN APPLANATION TONOMETER(GAT) AND SLIT LAMP MOUNTED GAT 280

P-168
COMPARATIVE ANALYSIS OF DEEP OPTIC NERVE HEAD STRUCTURES WITH SPECTRAL DOMAIN AND SWEPT-SOURCE OPTICAL COHERENCE TOMOGRAPHY 281

P-169
CLINICAL IMPLICATIONS OF INTRAOCULAR PRESSURE CORRECTION FOR CENTRAL CORNEAL THICKNESS IN NORMAL-TENSION GLAUCOMA WITH THIN CENTRAL CORNEAL THICKNESS 282

P-170
INTRAOCULAR PRESSURE VARIABILITY MEASURED BY AN ICARE TONOMETER IN PRIMARY OPEN ANGLE GLAUCOMA 284

P-171
CORNEAL HYSTERESIS USING OCULAR RESPONSE ANALYZER FOR SCREENING EXAMINATION WITH OR WITHOUT GLAUCOMATOUS FUNDUS FINDINGS 286

P-172
ASSOCIATIONS BETWEEN VF PROGRESSION AND DIURNAL CHANGES OF CORNEAL HYSTERESIS IN JAPANESE GLAUCOMA PATIENTS: PROSPECTIVE COHORT STUDY 287

P-173
COMPARISON OF NON-CONTACT TONOMETRY AND GOLDMANN APPLANATION TONOMETRY MEASUREMENTS IN NON-PATHOLOGIC HIGH MYOPIA 288

P-174
DIURNAL PRESSURE CURVE IN PATIENTS WITH PSEUDOEXFOLIATIVE SYNDROME GR.II 290

P-175
COMPARATIVE ASSESSMENT OF IOP MEASUREMENT BETWEEN NON-CONTACT TONOMETRY AND GOLDMANN APPLANATION TONOMETRY AMONG GLAUCOMA PATIENTS IN ANGTHONG 291

P-177
ASSOCIATION BETWEEN CIRCADIAN INTRAOCULAR PRESSURE FLUCTUATION AND RETINAL NERVE FIBER LAYER THICKNESS MEASURED BY OPTICAL COHERENCE TOMOGRAPHY 293

P-178
ULTRASOUND BIOMICROSCOPY IN PSEUDOPHAKIC PATIENTS WITH CHRONIC INTRAOCULAR INFLAMMATION AND/OR INCREASED INTRAOCULAR PRESSURE 294

P-180
MASK-INDUCED DIFFERENCES IN INTRAOCULAR PRESSURE IN GLAUCOMA PATIENTS 296

P-181
ASSESSMENT OF THE IMPACT OF PHYSICAL ACTIVITY ON THE LEVEL OF INTRAOCULAR PRESSURE IN YOUNG PEOPLE 297

P-182
WHETHER IT IS NECESSARY TO CONDUCT ROUTINE TONOMETRY IN CHILDREN… 299

P-183
HOMONYMOUS QUADRANTANOPIA ASSOCIATED WITH DEHYDRATION FOLLOWING ACUTE DIARRHEA: A CASE REPORT 301

P-184
CORRELATION BETWEEN BLOOD PRESSURE AND INTRAOCULAR PRESSURE 303

P-185
COMPARISON OF THREE INTRAOCULAR PRESSURE MEASUREMENT: OCULAR RESPONSE ANALYSER, ICARE AND GOLDMANN APPLANATION TONOMETRY 304

P-186
INTRAOCULAR PRESSURE REDUCTION AND PROGRESSION OF HIGHLY MYOPIC GLAUCOMA: A 12-YEAR FOLLOW-UP COHORT STUDY 305

P-187
MECHANISM OF MIR-335-5P/SLC2A3 AXIS REGULATING FERROPTOSIS OF TRABECULAR MESHWORK CELLS IN PRIMARY OPEN-ANGLE GLAUCOMA 306

PLB-010
INCREASED RISKS OF OPEN-ANGLE GLAUCOMA IN UNTREATED HYPERTENSION 308

PLB-011
REAL-WORLD VARIATION IN INTRAOCULAR PRESSURE POST INTRAVITREAL STEROID INJECTION AND ITS CORRELATION WITH PRE-EXISTING OR FAMILY HISTORY OF GLAUCOMA 309

P-188
NADPH OXIDASE 2 DE-REPRESSION PRESERVES RGC LOSS IN THE VITRO AND VIVO MOUSE MODEL OF GLAUCOMA 312

P-189
CONTRALATERAL NEUROPROTECTIVE EFFECT OF BRIMONIDINE IN A CHRONIC MONOCULAR HYPERTENSION RAT MODEL 313

P-190
VISUAL CHANGES AND NEUROPROTECTIVE EFFECTS OF ZEAXANTHIN IN A MOUSE MODEL OF RETINAL ISCHEMIA/REPERFUSION INJURY 315

P-191
GREATER OUTFLOW FACILITY INCREASE AFTER TARGETED TRABECULAR BYPASS IN ANGIOGRAPHICALLY DETERMINED LOW-FLOW REGIONS COMPARED TO HIGH-FLOW REGIONS 316

P-192
INDUCTION OF MICROGLIA-INDUCED NEUROINFLAMMATION IN A RAT EX VIVO GLAUCOMA MODEL 317

P-193
EFFECTS OF ELEVATED IOP ON RETINAL GANGLION CELL DEATH AND EXPRESSION AND INTERACTION OF RETINAL AQUAPORIN 9 AND MONOCARBOXYLIC ACID TRANSPORTERS 318

P-194
MURINE CYTOMEGALOVIRUS LOCALIZATION AND UVEITIC CELL INFILTRATION MIGHT CONTRIBUTE TO TRABECULAR MESHWORK IMPAIRMENT IN POSNER-SCHLOSSMAN SYNDROME 319

P-195
DENDRITE REGENERATION OF RETINAL GANGLION CELLS BY GENE THERAPY USING A CONSTITUTIVE ACTIVE FORM OF INSULIN RECEPTOR 320

P-196
AAV-ELAVL1/HUR GENE THERAPY PROVIDES NEUROPROTECTION OF RETINAL GANGLION CELLS 321

P-197
HISTAMINE H3 RECEPTOR ANTAGONIST-NITRIC OXIDE DONOR HYBRID COMPOUNDS FOR IOP CONTROL AND PREVENTION OF PHOTORECEPTOR DEGENERATION IN RABBIT MODELS 323

P-198
AIBP ENHANCES MITOCHONDRIAL FUNCTION IN MÜLLER GLIA IN RESPONSE TO GLAUCOMATOUS INSULTS 325

P-199
ESTABLISHMENT OF OPEN-ANGLE OCULAR HYPERTENSION MODEL BY CONDITIONAL OVER EXPRESSION OF AUTOTAXIN IN MICE EYES 326

P-200
ASSOCIATION BETWEEN PRIMARY ANGLE CLOSURE GLAUCOMA AND URIC ACID LEVELS IN SERUM AND AQUEOUS HUMOR 327

P-201
HYDROGEN SULFIDE PRECURSOR BALANCES IRON HOMEOSTASIS IN THE RETINA CAUSED BY ELEVATED HYDROSTATIC PRESSURE 328

P-202
OCULAR TISSUE REACTION TO IMPLANTED ANTI-GLAUCOMA SHUNT 329

P-203
ROLE OF INFLAMMATORY AND AUTOIMMUNE BIOMARKERS IN OPEN-ANGLE GLAUCOMA: A PILOT STUDY 330

P-204
EFFECT OF MITOMYCIN-C AND RETINOIC ACID ON CONJUNCTIVAL LYMPHATICS IN RAT EYES: AN EXPERIMENTAL STUDY 331

P-205
ANALYSIS OF AUTOPHAGY MARKERS IN DIFFERENT CELL TYPES OF THE RETINA WITH AGE AND AFTER IOP INJURY WITH SINGLE CELL SEQUENCING 333

P-207
NNA1 DEFICIENCY CAUSES RETINAL DEGENERATION AND GLAUCOMA IN A PCD MOUSE MODEL 334

P-208
TRANSFORMING GROWTH FACTOR-B (TGFB) 1 AND 2 PROMOTES THE DIFFERENTIATION OF HUMAN TRABECULAR MESHWORK PROGENITOR CELLS 335

P-209
LOCAL ADENOVIRAL DELIVERY OF VASCULAR ENDOTHELIAL GROWTH FACTOR C INDUCES LYMPHANGIOGENESIS IN THE CONJUNCTIVA IN RABBITS 336

P-210
THE EXPRESSION OF RNA-BINDING PROTEIN WITH MULTIPLE SPLICING (RBPMS) IN EX VIVO GLAUCOMA ANIMAL MODEL THROUGHOUT THE AGEING 337

P-212
PROFILING OF MYOCILIN PROCESSING AND GLOBAL UBIQUITYLOME OF TRABECULAR MESHWORK CELLS IN A GLAUCOMA MODEL 338

P-213
EXCITATORY - INHIBITORY BALANCE ALTERATIONS IN THE INNER RETINA OF AN ANIMAL MODEL OF GLAUCOMA 340

P-214
R28 CELLS: IS THIS THE BEST CELL LINE FOR GLAUCOMA STUDIES? 341

P-216
CROSS-SECTIONAL STUDY OF ADMINISTERED TESTS IN PANDEMIC AT AUTHORITATIVE ELECTROPHYSIOLOGY LABORATORY 342

P-217
DIAGNOSTIC TECHNIQUE FOR MEASURING LIGHT SCATTERING IN INTRAOCULAR LENSES TO CORRECT CORNEAL COMA 344

P-218
PRIMARY OPEN ANGLE GLAUCOMA PATIENTS HAVE LOWER SYSTEMIC MITOCHONDRIAL FUNCTION, ASSOCIATED WITH LOWER NAD LEVELS, COMPARED TO CONTROLS 345

P-219
THE EFFECTS OF VALPROIC ACID ON BLEB MORPHOLOGY IN AN ANIMAL MODEL OF MINIMALLY INVASIVE BLEB SURGERY 347

P-220
THERAPEUTIC EFFECT OF EXOSOMES DERIVED FROM RETINAL ORGANOIDS ON RETINAL GANGLION CELL SURVIVAL IN A RAT MODEL OF CHRONIC OCULAR HYPERTENSION 349

P-221
AIBP PROTECTS RETINAL GANGLION CELLS AGAINST MITOCHONDRIAL DYSFUNCTION AND INFLAMMATORY RESPONSES IN GLAUCOMATOUS NEURODEGENERATION 350

PLB-012
COMPARISON OF AQUEOUS HUMOUR COMPOSITION IN INDIVIDUALS WITH AND WITHOUT PSEUDOEXFOLIATION SYNDROME 351

P-222
THE ASSOCIATION OF INFERONASAL VERSUS SUPERIOR LASER PERIPHERAL IRIDOTOMY WITH DYSPHOTOPSIA IN ASIAN EYES 353

P-223
OUTCOMES OF MICROPULSE LASER TRABECULOPLASTY COMPARED TO SELECTIVE LASER TRABECULOPLASTY FOR 12 MONTHS 355

P-224
RETROSPECTIVE REVIEW OF THE CLINICAL OUTCOME AND CASE SELECTION OF TRAN-SCLERAL CYCLODIODE LASER PATIENTS AT ROYAL LIVERPOOL UNIVERSITY HOSPITAL, UK 356

P-225
EFFICACY OF LPI FOR PEACH (PEDIATRIC EVERSIONAL ANGLE CLOSURE WITH HEADACHE) 358

P-226
DIRECT SELECTIVE LASER TRABECULOPLASTY: FIRST RESULTS 360

P-227
THE RCOPHTH UK 'PACS PLUS CRITERIA': A RETROSPECTIVE COHORT REVIEW OF 600 CONSECUTIVE PATIENTS TREATED WITH BILATERAL YAG PERIPHERAL IRIDOTOMIES 361

P-228
TRAN SCLERAL DIODE LASER CYCLOPHOTOCOAGULATION (TSCPC) WITH AND WITHOUT TRANSILLUMINATION IN ADULTS WITH REFRACTORY GLAUCOMA: SHORT-TERM RESULTS 362

P-229
TWO-YEARS EFFICACY AND SECURITY OF SELECTIVE LASER TRABECULOPLASTY (SLT) AS INITIAL, SUBSTITUTIVE, OR ADJUVANT THERAPY 364

P-230
DIODE LASER CYCLOPHOTOCOAGULATION WITH AND WITHOUT TRANSCORNEAL TORCHLIGHT TRANSILLUMINATION IN REFRACTORY PAEDIATRIC GLAUCOMA 368

P-231
MICROPULSE TRANSSCLERAL DIODE LASER PHOTOCOAGULATION IN REFRACTORY GLAUCOMA:SHORT TERM SAFETY&IMPACT OF SURGICAL HISTORY ON OUTCOME OF THE PROCEDURE 370

P-232
SAFETY AND EFFICACY OF MICROPULSE TRANSSCLERAL LASER THERAPY IN A LATIN-AMERICAN GLAUCOMA COHORT FOLLOWING CONSENSUS BASED PARAMETERS AND TECHNIQUE 372

P-233
SAFETY AND EFFICACY OF SLOW SWEEP SPEED MICROPULSE TRANSSCLERAL LASER THERAPY (MTLT) FOR TREATMENT OF GLAUCOMA 374

P-234
COMPARISON OF SAFETY AND EFFECTIVENESS OF MICROPULSE TRANSCLERAL CYCLOPHOTOCOAGULATION AND SLOW COOK DIODE LASER IN OAG PATIENTS 376

P-235
LIGHT BEFORE THE END OF TUNNEL 380

P-236
SELECTIVE LASER TRABECULOPLASTY VS MEDICAL MANAGEMENT AS PRIMARY THERAPY FOR OPEN ANGLE GLAUCOMA - A RANDOMIZED CASE CONTROL STUDY 381

P-237
SELECTIVE LASER TRABECULOPLASTY AS AN ADD-ON TREATMENT IN GLAUCOMA PATIENTS NOT CONTROLLED WITH MEDICAL THERAPY: A ONE-YEAR FOLLOW-UP STUDY 383

P-238
THE EFFICACY AND SAFETY OF MICROPULSE CYCLOPHOTOCOAGULATION IN JAPANESE REFRACTORY GLAUCOMA FOR 12 MONTHS 384

P-241
CLINICAL EFFICACY OF TWO MODALITIES OF SELECTIVE LASER TRABECULOPLASTY IN THE TREATMENT OF OPEN-ANGLE GLAUCOMA OR OCULAR HYPERTENSION 385

P-242
MICROPULSE TRANSSCLERAL LASER THERAPY (MP-TLT) AS A NEW TREATMENT OPTION FOR PATIENTS WITH GLAUCOMA - OUTCOMES OF A NINE MONTHS OBSERVATION 388

P-243
EFFICACY OF MICROPULSE LASER TRABECULOPLASTY IN ASIAN PATIENTS AT 12 MONTHS 389

P-246
REAL-WORLD LONG-TERM OUTCOMES OF SELECTIVE LASER TRABECULOPLASTY 391

P-247
FACTORS PREDICTING SUCCESSFUL SELECTIVE LASER TRABECULOPLASTY TO PREVENT GLAUCOMA PROGRESSION TO SURGERY 393

P-248
SELECTIVE LASER TRABECULOPLASTY IS SAFE AND EFFECTIVE IN ALL STAGES OF GLAUCOMA: EXPERIENCE FROM A LATIN AMERICAN ACADEMIC CENTER 394

P-249
DIFFERENCES IN CLINICAL OUTCOMES BETWEEN 10- AND 20-SECOND ONE-WAY SWEEPS OF MICRO-PULSE TRANSSCLERAL LASER THERAPY 395

P-251
TRANSSCLERAL CYCLOPHOTOCOAGULATION WITH STANDARDIZED PROTOCOL TO REDUCE IOP IN EYES AFFECTED BY GLAUCOMA, FIRST RESULTS OF A PRELIMINARY STUDY 396

P-252
TO EVALUATE THE EFFECT OF SELECTIVE LASER TRABECULOPLASTY ON VISUAL FIELD STABILITY IN PATIENTS AFFECTED BY OPEN ANGLE GLAUCOMA 397

P-253
SELECTIVE LASER TRABECULOPLASTY EFFECTIVENESS IN PATIENTS WITH OPEN-ANGLE GLAUCOMA AND OCULAR HYPERTENSION: REAL-LIFE EXPERIENCE IN UKRAINE 398

P-254
TOSCA'S TRANS OCULAR SUBTHRESHOLD CYCLO ACTIVATION DUAL WAVELENGTH LASER (1,475NM AND 810NM) 399

P-255
CLINICAL ANALYSIS OF SLT REPETITION IN PATIENTS WITH PSEUDOEXFOLIATIVE GLAUCOMA 400

P-256
ONE-NANOSECOND SELECTIVE LASER TRABECULOPLASTY IN PATIENTS WITH OPEN-ANGLE GLAUCOMA AND OCULAR HYPERTENSION 401

P-257
"SELECTIVITY" OF SELECTIVE LASER TRABECULOPLASTY 403

P-258
OUTCOME OF SELECTIVE LASER TRABECULOPLASTY IN SUDAN 405

P-260
MINIMALLY INVASIVE APPROACH FOR MALIGNANT GLAUCOMA IN PSEUDOPHAKIC EYES : A CASE SERIES 406

P-261
LASER PERIPHERAL IRIDOTOMY IN SECONDARY ACUTE ANGLE CLOSURE AFTER PARS PLANA VITRECTOMY: A CASE SERIES 408

P-263
KARACHI SELECTIVE LASER TRABECULOPLASTY (SLT) STUDY 410

P-264
RETROIRIDIAN CYSTS MANAGEMENT WITH ND:YAG LASER-PUNCTURE, A CASE REPORT 411

P-265
TO ASSESS THE SHORT TERM EFFICACY AND SAFETY OF MICROPULSE TRANSSCLERAL DIODE LASER CYCLOPHOTOCOAGULATION(MPTSCPC) PROCEDURE IN REFRACTORY GLAUCOMA 413

P-266
OUR RESULTS WITH DIODE TRANSSCLERAL CYCLOPHOTOCOAGULATION AND TRANSSCLERAL SUBCYCLOPHOTOTHERAPY TREATMENT: COMBINE TECHNIQUE. PRELIMINARY RESULTS 415

P-268
STUDY OF THE EFFICACY OF SELECTIVE LASER TRABECULOPLASTY IN OCULAR HYPERTENSION AND GLAUCOMA 417

P-269
"SELECTIVITY" OF SELECTIVE LASER TRABECULOPLASTY 419

P-270
CLINICAL OUTCOMES OF SELECTIVE LASER TRABECULOPLASTY IN OPEN ANGLE GLAUCOMA PATIENTS ALREADY UNDER FULL ANTI-GLAUCOMA MEDICATION 420

P-271
ACUTE PRIMARY ANGLE CLOSURE ATTACK; LONG TERM CLINICAL OUTCOMES OVER A 3 YEAR PERIOD 421

P-273
ARE OCULAR HYPOTENSIVE DRUGS ESSENTIAL TO PREVENT INTRAOCULAR SPIKES FOLLOWING ANTERIOR SEGMENT LASER PROCEDURES? 422

P-274
LASER PERIPHERAL IRIDOPLASTY – TO PERFORM OR NOT TO PERFORM? 423

P-275
CYCLO G6 LASER AND GLAUCOMA 424

P-276
URRETS-ZAVALIA SYNDROME FOLLOWING IMPLANTABLE COLLAMER LENS SURGERY TREATED WITH SELECTIVE LASER TRABECULOPLASTY: A CASE REPORT 426

P-278
CLINICAL OUTCOMES OF MICROPULSE TRANSSCLERAL LASER THERAPY WITH REVISED P3 DELIVERY DEVICE 427

P-279
EFFECT OF MICROPULSE TRANSSCLERAL LASER THERAPY ON CORNEAL ENDOTHELIAL CELL AND CENTRAL CORNEAL THICKNESS 428

P-280
PHACOEMULSIFICATION COMBINED WITH ENDOSCOPIC CYCLOPHOTOCOAGULATION VS PHACOEMULSIFICATION ALONE IN PRIMARY ANGLE CLOSURE GLAUCOMA - A RCT 429

PLB-013
DYNAMICS OF THE MOLECULAR MARKER OF INTERCELLULAR ADHESION (ICAM-1) IN PATIENTS WITH NEOVASCULAR GLAUCOMA AFTER TRANSSCLERAL LASER CYCLOCOAGULATION 431

PLB-014
LONG TERM EFFECTIVENESS OF REPEATED LOW POWER SELECTIVE LASER TRABECULOPLASTY IN PATIENTS WITH PRIOR TRABECULECTOMY 432

PLB-015
CORNEAL EFFECTS OF SELECTIVE LASER TRABECULOPLASTY 433

PLB-016
IMPROVEMENT OF THE QUALITY OF LIFE OF PATIENTS WITH GLAUCOMA OPTIC NEUROPATHY 434

P-282 436

INVESTIGATOR-INITIATED CLINICAL STUDIES TO ASSESS SAFETY, TOLERABILITY, AND OCULAR HYPOTENSIVE EFFICACY OF QLS-111, A NOVEL KATP CHANNEL OPENER 436

P-283
OMIDENEPAG ISOPROPYL (OMDI) 0.002% AND PRESERVATIVE-FREE OMDI (DE-117B) BIOEQUIVALENCE IN PRIMARY OPEN-ANGLE GLAUCOMA OR OCULAR HYPERTENSION (DAISY) 438

P-284
THREE-YEAR RESULTS OF MINIMALLY INVASIVE DEVICE TRABEX+ IN PATIENTS WITH PRIMARY OPEN ANGLED GLAUCOMA 440

P-285
ASSOCIATION BETWEEN OCULAR SURFACE ASSESSMENT AND TOPICAL TREATMENT ADHERENCE IN PATIENTS WITH GLAUCOMA 441

P-287
ANTI-VASCULAR ENDOTHELIAL GROWTH FACTOR FOR NEOVASCULAR GLAUCOMA: A COCHRANE SYSTEMATIC REVIEW 444

P-288
CROSSOVER TRIAL COMPARING FIXED-COMBINATIONS OF 0.1% BRIMONIDINE/TIMOLOL VS 1% DORZOLAMIDE/TIMOLOL AS ADJUNCTIVE THERAPIES TO PROSTAGLANDIN ANALOGUES 445

P-289
CLINICAL EFFICACY AND TOLERABILITY OF RHO KINASE INHIBITORS 446

P-290
EFFECT OF 365 BREATHING TECHNIQUE ON INTRAOCULAR PRESSURE AND AUTONOMIC FUNCTION IN GLAUCOMA PATIENTS: A RANDOMIZED CONTROL TRIAL 447

P-291
CATARACT AND OCULAR HYPERTENSION IN CHILDREN UNDER SYSTEMIC CORTICOSTEROID THERAPY 448

P-292
EFFECT OF LATANOPROSTENE BUNOD ON OCULAR MICROCIRCULATION MEASURED BY LASER SPECKLE FLOWGRAPHY IN PATIENTS WITH OPEN-ANGLE GLAUCOMA 449

P-293
REAL-LIFE EXPERIENCE OF MICROPULSE TRANSSCLERAL CYCLOPHOTOCOAGULATION (MP-TSCPC) IN CASES OF SEVERAL GLAUCOMA TYPES 450

P-294
FOCUSED ULTRASOUND CYCLOPLASTY, IN THE TREATMENT OF GLAUCOMA 453

P-295
GONIO-ENDOSCOPY: A NOVEL APPROACH TO MINIMALLY INVASIVE GLAUCOMA SURGERY IN A GLAUCOMATOUS EYE 456

P-296
LONG-TERM EFFECTS OF LATANOPROST WITH DIFFERENT EXCIPIENT COMPOSITIONS ON INTRAOCULAR PRESSURE, HYPEREMIA AND DISCOMFORT 457

P-297
EARLY POST-OPERATIVE EFFECT OF MICROPULSE CYCLOPHOTOCOAGULATION ON CORNEAL, RETINAL, AND CILIARY BODY STRUCTURES 459

P-298
CAN ULTRASOUND CYCLO-PLASTY (UCP) PREVENT GLAUCOMA PROGRESSION IN BOSTON KERATOPROSTHESIS TYPE I PATIENTS? 460

P-299
MICROCYCLOPHOTOCOAGULATION IN GLAUCOMA TREATMENT: A SHORT-TERM FOLLOW-UP STUDY 464

P-300
IMPROVEMENT OF CORNEAL EPITHELIAL DAMAGE AFTER SWITCHING FROM CONCOMITANT BRINZOLAMIDE AND BRIMONIDINE TO BRINZOLAMIDE/BRIMONIDINE FIXED COMBINATION 465

P-301
SODIUM HYALURONATE IMPROVES CORNEAL REINNERVATION AND EPITHELIAL HEALING IN AN *IN VIVO* BAK-INDUCED TOXICITY MODEL 466

P-302
EFFICACY OF NETARSUDIL IN PRIMARY ANGLE-CLOSURE DISEASE AFTER LASER PERIPHERAL IRIDOTOMY WITH PERSISTENT HIGH INTRAOCULAR PRESSURE: INTERIM RESULTS 468

P-303
ELECTRICAL OPTIC NERVE STIMULATION IN NORMAL TENSION GLAUCOMA 470

P-304
MYOPIC SHIFT INDUCED BY OMIDENEPAG ISOPROPYL 0.002% IS ASSOCIATED WITH FORWARD MOVEMENT OF LENS IN PATIENTS WITH PRIMARY OPEN-ANGLE GLAUCOMA 471

P-305
CAI-AUGMENTED MACULAR PIGMENT SUPPLEMENTATION IMPROVES VISUAL ACUITY AND CONTRAST SENSITIVITY IN EYES WITH PERICENTRAL GLAUCOMATOUS VISUAL FIELD LOSS 472

P-306
THE USE OF ANTI-GLAUCOMA MEDICATIONS FOLLOWING PEDIATRIC GLAUCOMA SURGERY: A REPORT ON EFFICACY AND TRENDS IN CAIRO UNIVERSITY 473

P-307
DORZOLAMIDE INDUCED GIANT CELL THROMBOCYTOPENIA: A CASE REPORT OF AN HITHERTO UNREPORTED CONDITION 474

P-308
ROLE OF NETARSUDIL IN PATIENTS OF ADVANCED GLAUCOMA ON MAXIMUM TOLERATED MEDICAL THERAPY DURING COVID-19 PANDEMIC 476

P-309
CITICHOLINE IN EYE DROPS AS A NEUROPROTECTIVE AGENT IN GLAUCOMA TREATED PATIENTS 478

P-310
EFFICACY AND SAFETY OF A FIXED COMBINATION OF BIMATOPROST (0.03% W/V) AND TIMOLOL (0.5% W/V) FOR PATIENTS WITH OPEN-ANGLE GLAUCOMA 479

P-312
ABERRANT CORNEAL HOMEOSTASIS IN PATIENTS WITH LONG-TERM IOP-LOWERING MEDICATIONS 481

P-314
MEDICAL TREATMENT FOR LIMBAL EPITHELIAL STEM CELL DEFICIENCY IN PATIENTS TREATED FOR GLAUCOMA 482

P-315
ASSOCIATION BETWEEN EYE DROP INSTILLATION TECHNIQUE AND VISUAL FIELD PROGRESS IN GLAUCOMA PATIENTS 483

P-316
TRIPLENEX (TRIPLE FIXED COMBINATION) USE EVALUATION IN PATIENTS WITH GLAUCOMA: RANDOMIZED CLINICAL TRIAL 485

P-317
TOPICAL GLAUCOMA THERAPY ANNUAL COST IN MEXICO 487

P-318
GLAUCOMA IN PATIENTS WITH COVID-19 489

P-319
SENOLYTICS IN GLAUCOMA: A REVIEW OF THE LITERATURE, PERSPECTIVES AND PROSPECTS 490

P-322
ANURIC ACUTE KIDNEY INJURY AFTER TAKING ACETAZOLAMIDE FOR GLAUCOMA TREATMENT 492

P-324
EFFICACY AND TOLERANCE OF NETARSUDIL LATANOPROST FIXED DOSE COMBINATION (NLFC) IN A SWITCH STUDY WITH OTHER GLAUCOMA MEDICATIONS 493

P-325
NTG UNRAVELLING THE CONUNDRUM FOR METABOLIC SYNDROME: A CASE REPORT 494

P-326
SIGNIFICANT REDUCTION IN THE RATE OF GLAUCOMA PROGRESSION AFTER ADDING SYSTEMIC AND TOPICAL UBICHINON-10: A CASE REPORT 496

P-327
EVALUATION OF TRIPLE-FIXED-COMBINATION OF BIMATOPROST-TIMOLOL-BRIMONIDINE CONTROL OF INTRAOCULAR PRESSURE IN PATIENTS WITH GLAUCOMA 497

P-328
OCULAR SURFACE DISEASE WITHIN SPECIALIST GLAUCOMA CLINICS IN THE UNITED KINGDOM: A CONTEMPORARY PREVALENCE STUDY 499

P-329
AN ANALYSIS OF 3,536 ADVERSE EVENTS FROM STENT-BASED MEDICAL DEVICES REPORTED BY THE FDA'S MANUFACTURER AND USER FACILITY DEVICE EXPERIENCE DATABASE 500

P-330
ROCK INHIBITION-RELATED CONJUNCTIVAL HYPERAEMIA: EVENT CHARACTERISTICS FROM THE MERCURY-3 STUDY 502

P-331
PHASE 3 TRIALS OF IDOSE TR (TRAVOPROST INTRAOCULAR IMPLANT) VERSUS TOPICAL TIMOLOL 503

P-332
GLAUCOMA DRUG DELIVERY SYSTEMS: A SINGLE-CENTER SURVEY 504

P-333
THE EXIMORE LATANOPROST PUNCTAL PLUG: RESULTS OF A FIRST-IN-HUMAN STUDY IN EYES WITH OHTN OR EARLY OAG 505

P-334
A PHASE 3, RANDOMIZED STUDY COMPARING LATANOPROST PRESERVATIVE-FREE CATIONIC EMULSION TO PRESERVED-LATANOPROST IN GLAUCOMA AND OCULAR HYPERTENSION 506

P-335
SAFETY AND EFFICACY OF A SINGLE ADMINISTRATION OF BIMATOPROST IMPLANT: 1-YEAR OUTCOMES 508

P-336
THE 5-YEAR OUTCOME OF ASIAN PATIENTS WITH LOW-TO-MODERATE RISK OF OCULAR HYPERTENSION AFTER MEDICATION REDUCTION 510

P-337
EFFECTS OF NCX 470, A NITRIC OXIDE (NO)-DONATING BIMATOPROST, IN AN *IN VITRO* 3D-HUMAN TRABECULAR MESHWORK (TM)/ SCHLEMM'S CANAL (SC) TISSUE MODEL 511

P-338
IOP-LOWERING EFFICACY OF NETARSUDIL/LATANOPROST IN PATIENTS WITH GLAUCOMA STRATIFIED BY PRIOR MEDICATION USE: AN EXPLORATORY ANALYSIS FROM MERCURY-3 513

P-339
NCX 470, A NITRIC OXIDE DONATING BIMATOPROST COMPARED WITH LATANOPROST - ADAPTIVE DESIGN PERIOD RESULTS FROM THE PHASE 3 MONT BLANC CLINICAL TRIAL 514

PLB-017
BASELINE INTRAOCULAR PRESSURE DOES MATTER IN SEVERE STEROID-INDUCED OCULAR HYPERTENSION 515

PLB-018
TOLERABILITY OF OPEN-LABEL NICOTINAMIDE AND PYRUVATE SUPPLEMENTATION FOR PRIMARY OPEN ANGLE GLAUCOMA OVER 14 MONTHS 516

P-340
FUNDUSCOPIC OPTIC DISC CHANGES IN GROWTH PHASE 518

P-341
INTRAOCULAR PRESSURE MEASUREMENT USING ICARE REBOUND TONOMETER IN DIFFERENT POSITIONS OF EYE AND DIFFERENT LOCATIONS ON CORNEA 519

P-342
24-MONTH EVALUATION OF ENDOTHELIAL CELL DENSITY AND LOSS FOLLOWING AB-INTERNO CANALOPLASTY 521

P-343
COMPARING FIELD PROGRESSION OF PHACOEMULSIFICATION COMBINED WITH MIGS PLUS: SCHLEMM CANAL MICROSTENT VERSUS AB INTERNO EXCISION 522

P-344
SURGICAL MANAGEMENT OF GLAUCOMA ASSOCIATED WITH STURGE-WEBER SYNDROME 524

P-345
REAL WORLD OUTCOMES OF ACUTE PRIMARY ANGLE CLOSURE ATTACK IN PATIENTS PRESENTING TO MOORFIELDS EYE HOSPITAL, UNITED KINGDOM 525

P-346
VIRTUAL GLAUCOMA CLINIC WITH INVESTIGATIONS PERFORMED IN A COMMUNITY SETTING IN SINGAPORE - DOES IT WORK? 526

P-347
THE PHOTOREAL NEW-AGE INNOVATIVE COUNSELLING TOOL FOR GLAUCOMA WITH 3D AUGMENTED REALITY (EYE MG AR) 527

P-348
NOVEL HYPERPARALLEL OPTICAL COHERENCE TOMOGRAPHY FOR ANGLE CLOSURE ASSESSMENT: COMPARISON WITH SWEPT-SOURCE OCT AND GONIOSCOPY 529

P-349
3D PRINTING OPHTHALMOLOGY MODELS FOR ENHANCING GLAUCOMA ANATOMY LEARNING THROUGH THE CONCEPT OF PUZZLE ASSEMBLY - A SELF LEARNING TACTILE TOOL KIT 532

P-350
CLINICAL CHARACTERISTICS OF PIGMENT DISPERSION SYNDROME AND PIGMENTARY GLAUCOMA IN SOUTHERN SPAIN 534

P-351
CAUSES OF OCULAR HYPERTENSION/SECUNDARY GLAUCOMA IN UVEITIS 535

P-352
GLOBAL LONGITUDINAL DATA REGISTRY ON THE ROLE OF CANALOPLASTY FOR TREATMENT OF GLAUCOMA - ONE YEAR RESULTS 536

P-353
ASSOCIATION BETWEEN OPTIC NERVE HEAD PERFUSION MEASURES AND RETINAL GANGLION CELL COUNT ESTIMATES IN GLAUCOMA 537

P-354
OCULAR HYPERTENSION AND GLAUCOMA ASSOCIATED WITH ACANTHAMOEBA KERATITIS: CLINICAL FEATURES AND OUTCOMES AT MOORFIELDS EYE HOSPITAL, UNITED KINGDOM 539

P-356
COMPARE THE RISKS OF OPEN ANGLE GLAUCOMA WITH RANIBIZUMAB AND AFLIBERCEPT INTRAVITREOUS INJECTION 540

P-358
HIGH MYOPIA INCREASED THE RISK OF PRIMARY OPEN-ANGLE GLAUCOMA: A SYSTEMATIC REVIEW AND META-ANALYSIS 541

P-359
HOLOGRAPHIC ELYSIUM OF A 3D GLAUCOMA ANATOMICAL & PATHOLOGICAL METAVERSE WITH EXTENDED REALITY/MIXED REALITY 543

P-360
AN INNOVATIVE, SELF-BUILT, 3D, COST EFFECTIVE, SMART PHONE APP FOR SIMULATIVE GLAUCOMA LEARNING 545

P-361
EFFECT OF GLAUCOMA SURGERY ON OCULAR BIOMETRY IN EARLY CHILDHOOD GLAUCOMA 547

P-362
SYSTEMATIC REVIEW OF CLINICAL PRACTICE GUIDELINES FOR THE DIAGNOSIS AND MANAGEMENT OF OPEN-ANGLE GLAUCOMA 548

P-363
SWAN SYNDROME: A POSSIBLE CAUSE OF LATE HYPHEMA AFTER TRABECULECTOMY 549

P-364
QUANTITATIVE EVALUATION OF EYELID HYPERPIGMENTATION AND ERYTHEMA CAUSED BY PROSTAGLANDIN F RECEPTOR AGONISTS ANALOGUES USING MEXAMETER MX18 551

P-365
RELIABILITY OF AHMED GLAUCOMA VALVE SURGICAL VIDEOS ON THE INTERNET FOR EDUCATIONAL PURPOSES 552

P-367
INFLUENCE OF COGNITION ASSESSMENT ON VISUAL FIELD VARIABILITY 553

P-368
CORRELATION BETWEEN RISK OF FALL AND GLAUCOMATOUS VISUAL FIELD DEFECTS 554

P-369
ENDOTHELIAL CELL DENSITY AND LOSS FOLLOWING AB-INTERNO CANALOPLASTY IN PATIENTS WITH MILD-MODERATE GLAUCOMA AS COMPARED TO SEVERE GLAUCOMA 556

P-370
ANTERIOR SEGMENT OPTICAL COHERENCE TOMOGRAPHY ANGIOGRAPHY FOLLOWING MINIMALLY INVASIVE GLAUCOMA SURGERY USING A TRABECULAR BYPASS IMPLANT 557

P-372
EFFECT OF CITICOLINE IN SLOWING GLAUCOMA DISEASE PROGRESSION 559

P-373
KAP TOWARDS GLAUCOMA AMONG NEW GLAUCOMA PATIENTS AND THEIR FIRST-DEGREE RELATIVES: A CROSS SECTIONAL STUDY IN A TERTIARY EYE CARE CENTER, SAUDI ARABIA 560

P-375
COMPARISON OF CORNEAL ABERRATION PROFILE BETWEEN GLAUCOMA PATIENTS ON MONOTHERAPY AND POLYTHERAPY 561

P-376
INTRAOCULAR HYPERTENSION CAUSED BY ELEVATED EPISCLERAL VENOUS PRESSURE FOLLOWING ARTERIOVENOUS FISTULA EMBOLIZATION 562

P-377
INCREASED PLASMA CORTISOL LEVELS IN PRIMARY ANGLE CLOSURE GLAUCOMA 564

P-378
NEOVASCULAR GLAUCOMA - 16 YEARS OF EXPERIENCE 565

P-379
RETINAL VESSEL DIAMETERS AND RETINAL NERVE FIBRE LAYER THICKNESS MEASUREMENTS BY SCANNING LASER POLARIMETRY IN MIDDLE-AGED CAUCASIANS 566

P-380
PREVALENCE OF OCULAR HYPERTENSION AND GLAUCOMA ASSOCIATED WITH DESCEMET'S STRIPPING AUTOMATED ENDOTHELIAL KERATOPLASTY 567

P-381
GLAUCOMA SPECIALIST EMAIL ADVICE SERVICE (GSEAS) STUDY 568

P-382
DEVELOPING AN ONLINE EDUCATIONAL COURSE FOR GLAUCOMA PATIENTS 569

P-384
BERNARD BECKER (1920-2013) THE MAN, THE SCIENTIST, THE PHYSICIAN: HIS LIFE AND HIS CONTRIBUTION TO THE DIAGNOSIS AND TREATMENT OF GLAUCOMA 570

P-385
SUCCESSFUL GLAUCOMA MANAGEMENT IN PANDEMIC: A REVIEW 572

P-386
INTRAOCULAR PRESSURE CHANGES IN PATIENTS WITH CHRONIC RENAL FAILURE UNDERGOING HEMODIALYSIS 573

P-387
COMPLICATIONS AND INTERCURRENCES DURING CATARACT SURGERY IN PATIENTS WITH GLAUCOMA 575

P-391
THE BEHAVIOURAL SUITABILITY OF INDIE PUPPIES TO TRAIN AS GUIDE DOGS FOR THE BLIND 576

P-392
AN INNOVATIVE GLAUCOMA TITLED-BASED CRICKET MATCH FOR SCREENING AND PROMOTING AWARENESS ON GLAUCOMA 577

P-393
UNILATERAL CONGENITAL ECTROPION UVEAE WITH GLAUCOMA: A TWO-CASE SERIES 579

P-394
GONIOSCOPY AND OPHTHALMOLOGISTS IN TRAINING: THIS "NARROW" TO " "CLOSABLE" RELATIONSHIP (PRELIMINARY RESULTS OF AN ONGOING STUDY) 581

P-395
COMPARISON OF GOLDMANN APLANATION TONOMETRY, BIOMECHANICALLY CORRECTED INTRAOCULAR PRESSURE AND PENTACAM CORRECTION FORMULAS IN EYES WITH GLAUCOMA 583

P-396
COMPARATIVE STUDY OF PERIPAPILLARY RETINAL NERVE FIBRE LAYER THICKNESS AND MACULAR THICKNESS IN NORMAL AND GLAUCOMATOUS EYES BY SPECTRAL DOMAIN OCT 584

P-397
STATUS OF SECONDARY GLAUCOMA IN A TERTIARY HOSPITAL DURING THE COVID-19 PANDEMIC. A STUDY FROM EASTERN INDIA 585

P-398
ANTERIOR CHAMBER ANGLE STATUS AT THE TIME OF NEOVASCULAR GLAUCOMA DIAGNOSIS 587

P-400
THE IMPACT OF COVID-19 IN THE FOLLOW-UP OF GLAUCOMA PATIENTS: A 2-YEAR PANDEMIC ANALYSIS 589

P-401
OUTCOME OF AHMED VALVE IMPLANTATION IN REFRACTORY GLAUCOMA AT ALZARGA SPECIALIZED EYE CENTER IN KHARTOUM STATE-SUDAN 591

P-402
1+1 ≥ 2: DYSTHYROID OPTIC NEUROPATHY (DON) - THE SILENT MIMIC OF GLAUCOMA PROGRESSION 592

P-404
COMPARISON BETWEEN MANUAL COUNTING AND CUSTOMIZED SOFTWARE ANALYSIS OF LENS EPITHELIAL CELL DENSITY 594

P-406
TREATMENT-RESISTANT GLAUCOMA SECONDARY TO ACANTHAMOEBA ENDOPHTHALMITIS FOLLOWING INTRAVITREAL INJECTION 596

P-407
BILATERAL PRIMARY CONGENITAL GLAUCOMA ASSOCIATED WITH PHACE SYNDROME: A CASE REPORT 597

P-409
TRAINING THE NEXT GENERATION OF PEDIATRIC GLAUCOMA SURGEONS: AN INTERNATIONAL EFFORT 600

P-410
UNILATERAL HYPERTENSIVE ZOSTER PAN UVEITIS: A CASE REPORT 601

P-412
VISUAL FIELD DEFECTS AND GLAUCOMATOUS OPTIC DISC IN A YOUNG WOMAN: DOES IT ALWAYS WARRANT TREATMENT? 602

P-413
STEROID OPHTHALMIC HYPERTENSION AGAINST THE BACKGROUND OF METHYLPREDNISOLONE ADMINISTRATION IN PATIENT WITH SYSTEMIC LUPUS ERYTHEMATOSUS: CASE REPORT 604

P-415
THE BIG CHALLENGES IN A SMALL EYE: MANAGEMENT OF SECONDARY ANGLE CLOSURE GLAUCOMA AND AQUEOUS MISDIRECTION IN A NANOPHTHALMIC PATIENT, A CASE REPORT 606

P-416
IMPACT OF MIGS ON THEATRE CAPACITY IN GLAUCOMA 609

P-417
THREE CASES OF GLAUCOMA WITH IMPROVEMENT OF VISUAL FIELD DEFECTS AFTER EXTENDED ENDOSCOPIC TRANSSPHENOIDAL APPROACH FOR PITUITARY ADENOMA 610

P-418
MULTIDIMENSIONAL MODEL FOR OVERVIEW OF GLAUCOMA 611

P-419
IRIDOCORNEAL ENDOTHELIAL SYNDROME (ICE) - CASE REPORT 613

P-420
NEOVASCULAR GLAUCOMA WITH RETINITIS PIGMENTOSA IN A 58-YEAR-OLD FEMALE: A CASE REPORT 614

P-422
THE PROBLEM OF GLAUCOMA CARE IN UKRAINE DURING WARTIME 616

P-424
GENOMIC RESEARCH IN SOUTHEAST NIGERIA: ATTITUDES AND PREFERENCES AMONG OPHTHALMIC PATIENTS FOR FEEDBACK ON RESEARCH- A CROSS SECTIONAL STUDY 617

P-425
OPHTHALMOHYPERTENSION IN BILATERAL ACUTE DEPIGMENTATION OF THE IRIS 618

P-427
INVESTIGATING THE EFFECT OF CROCIN IN PRIMARY OPEN ANGLE GLAUCOMA: A RANDOMIZED, TRIPLE-BLIND, PLACEBO-CONTROLLED CLINICAL TRIAL 620

P-428
RISK OF GLAUCOMA IN PATIENTS WITH RETINOPATHY OF PREMATURITY: A POPULATION-BASED COHORT STUDY 624

P-429
CENTRAL VISUAL FIELD DAMAGE IN GLAUCOMA EYES WITH CHOROIDAL MICROVASCULATURE DROPOUT WITH AND WITHOUT HIGH AXIAL MYOPIA 625

P-430
NEUROPROTECTIVE EFFECT OF NON-INVASIVE GAMMAFLICKER LIGHT STIMULATION IN GLAUCOMA DISEASE 626

P-431
METABOLIC HEALTH, OBESITY, AND INTRAOCULAR PRESSURE: METABOLICALLY HEALTHY OBESE VS METABOLICALLY UNHEALTHY NORMAL WEIGHT INDIVIDUALS 628

P-432
PERSONALIZED CHOICE OF TREATMENT FOR PATIENTS WITH PRIMARY ANTERIOR CHAMBER ANGLE CLOSURE 629

P-433
POSTOPERATIVE COMPLICATIONS AND REOPERATIONS FOR GLAUCOMA IN MICROSHUNT VS TRABECULECTOMY STUDY DURING 2-YEAR FOLLOW-UP 630

P-434
CORRELATION BETWEEN OPTIC DISC AREA AND AXIAL LENGTH IN GLAUCOMA SUSPECTS AND PATIENTS 631

P-435
PATIENT-REPORTED OUTCOMES AFTER INCISIONAL GLAUCOMA SURGERY VERSUS MINIMALLY INVASIVE GLAUCOMA SURGERY 632

P-436
'EYE MG 3D' APP - A 3D GLAUCOMA APP WITH TRUE COLOUR CONFOCAL IMAGES TO ENHANCE PEDAGOGY & COUNSELLING 634

P-437
MICROSHUNT VS TRABECULECTOMY: INTERIM SAFETY OBSERVATIONS FROM AN ONGOING OPEN-LABEL EXTENSION STUDY IN PATIENTS WITH PRIMARY OPEN-ANGLE GLAUCOMA 636

P-438
THE EUROPEAN GLAUCOMA SOCIETY (EGS) PATIENTS INVOLVEMENT INITIATIVE. PATIENTS' PERCEPTION OF GLAUCOMA CARE 637

PLB-019
THE EYES SEE WHAT THE MIND KNOWS - A STUDY TO ANALYZE THE COGNITIVE FUNCTION IN NORMAL TENSION GLAUCOMA PATIENTS 638

PLB-020
AN EXTENSIVE IOP PROFILE COMBINING 24-HOUR IOP CURVE WITH ICARE HOME AND WATER-DRINKING TEST. IMPACT ON DECISION-MAKING USEFULNESS TO TREAT GLAUCOMA 640

PLB-021
SCREENING FOR ANXIETY AND DEPRESSION AMONG GLAUCOMA PATIENTS USING THE HOSPITAL ANXIETY AND DEPRESSION SCALE (HADS-P) 642

PLB-022
A NOVEL DRUG-ELUTING CONTACT LENS FOR THE CONTROLLED DELIVERY OF BIMATOPROST FOR THE TREATMENT OF OPEN-ANGLE GLAUCOMA 644

PLB-023
CLINICAL OUTCOMES OF GLAUCOMA DRAINAGE DEVICES (GDD) IN PATIENTS WITH REFRACTORY GLAUCOMA 645

PLB-024
PREDICTORS OF LOW UPTAKE OF GLAUCOMA SURGERIES AMONG GLAUCOMA PATIENTS IN A WEST AFRICAN POPULATION 646

P-439
THE IMPACT OF MYOPIC TILTED DISC ON THE PARAMETERS OF OPTICAL COHERENCE TOMOGRAPHY 648

P-440
PROOF-OF-CONCEPT STUDY FOR REMOTE PERIMETRY IN A VIRTUAL REALITY METAVERSE ENVIRONMENT 649

P-441
ONLINE PERIMETRY: VALIDATION, COMPARISON WITH STANDARD AUTOMATED PERIMETRY AND PATIENT APPRAISAL 651

P-442
ASSOCIATIONS BETWEEN CLUSTERED VISUAL FIELD PROGRESSION AND LOCATIONS OF DISC HEMORRHAGES IN GLAUCOMA: A 3-YEAR PROSPECTIVE STUDY 653

P-443
STRUCTURE FUNCTION RELATIONSHIPS OF VESSEL DENSITY AND RETINAL NERVE FIBER LAYER THICKNESS IN EARLY GLAUCOMATOUS EYES WITH HIGH MYOPIA 654

P-444
OVERESTIMATION OF RETINAL NERVE FIBER LAYER (RNFL) DEFECT SIZE BY OPTICAL COHERENCE TOMOGRAPHY TOPOGRAPHIC RNFL THICKNESS ANALYSIS IN GLAUCOMA 655

P-445
LONG-TERM INTRAOCULAR PRESSURE FLUCTUATION IS A RISK FACTOR FOR VISUAL FIELD PROGRESSION IN ADVANCED GLAUCOMA 656

P-446
CHORIOCAPILLARIS AND PROGRESSIVE GANGLION CELL-INNER PLEXIFORM LAYER LOSS IN NON-GLAUCOMATOUS EYES 658

P-447
WIDE-FIELD OPTICAL COHERENCE TOMOGRAPHY ANGIOGRAPHY MAP FOR HIGH MYOPIC GLAUCOMA DETECTION 660

P-449
RACIAL DIFFERENCES IN GLAUCOMA DIAGNOSTIC ACCURACY OF MACULAR GANGLION CELL COMPLEX AND PERIPAPILLARY RETINAL NERVE FIBER LAYER THICKNESS 661

P-451
PERIPAPILLARY AND MACULAR VASCULAR PARAMETERS BY OPTICAL COHERENCE TOMOGRAPHY ANGIOGRAPHY IN PRIMARY CONGENITAL GLAUCOMA 663

P-452
ANNOTATING AND PREDICTING ARTIFICIAL INTELLIGENCE TOOL BOX - DIAGNOSING STRUCTURAL GLAUCOMATOUS DAMAGE FROM CONFOCAL FUNDUS IMAGES 666

P-453

P-454
CLINICAL FACTORS ASSOCIATED WITH LONG-TERM OPTICAL COHERENCE TOMOGRAPHY MEASUREMENT VARIABILITY IN GLAUCOMA 670

P-455
VISUAL FIELD INDICES IN CHILDREN WITH GLAUCOMA COMPARED TO THAT IN ADULT GLAUCOMA PATIENTS WITH COMPARABLE RETINAL NERVE FIBER LAYER THICKNESS 672

P-458
CLINICAL CHARACTERISTICS OF OPEN-ANGLE GLAUCOMA PROGRESSION WITH PERIPAPILLARY MICROVASCULATURE DROPOUT IN DIFFERENT LOCATIONS 674

P-459
LONGITUDINAL VASCULAR CHANGES ASSESSED USING AS-OCTA IN DIFFERENT CONJUNCTIVAL INCISIONS IN FILTERING TRABECULECTOMY BLEBS: A PILOT STUDY 675

P-462
CLINICAL VALIDATION OF DEVICE-INDEPENDENT WEB-BROWSER PERIMETER (MELBOURNE RAPID FIELDS) COMPARED TO HUMPHREY FIELD ANALYZER FOR GLAUCOMA 676

P-463
RAPID OBJECTIVE PERIMETRY IN GLAUCOMA 677

P-464
RELATIONSHIP BETWEEN MRI OF THE BRAIN PRIMARY VISUAL CORTEX AND WEIGHTED SCALE COMBINING THE ESTIMATED RETINAL GANGLION CELL COUNT 679

P-466
ENHANCING STRUCTURE-FUNCTION RELATIONSHIP IN EARLY GLAUCOMA WITH COMPENSATION OF DEMOGRAPHIC AND ANATOMICAL DATA 680

P-467
ANALYSIS OF GLOBAL AND FOCAL LOSS IN GLAUCOMA PROGRESSION 681

P-469
CORNEAL BIOMECHANICS IN VISUAL FIELD PROGRESSION OF PRIMARY OPEN-ANGLE GLAUCOMA WITH OCULAR NORMOTENSION OR HYPERTENSION 683

P-470
GANGLION CELL COMPLEX ANALYSIS TO ASSESS THE PROGRESSION OF GLAUCOMA 685

P-471
DETECTION OF IRIDOCORNEAL ANGLE CHANGES AFTER UNCOMPLICATED PHACOEMULSIFICATION USING AUTOMATED GONIOSCOPY IMAGING 686

P-472
DEVELOPMENT OF A NOVEL SCREENING PROGRAM FOR GLAUCOMA WITH A HEAD MOUNT PERIMETER IMO 687

P-473
ASSOCIATION BETWEEN PROGRESSIVE CIRCUMPAPILLARY VESSEL DENSITY LOSS AND VISUAL FIELD PROGRESSION IN GLAUCOMATOUS EYES WITH HIGH MYOPIA 688

P-474
ACCEPTANCE, TOLERABILITY AND PATIENT COMFORT DURING HOME-BASED VISUAL FIELD TESTING USING A VIRTUAL REALITY HEADSET 689

P-476
DETECTION AND CHARACTERISATION OF VISUAL FIELD DEFECTS USING OCTOPUS PERIMETRY IN CONGENITAL GLAUCOMA 690

P-477
CHANGES OF EMOTIONAL STATUS AND BRAIN FUNCTIONAL CONNECTIVITY IN GLAUCOMA PATIENTS 692

P-479
OFFSET OF OPENINGS IN OPTIC NERVE HEAD CANAL AT LEVEL OF BRUCH'S MEMBRANE, ANTERIOR SCLERA, AND LAMINA CRIBROSA 693

P-480
COMPARISON OF ***IN VIVO*** TRABECULAR MESHWORK MORPHOLOGY BETWEEN NORMAL AND GLAUCOMATOUS EYES USING HIGH-RESOLUTION ADAPTIVE OPTICS GONIOSCOPY 697

P-481
EVALUATION OF MICROVASCULAR CHANGES AND OPTIC NERVE HEAD PERFUSION FOLLOWING TRABECULECTOMY – AN OPTICAL COHERENCE TOMOGRAPHY ANGIOGRAPHY(OCT-A) STUDY 698

P-482
CLASSIFICATION OF VISUAL FIELD ABNORMALITIES IN HIGHLY MYOPIC EYES WITHOUT PATHOLOGIC CHANGE 700

P-483
INTER-EYE ASSOCIATION AND DIFFERENCE OF THE RATES OF VISUAL FIELD PROGRESSION IN PATIENTS WITH BILATERAL OPEN-ANGLE GLAUCOMA 701

P-484
CONCORDANCE BETWEEN THE CLINICAL FINDINGS, OCT AND 30-2 VF IN PATIENTS WITH DIAGNOSIS OF GLAUCOMA SUSPECT AND PRIMARY OPEN-ANGLE GLAUCOMA 702

P-486
THE DEFINITION OF PREPERIMETRIC GLAUCOMA VARIES A LOT AS THERE ARE NO STANDARD GUIDELINES. A SYSTEMATIC REVIEW 704

P-487
COMPARISON OF SUPERIOR AND INFERIOR VISUAL FIELD ASYMMETRY IN NORMAL TENSION GLAUCOMA IN AN ASIAN POPULATION 706

P-488
PHOTOPIC NEGATIVE RESPONSE (PHNR) AMPLITUDE USING HANDHELD RETEVAL IN PRIMARY GLAUCOMA 707

P-489
COMPARISON IN GLAUCOMATOUS VISUAL FIELD LOSS PROGRESSION ON 30-2 AND 10-2 VISUAL FIELDS 709

P-490
COMPARISON OF OPTICAL COHERENCE TOMOGRAPHY STRUCTURAL PARAMETERS FOR DIAGNOSIS OF GLAUCOMA IN HIGH MYOPIA 710

P-491
PAPILLOMACULAR BUNDLE DEFECT (PMBD) IN GLAUCOMA PATIENTS WITH HIGH MYOPIA: FREQUENCY AND RISK FACTORS 711

P-492
COMPARISON OF CORNEAL BIOMECHANICAL PARAMETERS DETECTED USING CORVIS-ST IN NORMAL TENSION GLAUCOMA AND HIGH TENSION GLAUCOMA712

P-493
MEASUREMENT PRECISION OF AN OPTICAL COHERENCE TOMOGRAPHY DEVICE IN NORMAL AND GLAUCOMATOUS EYES 713

P-494
CORRELATION BETWEEN ENLARGEMENT OF RETINAL NERVE FIBER DEFECT ANGLE IN EN-FACE IMAGING AND VISUAL FIELD PROGRESSION 715

P-495
EVALUATION OF VISUAL CORTEX ACTIVITY USING FUNCTIONAL NEAR INFRARED SPECTROSCOPY [FNIRS] IN PRIMARY GLAUCOMA 716

P-496
EVALUATING THE EFFECTIVENESS OF A MODIFIED RISK CALCULATOR BASED ON THE OCULAR HYPERTENSION TREATMENT STUDY 717

P-497
CHARACTERISTICS OF 10-2 VISUAL FIELD SENSITIVITY THAT DECREASES VISUAL ACUITY 718

P-498
THE EFFECT OF BIMATOPROST SUSTAINED-RELEASE ON DIURNAL INTRAOCULAR PRESSURE CURVE: INITIAL CASE SERIES 719

P-499
ASSESSMENT OF PERFUSED PERIPAPILLARY CAPILLARIES AND RADIAL PERIPAPILLARY CAPILLARY NETWORK IN PRIMARY OPEN ANGLE GLAUCOMA PATIENTS 720

P-500
DIAGNOSING EARLY GLAUCOMATOUS DAMAGE IN A HOMONYMOUS HEMIANOPIC PATIENT WITH SPECTRALIS SD-OCT 721

P-503
CHANGES IN OPTIC NERVE HEAD MEASUREMENTS USING OPTICAL COHERENCE TOMOGRAPHY(OCT) FOLLOWING COMBINED TRABECULOTOMY WITH TRABECULECTOMY IN JOAG 724

P-504
THE USE OF A NEW WIRELESS TYPE IV POLYSOMNOGRAPHY TO EVALUATE THE ASSOCIATION BETWEEN OBSTRUCTIVE SLEEP APNEA SYNDROME AND GLAUCOMA 726

P-505
COMPARISON OF SECTORAL STRUCTURE-FUNCTION RELATIONSHIPS IN MYOPIC GLAUCOMA: PERIPAPILLARY VESSEL DENSITY VERSUS PERIPAPILLARY RNFL THICKNESS 727

P-506
CHOROIDAL THICKNESS IN JUVENILE OPEN ANGLE GLAUCOMA 729

P-507
THE RELATIONSHIP BETWEEN THE RESULTS OF TRANSCRANIAL DOPPLER ULTRASONOGRAPHY AND VISUAL FIELD TEST 731

P-510
THE DEGREE OF LOSS IN THE TISSUE THICKNESS, MICRO VASCULAR DENSITY, SPECIFIC PERIMETRY, AND STANDARD PERIMETRY IN EARLY GLAUCOMA 732

P-512
MACULAR VESSEL DENSITY VS MACULAR THICKNESS IN EARLY STAGE OF PRIMARY OPEN ANGLE GLAUCOMA 733

P-513
LARGE OPTIC DISC OR GLAUCOMA? – PRELIMINARY RESULTS FROM THE LONGITUDINAL GUTENBERG OPTIC DISC STUDY 734

P-514
INVESTIGATING PERIPAPILLARY VESSEL DENSITY ON OCT ANGIOGRAPHY AFTER INSTILLATION OF TOPICAL BRIMONIDINE VERSUS DORZOLAMIDE 735

P-515
EFFECT OF SEVERITY OF GLAUCOMA ON DARK/LIGHT ASYMMETRIES: EVIDENCE FOR THE PREFERENCE INFLUENCE OF GLAUCOMA ON THE ON-CELL PATHWAY 736

P-517
PROGRESSION ANALYSIS FOR OBJECTIVE PERIMETRY 738

P-518
REPEATABILITY OF 24-2 VISUAL FIELDS TAKEN WITH A BINOCULAR PERIMETER 740

P-519
CHOROIDAL THICKNESS INCREASE AFTER INTRAOCULAR PRESSURE LOWERING GLAUCOMA SURGERIES DETECTED WITH SWEPT-SOURCE OPTICAL COHERENCE TOMOGRAPHY 742

P-520
SHORT-TERM CHANGE OF RETINAL CAPILLARY NETWORK FOLLOWING ACUTE PRIMARY ANGLE CLOSURE 744

P-521
STUDY OF TECHNOLOGIES FOR THE DIAGNOSIS OF ANGLE CLOSURE (ACE): PROTOCOL FOR A PROSPECTIVE, CROSS-SECTIONAL, MULTI-CENTRE DIAGNOSTIC STUDY 745

P-522
IRIDOTOMY THAT TRANSILLUMINATES….. SAFE IRIDOTOMY? 746

P-523
EVALUATION OF BLEB MORPHOLOGY AFTER FILTERING SURGERY IN OPEN ANGLE AND ANGLE CLOSURE GLAUCOMA 748

P-524
TRUE COLOR CONFOCAL SCANNER OPHTHALMOSCOPY TO DETECT RETINAL NERVE FIBER LAYER DEFECTS IN PATIENTS WITH PRIMARY OPEN ANGLE GLAUCOMA 749

P-525
STRUCTURAL CORRELATION OF VISION ASYMMETRY IN ADVANCED GLAUCOMA 751

P-527
INFLUENCE OF GLAUCOMA FILTERING SURGERY ON PERIPAPILLARY AND MACULAR VASCULAR DENSITY 752

P-528
OCTA OF THE RETINA AND THE CHOROID IN PSEUDOEXFOLIATIVE, PRIMARY OPEN ANGLE AND NORMAL TENSION GLAUCOMA 753

P-529
OCULAR SURFACE DISEASE ASSOCIATION WITH VISUAL FIELD AND OPTICAL COHERENCE TOMOGRAPHY RELIABILITY IN GLAUCOMA PATIENTS 754

P-530
DETECTION OF VISUAL FIELD DEFECTS IN EARLY GLAUCOMATOUS EYES: COMPARISON OF HUMPHREY 24-2C AND OCTOPUS PERIMETRY G1 PROGRAM WITH G-PERIPHERAL MODE 755

P-531
OPTICAL COHERENCE TOMOGRAPHY PARAMETERS OF THE MACULA AND OPTIC NERVE IN PATIENTS BETWEEN 4 AND 17 YEARS OLD WITH AND WITHOUT GLAUCOMA 756

P-532
COMPARISON OF PATHOGENETIC CLINICAL FEATURES IN UNILATERAL NORMAL TENSION GLAUCOMA DEPENDING ON THE OPTIC DISC HEMORRHAGE 759

P-534
INVESTIGATION OF THE OPTIC NERVE HEAD MORPHOLOGY INFLUENCE TO THE OPTIC NERVE HEAD BIOMECHANICS 760

P-536
STRUCTURAL AND FUNCTIONAL CHANGES IN MACULA OVERTIME IN OCULAR HYPERTENSION VS CONTROLS 761

P-537
PREDICTIVE VALUE OF DYNAMIC CORNEAL RESPONSE PARAMETERS EVALUATED WITH CORVIS ST ON THE VISUAL FIELD PROGRESSION IN PROSTAGLANDIN TREATED OAG PATIENTS 762

P-538
COMPARATIVE ANALYSIS OF ELECTROPHYSIOLOGICAL AND PERIMETRIC PARAMETERS IN PATIENTS WITH SUSPECTED GLAUCOMA 763

P-539
STRUCTURE-FUNCTION RELATIONSHIP AS MEASURED BY SD-OCT AND OCTOPUS PERIMETRY IN CHILDHOOD GLAUCOMA 765

P-540
COLOUR VISION AND CONTRAST SENSITIVITY CHANGES IN PATIENT WITH PRIMARY ANGLE CLOSURE AND PRIMARY ANGLE CLOSURE GLAUCOMA 768

P-541
THE CHARACTERISTIC OF RETINAL NERVE FIBER LAYER THICKNESS IN ADVANCE AND END-STAGE GLAUCOMA USING SPECTRAL DOMAIN OPTICAL COHERENCE TOMOGRAPHY 769

P-542
VISUAL FIELD INDICES IN NORMAL CHILDREN COMPARED TO ADULTS WITH COMPARABLE RETINAL NERVE FIBER LAYER THICKNESS 771

P-543
RELATIONSHIP OF VESSEL DENSITY BY OPTICAL COHERENCE TOMOGRAPHY ANGIOGRAPHY (OCT-A) IN HEALTHY, GLAUCOMA SUSPECT, AND GLAUCOMA EYES 774

P-547
COMPARISON THE EFFECTS OF WATER DRINKING TEST ON VESSEL DENSITY OF OPTIC NERVE HEAD AND MACULA IN HEALTHY AND GLAUCOMA EYES BY OCTA 775

P-548
AXIAL LENGTH AND CHORIOCAPILLARIS FLOW DEFICITS IN NON-PATHOLOGICAL HIGH MYOPIA 776

P-550
CONSISTENCY OF BINOCULAR ESTERMAN VISUAL FIELD TEST 777

P-551
FRONTAL LOBE DISORDERS AND VISUAL FIELD TESTING. CASE REPORT 778

P-552
INTRAOBSERVER AND INTEROBSERVER AGREEMENT IN THE DETERMINATION OF THE CUP-DISC RATIO OF THE OPTIC NERVE. PRELIMINARY RESULTS 779

P-553
DIAGNOSTIC ACCURACY OF OPTIC NERVE HEAD AND MACULA OCT PARAMETERS FOR DETECTING GLAUCOMA IN EYES WITH AND WITHOUT AXIAL HIGH MYOPIA 781

P-554
LAMINA CRIBROSA THICKENING IN PROLIFERATIVE DIABETIC RETINOPATHY AS A PROTECTIVE MECHANISM IN THE DEVELOPMENT OF NEOVASCULAR GLAUCOMA 782

P-555
STRUCTURAL CHARACTERISTICS OF CHOROIDAL MICROVASCULAR DROPOUT IN PRIMARY OPEN-ANGLE GLAUCOMA: COMPARISON BETWEEN WIDTH AND AREA 783

P-556
ORDER OF MAGNITUDE (OM): VIRTUAL REALITY-BASED VISUAL FIELD EXAMINATION TO DETECT GLAUCOMATOUS FIELD LOSS 784

P-557
A NEW GLAUCOMA MIMIC: SUBCLINICAL OPTIC TRACT DEFECTS DIAGNOSED BY WIDEFIELD MACULAR OCT SCANS 785

P-558
FACTORS AFFECTING VISUAL ACUITY AND CENTRAL VISUAL FUNCTION IN GLAUCOMA PATIENTS WITH MYOPIA 787

P-559
CHARACTERISTICS OF PRIMARY ANGLE-CLOSURE GLAUCOMA EYES PRESENTING WITH VISUAL FIELD LOSS OF DIFFERENT SEVERITY LEVELS 788

P-560
STAGE SPECIFIC GLAUCOMATOUS CHANGES OF THE MACULA RECORDED USING SPECTRAL DOMAIN OPTICAL COHERENCE TOMOGRAPHY 789

P-561
COMPARISON OF GLAUCOMA DIAGNOSTIC ACCURACY OF MACULAR GANGLION CELL COMPLEX THICKNESS BASED ON NON-HIGHLY MYOPIC AND HIGHLY MYOPIC 791

P-562
OPTIC NERVE HEAD CHARACTERISTICS IN PATIENTS WITH UNILATERAL CORNEAL TRANSPLANTATION 792

P-563
QUANTITATIVE RETINAL NERVE FIBER LAYER ANALYSIS COMPARISON BETWEEN TWO MULTIMODAL IMAGING PLATFORMS: THE HEIDELBERG SPECTRALIS & NIDEK MIRANTE 793

P-564
OPTICAL COHERENCE TOMOGRAPHY ANGIOGRAPHY IN GLAUCOMA: A CASE-CONTROL STUDY 794

P-565
TO CORRELATE THE MACULAR CIRCULATION ON SS-OCT-A WITH ANATOMICAL AND FUNCTIONAL ASPECTS IN OCULAR HYPERTENSIVE AND PRE-PERIMETRIC GLAUCOMA PATIENTS 795

P-566
ANTERIOR SEGMENT OPTICAL COHERENCE TOMOGRAPHY FOR ADEQUATE POSTOPERATIVE PLACEMENT OF PRESERFLO MICROSHUNT 797

P-567
FUNCTIONAL PLASTICITY OF THE OPTIC NERVE AFTER EXOGENOUS NERVE GROWTH FACTOR ADMINISTRATION: REPORT OF TWO CASES 799

P-568
TO DETERMINE MACULAR GANGLION CELL LOSS BY SD-OCT IN OHT, POAG SUSPECTS, POAG & TO ACCESS IF GCIPL IS SUPERIOR TO PRNFL 800

P-570
ELECTROPHYSIOLOGY OF GLAUCOMA - THE PATH TO EARLY AND FINAL DIAGNOSIS 802

P-571
REVERSE PUPILLARY BLOCK IN NON PIGMENT DISPERSION GLAUCOMA AND THE VALUE OF DYNAMIC AS-OCT 804

P-572
ASSESSMENT OF OPTIC NERVE HEAD BLOOD FLOW IN PATIENTS WITH NORMAL TENSION GLAUCOMA BY LASER DOPPLER HOLOGRAPHY 807

P-573
SHOULD N 75 MARKER BE PRESENT IN VISUAL EVOKED POTENTIAL TEST IN MIGRAINE PATIENTS WITH AURA? 808

P-574
REPEATABILITY AND RELIABILITY CRITERIA FOR BINOCULAR ESTERMAN VISUAL FIELD 809

P-576
LONGITUDINAL MACULAR RETINAL AND CHOROIDAL MICROVASCULATURE CHANGES IN HIGH MYOPIA 810

P-577
USE OF ANTERIOR SEGMENT OCT IN SOME RARE TYPES OF GLAUCOMA 811

P-578
EFFECTS OF MIOSIS ON ANTERIOR STRUCTURES AFTER CATARACT SURGERY IN ANGLE CLOSURE GLAUCOMA 812

P-579
THE PREVALENCE OF GLAUCOMA IN CONFRONTATION VISUAL FIELD DEFECTS IN AN OPHTHALMIC POPULATION 814

P-581
COMPARATIVE STUDY OF CHANGES IN PHOTOPIC NEGATIVE RESPONSE AND PATTERN ELECTRORETINOGRAM IN NORMAL, SUSPECT AND ESTABLISHED, GLAUCOMA 816

P-582
COMPARING GLAUCOMA PROGRESSION ANALYSIS WITH PULSAR VISUAL FIELDS, OCT RETINAL NERVE FIBRE LAYER AND MACULAR SCANS, AND STEREO OPTIC DISC PHOTOGRAPHS 818

P-583
IDENTIFYING MACULAR GANGLION CELL COMPLEX LOSS IN DIFFERENT STAGES OF GLAUCOMA 819

P-584
PERIPAPILLARY CHOROIDAL THICKNESS IN PRIMARY OPEN ANGLE GLAUCOMA, NORMAL TENSION GLAUCOMA AND NORMAL EYES: A SYSTEMATIC REVIEW AND META-ANALYSIS 820

P-585
MACULAR AND SUBMACULAR CHOROIDAL MICROVASCULATURE IN PATIENTS WITH PRIMARY OPEN-ANGLE GLAUCOMA AND HIGH MYOPIA 821

P-586
RETINAL NERVE FIBER LAYER OPTICAL TEXTURE ANALYSIS: IDENTIFYING UNDETECTED AXONAL FIBER BUNDLE LOSS IN OCULAR HYPERTENSION 822

P-587
TOPOGRAPHIC ASSOCIATION BETWEEN VISUAL FIELD CHANGES AND CIRCUMPAPILLARY RNFL IN ADVANCED GLAUCOMA; A STRUCTURE- FUNCTION ANLAYSIS 823

P-588
CORRELATION BETWEEN FUNCTIONAL MITOCHONDRIAL IMAGING USING FLAVOPROTEIN FLUORESCENCE AND SECTORIAL OCT PARAMETERS 827

P-589
PREDICTIVE FACTORS FOR VISUAL FIELD NON-PROGRESSION AND PROGRESSION IN MYOPIC NORMAL TENSION GLAUCOMA 829

P-590
NOVEL DISCOVERIES OF RELATIONSHIP BETWEEN VITREOUS ZONULE AND ANTERIOR SEGMENT CHARACTERISTICS IN PRIMARY ANGLE-CLOSURE DISEASES 830

P-591
RETINAL NERVE FIBRE LAYER OPTICAL TEXTURE ANALYSIS FOR ASSESSMENT OF GLAUCOMA PROGRESSION: A 5-YEAR PROSPECTIVE STUDY 833

P-592
RELIABILITY OF VISUALL VIRTUAL REALITY PERIMETRY AS AN ALTERNATIVE TO HUMPHREY VISUAL FIELD TESTING 834

PLB-026
EVALUATION OF THE CONSISTENCY OF GLAUCOMATOUS VISUAL FIELD DEFECTS USING A CLUSTERED SITA-FASTER PROTOCOL 836

PLB-027
RETINAL NERVE FIBER LAYER THICKNESS MEASUREMENT BEFORE AND AFTER CATARACT SURGERY USING SPECTRAL -DOMAIN OPTIC COHERENCE TOMOGRAPHY 838

PLB-028
CORRELATION OF MACULAR GANGLION CELL + INNER PLEXIFORM LAYER AND CIRCUMPAPILLARY RNFL THICKNESS IN GLAUCOMA SUSPECTS AND GLAUCOMATOUS EYES 841

P-593
SURGICAL MANAGEMENT OF HYPOTONY: A RETROSPECTIVE CONSECUTIVE CASE SERIES TREATED BETWEEN 2020 AND 2022 IN A TERTIARY CENTER IN A DEVELOPING COUNTRY 844

P-594
OUTCOMES OF BENT NEEDLE AB INTERNO GONIECTOMY IN MODERATE TO SEVERE PRIMARY OPEN ANGLE GLAUCOMA EYES 846

P-595
REAL WORLD DATA ON THE SAFETY AND EFFICACY OF A NOVEL SUPRACILIARY MICROSPONGE IMPLANT AT 6 MONTHS 847

P-596
MODIFIED TRABECULECTOMY WITH RELEASABLE SUTURES: A SECURE WAY OF SUCCESSFUL GLAUCOMA FILTRATION SURGERY 848

P-597
PRIMARY GLAUCOMA SURGERY FOR AFRICAN AND AFRICAN-CARIBBEAN PATIENTS (PEACE): A PILOT RANDOMISED CONTROLLED TRIAL 849

P-598
ASSESSING THE EFFICACY OF DIFFERENT OCULAR HYPOTENSIVE MEDICATION REGIMENS FOLLOWING MICROINVASIVE GLAUCOMA SURGERIES 850

P-599
MORPHOLOGICAL FEATURES OF CYSTIC VERSUS NON-CYSTIC TRABECULECTOMY BLEBS 852

P-600
USE OF ADJUNCTIVE ORAL IBUPROFEN IS ASSOCIATED WITH A REDUCED LIKELIHOOD OF EARLY BLEB FAILURE IN EYES AT RISK OF SCARRING 854

P-601
AGE AS A PREDICTIVE FACTOR IN MIGS OUTCOMES IN PRIMARY OPEN ANGLE GLAUCOMA 855

P-602
PRESERFLO MICROSHUNT VERSUS TRABECULECTOMY: 12 MONTH OUTCOMES AT A SPECIALIST REFERRAL CENTRE 857

P-603
ENDOTHELIAL CELL CHANGES IN PATIENTS AFTER PRESERFLO MICROSHUNT IMPLANTATION IN 1-YEAR FOLLOW-UP PERIOD 858

P-604
EYEWATCH: A NEW ADJUSTABLE DRAINAGE DEVICE IN A CASE OF REFRACTORY GLAUCOMA 859

P-605
OUTCOMES OF SUPRACILIARY DRAINAGE DEVICE IMPLANTATION IN PATIENTS WITH CONSISTENTLY LOW IOP 861

P-606
PRESERFLO MICROSHUNT AFTER PREVIOUSLY FAILED TRABECULECTOMY: ONE-YEAR SURGICAL OUTCOMES 862

P-607
COMPARISON OF MITOMYCIN-C AND 5 FLUORACIL TRABECULECTOMY BY ULTRASOUND BIOMICROSCOPY 863

P-608
LONG TERM SURGICAL SURVIVAL OF PRESERFLO® FILTERING SURGERY: A RETROSPECTIVE 2-YEAR ANALYSIS 865

P-609
EFFICACY AND SAFETY OF AB EXTERNO CANALOPLASTY: 3-YEAR FOLLOW-UP 866

P-610
LONG-TERM UPDATE ON DEEP SCLERECTOMY VS. COMBINED TRABECULOTOMY TRABECULECTOMY 867

P-612
MEDIUM AND LONG-TERM SURGICAL OUTCOMES OF THE PRESERFLO MICROSHUNT 868

P-613
TWO YEARS EFFECTIVENESS AND SAFETY OF XEN45 IMPLANT IN GLAUCOMA PATIENTS 869

P-614
VISCOCANALOPLASTY AND TRABECULOTOMY WITH OMNI DEVICE IN PATIENTS WITH DIFFERENT TYPES OF GLAUCOMA – REAL WORLD DATA 871

P-615
OUTCOMES OF BLEB NEEDLING WITH HIGH DOSE(40MG) INJECTABLE SUBCONJUNCTIVAL MITOMYCIN C IN FAILING OR FAILED BLEBS 872

P-617
ANTERIOR SEGMENT OPTICAL COHERENCE TOMOGRAPHY CHANGES DURING THE POST OPERATIVE COURSE AFTER INSERTION OF A SUPRACHOROIDAL MINIJECT DEVICE 874

P-619
RETROSPECTIVE ANALYSIS AND OUTCOME COMPARISONS BETWEEN 3 SCHLEMM'S CANALOPLASTY SURGICAL DEVICES FOR GLAUCOMA 876

P-620
CHALLENGING MANAGEMENT OF OCULAR HYPOTONY AFTER TRABECULECTOMY 877

P-621
XEN® IMPLANT: LONG-TERM OUTCOMES AND SAFETY PROFILE 878

P-622
THE PRESERFLO MICROSHUNT: A MULTI-CENTRE CLINICAL STUDY 879

P-623
DELAYING TRABECULECTOMY WITH TRABECULOTOMY USING THE OMNI SYSTEM: A CASE SERIES 880

P-624
PEPTIDE GEL, CK2-085, MAINTAINS OPERATIVE FIELD VISIBILITY DURING GLAUCOMA SURGERY: FIRST-IN-HUMAN RANDOMIZED CLINICAL TRIAL 881

P-625
IMPACT OF POSTOPERATIVE CHOROIDAL DETACHMENT ON TRABECULECTOMY OUTCOMES: A FOUR-YEAR COMPARATIVE STUDY 882

P-626
A NEW "TUBE IN TUBE" METHOD TO EXTEND GLAUCOMA DRAINAGE DEVICES USING A PAUL GLAUCOMA IMPLANT 883

P-627
THREE YEAR OUTCOMES OF THE PAUL® GLAUCOMA DRAINAGE DEVICE IN A TERTIARY REFERRAL CENTRE 885

P-628
EFFICACY OF INTRAOPERATIVE INJECTION VERSUS SPONGE APPLICATION OF MITOMYCIN C FOR TRABECULECTOMY 887

P-629
EFFICACY AND SAFETY OF AB EXTERNO PHACO-CANALOPLASTY VERSUS PHACO-ISTENT FIRST-GENERATION IN PATIENTS WITH POAG - EARLY RESULTS 888

P-630
CHANGES IN INTRAOCULAR PRESSURE AND TONOGRAPHIC OUTFLOW FACILITY FOLLOWING COMBINED VISCOCANALOPLASTY AND TRABECULOTOMY WITH THE OMNI SURGICAL SYSTEM 889

P-631
ACUTE POST-OPERATIVE INTRAOCULAR PRESSURE SPIKES FOLLOWING CATARACT SURGERY IN GLAUCOMA: A STUDY OF TRANS-INCISIONAL AQUEOUS RELEASE ('WOUND BURPING') 890

P-632
A NOVEL GLAUCOMA DRAINAGE DEVICE. 18 MONTHS SAFETY AND EFFICACY DATA OF THE EYEPLATE-300 891

P-633
A REAL WORLD PROSPECTIVE STUDY INTO THE EFFICACY OF THE PRESERFLO MICROSHUNT OVER A 12 MONTH PERIOD IN A UK TERTIARY CENTRE 892

P-634
SECONDARY GLAUCOMA AFTER CONGENITAL CATARACT SURGERY 894

P-635
CORNEAL TATTOO FOR SYMPTOMATIC GLARE AFTER LASER PERIPHERAL IRIDOTOMY: SINGLE VS DOUBLE LAMELLAR POCKET TECHNIQUE 895

P-636
OUTCOMES OF COMPLICATED CATARACT SURGERY IN PATIENTS WITH GLAUCOMA 896

P-637
LONG-TERM OUTCOME AFTER AB-EXTERNO CANALOPLASTY AS SIMPLE GLAUCOMA SURGERY OR IN COMBINATION WITH PHACOEMULSIFICATION 897

P-638
COMPARISON OF OUTCOMES AT SIX MONTHS BETWEEN GONIOTOMY AND HYDRUS IN OPEN ANGLE GLAUCOMA 899

P-639
CLINICAL OUTCOMES OF PRESERFLO® MICROSHUNT PROCEDURE WITH MITOMYCIN C ALONE VERSUS WITH MITOMYCIN C AND BEVACIZUMAB 901

P-640
12-MONTH OUTCOMES AFTER PHACO-ELIOS PROCEDURE – A REAL WORLD STUDY 903

P-641
A COMPUTATIONAL COMPARISON OF THREE GLAUCOMA FILTRATION SURGERIES 905

P-642
VISUAL AND REFRACTIVE OUTCOMES IN GLAUCOMA PATIENTS AFTER COMBINED PHACOEMULSIFICATION WITH ACRYSOF VIVITY IOL AND ISTENT INJECT IMPLANTATION 907

P-643
PHACOEMULSIFICATION WITH GONIOSCOPY-ASSISTED TRANSLUMINAL TRABECULOTOMY VERSUS PHACOEMULSIFICATION ALONE IN PRIMARY ANGLE CLOSURE GLAUCOMA 908

P-644
OUTCOME OF PRIMARY TRABECULECTOMY WITH MITOMYCIN-C (0.02%) IN JUVENILE OPEN ANGLE GLAUCOMA PATIENTS: A RETROSPECTIVE ANALYSIS IN INDIAN EYES 909

P-645
THE CORRELATION OF SIMPLIFIED FILTRATION-BLEB GRADING SYSTEM AND INTRAOCULAR PRESSURE AFTER TRABECULECTOMY IN THAILAND 911

P-646
INFERIOR KAHOOK DUAL BLADE-GONIOTOMY EFFICACY IN OPEN-ANGLE GLAUCOMA 913

P-647
MANAGEMENT OF PRIMARY ANGLE CLOSURE – REAL WORLD DATA FROM A TERTIARY REFERRAL CENTRE IN THE UK 914

P-648
CLINICAL OUTCOMES OF CANALOPLASTY WITH TRABECULOTOMY AND TRANSLUMINAL DILATION WITH GONIOTOMY IN PSEUDOPHAKIC EYES WITH SEVERE GLAUCOMA 915

P-650
SIX MONTHS SURGICAL OUTCOMES OF THE COMBINED CATARACT SURGERY AND PRESERFLO MICROSHUNT WITH MITOMYCIN C : REAL WORLD DATA 916

P-651
SURGICAL OUTCOMES OF INDONESIA'S VIRNA GLAUCOMA IMPLANT ON PRIMARY OPEN ANGLE GLAUCOMA AND JUVENILE GLAUCOMA: 1-YEAR OF FOLLOW-UP 917

P-652
COMPARISON OF OUTCOME AND PREOPERATIVE BLEB MORPHOLOGY BETWEEN NEEDLING AND SURGICAL BLEB REVISION USING ANTERIOR SEGMENT OPTICAL COHERENCE TOMOGRAPHY 918

P-653
TREATMENT OUTCOMES OF SUBTENON INJECTION AND SOAKED SPONGE APPLICATION OF ADJUNCTIVE MITOMYCIN-C IN TRABECULECTOMY: A META ANALYSIS 919

P-654
CASE SERIES OF NON-PENETRATING GLAUCOMA SURGERY TO TREAT EYES WITH RAISED INTRA-OCULAR PRESSURE AFTER PREVIOUS TREATMENT FOR INTRA-OCULAR MALIGNANCY 920

P-655
OBJECTIVELY MEASURED CHANGES IN POST-OPERATIVE AQUEOUS FLARE AFTER GLAUCOMA OPERATIONS 921

P-656
SURGICAL OUTCOMES OF PRIMARY FILTERING SURGERIES IN SECONDARY CHILDHOOD GLAUCOMA PATIENTS: A RETROSPECTIVE COHORT STUDY 922

P-657
6-YEAR EFFICACY AND SAFETY OF ITRACK AB-INTERNO CANALOPLASTY AS STANDALONE PROCEDURE AND COMBINED WITH CATARACT SURGERY IN PRIMARY OPEN-ANGLE GLAUCOMA 923

P-658
EFFECT OF PILOCARPINE IN PATIENTS UNDERGOING GONIOSCOPY-ASSISTED TRANSLUMINAL TRABECULOTOMY SURGERY 924

P-659
BASELINE CHARACTERISTICS OF PARTICIPANTS IN THE CONCEPT RANDOMISED CONTROLLED TRIAL (COMPARING PHACO VS PHACO WITH ENDOSCOPIC CYCLOPHOTOCOAGULATION) 925

P-660
SAFETY AND EFFICACY OF CANALOPLASTY – A 12-YEAR RETROSPECTIVE STUDY 926

P-661
TWO-YEAR OUTCOMES OF ANTERIOR VERSUS POSTERIOR SCLERAL APPLICATION OF MITOMYCIN C-SOAKED SPONGE IN TRABECULECTOMY 927

P-662
SAFETY AND EFFICACY OF THE HYDRUS MICROSTENT DURING THE INITIAL LEARNING CURVE 928

P-663
OUTCOME OF ISTENT TRABECULAR MICROBYPASS IMPLANTATION IN SEVERE OPEN ANGLE GLAUCOMA 930

P-664
A LOCAL RETROSPECTIVE ANALYSIS AFTER 32 IMPLANTATIONS OF THE NEW XEN63 931

P-665
LONG-TERM STRUCTURAL CHANGES OBSERVED ON GONIOSCOPY AND ANTERIOR-SEGMENT OCT FOLLOWING GONIOSCOPY-ASSISTED TRANSLUMINAL TRABECULOTOMY (GATT) 933

P-666
PROSPECTIVE STUDY OF CANALOPLASTY AND TRABECULOTOMY PERFORMED BY TRAINEES – 12 MONTH RESULTS 934

P-667
LONG-TERM OUTCOMES OF EARLY POSTOPERATIVE HYPOTONY FOLLOWING MITOMYCIN C-AUGMENTED TRABECULECTOMY 935

P-668
DIRECT VISCODILATION OF THE COLLECTOR CHANNELS FOLLOWING DUAL BLADE GONIOTOMY WITH CATARACT SURGERY: 6 YEAR RESULTS 936

P-669
DOES CATARACT SURGERY INCREASE THE RISK OF LATE-ONSET GLAUCOMA IN CHILDREN WITH CONGENITAL CATARACTS? 937

P-670
1-YEAR OUTCOMES OF PRESERFLO® MICROSHUNT AT A SINGLE TERTIARY CENTRE 938

P-672
EFFECTS OF TOPICAL GLAUCOMA EYE DROPS ON LONG-TERM TRABECULECTOMY OUTCOMES BASED ON GLAUCOMA MEDICATIONS INTENSITY INDEX 939

P-673
LONG-TERM INTRAOCULAR PRESSURE STABILITY BY TRABECULECTOMY CAN BE SLOWED DOWN GLAUCOMATOUS VISUAL FIELD LOSS PROGRESSION 940

P-674
PRESERFLO MICROSHUNT IN KERATOPLASTY-INDUCED GLAUCOMA TREATMENT – MEDIUM-TERM OBSERVATION 941

P-676
EVALUATING POSTOPERATIVE REFRACTIVE CHANGE IN GLAUCOMA SURGERY: MICROPULSE, HIFU, KAHOOK DUAL BLADE, TRABECULECTOMY AND BAERVELDT TUBE 942

P-677
THE PAUL GLAUCOMA IMPLANT (PGI) DEVICE -ONE YEAR FOLLOW UP ON SAFETY 943

P-678
DIRECT VISUALIZATION OF THE AQUEOUS OUTFLOW PATHWAY USING INDOCYANINE GREEN DURING TRABECULAR MICROBYPASS STENT (ISTENT INJECT) IMPLANTATION 944

P-679
LONG-TERM EFFICACY AND SAFETY OF XEN45 GEL STENT IN PATIENTS WITH PIGMENTARY GLAUCOMA 946

P-680
RETROSPECTIVE ANALYSIS OF THE SAFETY AND EFFICACY OF THE MINIJECT IMPLANT AT 3 MONTHS 947

P-683
SHORT TERM OUTCOMES OF KAHOOK DUAL BLADE (KDB GLIDE) EXCISIONAL GONIOTOMY IN MEDICALLY TREATED PRIMARY AND SECONDARY GLAUCOMA-AN INITIAL EXPERIENCE 948

P-685
NOVEL RNA MODIFICATION SIGNALING AND ITS IMPLICATION IN GLAUCOMA PATHOPHYSIOLOGY 949

P-686
TREATMENT OUTCOMES OF BAERVELDT GLAUCOMA IMPLANTATION IN PATIENTS WITH NEOVASCULAR GLAUCOMA WITH VERSUS WITHOUT A HISTORY OF TRABECULECTOMY 950

P-687
THREE YEAR SUCCESS RATES OF SURGICAL BLEB REVISION FOR EARLY BLEB SCARRING AFTER TRABECULECTOMY AT KOBE UNIVERSITY HOSPITAL 951

P-688
STEROIDS AND/OR NSAIDS AS POSTOPERATIVE TREATMENT AFTER TRABECULECTOMY – 12 MONTH RESULTS OF A RANDOMIZED CONTROLLED TRIAL 952

P-689
LONG-TERM EFFICACY OF HIGH-FREQUENCY DEEP SCLERECTOMY AS STAND-ALONE PROCEDURE AND COMBINED WITH CATARACT EXTRACTION IN OPEN ANGLE GLAUCOMA PATIENTS 953

P-690
TWO-YEAR CLINICAL EXPERIENCE OF THE GONIOSCOPY-ASSISTED TRANSLUMINAL TRABECULOTOMY SURGERY IN HISPANIC PATIENTS WITH GLAUCOMA 955

P-692
AN EVALUATION OF A NOVEL “AB INTERNO BLEB REVISION” TECHNIQUE IN THE MANAGEMENT OF FAILED TRABECULECTOMY BLEB 958

P-693
EFFECTS OF THE POSTOPERATIVE RESTRICTIVE MANAGEMENT AND EFFICACY OF THE BAERVELDT 350 IMPLANT AFTER 12 MONTHS FOLLOW-UP 960

P-694
ONE YEAR OUTCOMES OF THE PAUL GLAUCOMA IMPLANT IN COMPARISON TO THE BAERVELDT GLAUCOMA IMPLANT FOR GLAUCOMA 962

P-696
OUTCOMES OF TRABECTOME AND PHACO-TRABECTOME BY A GLAUCOMA SEVERITY INDEX IN MEXICAN POPULATION 963

P-697
OCT ANGIOGRAPHY CHANGES IN THE FOVEAL AVASCULAR ZONE AREA AFTER GLAUCOMA SURGERY 965

P-698
RISK FACTORS FOR AHMED VALVE TUBE EXPOSURE: SINGLE-CENTER EXPERIENCE 966

P-699
VISUAL OUTCOMES OF EXTENDED DEPTH OF FOCUS INTRAOCULAR LENS IN PHACOTRABECULECTOMY IN PATIENTS WITH CATARACT AND PSEUDOEXFOLIATION GLAUCOMA 967

P-700
6 MONTHS OUTCOMES OF AB-EXTERNO OPEN CONJUNCTIVA XEN GEL STENT IN OPEN ANGLE GLAUCOMA PATIENTS 968

P-701
SURGICAL OUTCOMES OF AHMED GLAUCOMA VALVE AND AUROLAB AQUEOUS DRAINAGE IMPLANT IN NEPALESE EYES: COMPARISON IN THE FIRST YEAR 970

P-702
PHACO-XEN45 SURGERY FOR THE TREATMENT OF UNCONTROLLED OPEN-ANGLE GLAUCOMA PATIENTS WITH CONCOMITANT CATARACT: 5-YEAR RESULTS971

P-703
IMPLANTATION OF EXTENDED DEPTH-OF-FOCUS INTRAOCULAR LENSES IN PRIMARY OPEN-ANGLE GLAUCOMA EYES: LONG-TERM OBSERVATION OF 3 CASES 972

P-704
AHMED CLEARPATH® 250 MM2: A PORTUGUESE TERTIARY CENTER EXPERIENCE 973

P-705
AHMED GLAUCOMA VALVE IMPLANT VS TRABECULECTOMY IN THE SURGICAL TREATMENT OF GLAUCOMA: A RETROSPECTIVE STUDY 974

P-708
EFFECT OF CATARACT SURGERY ON THE RATE OF VISUAL FIELD PROGRESSION IN PRIMARY ANGLE CLOSURE GLAUCOMA 975

P-709
COMPARISON OF KAHOOK DUAL BLADE AB-INTERNO TRABECULECTOMY COMBINED WITH PHACOEMULSIFICATION VERSUS TRABECULECTOMY: 6 MONTH RESULTS 977

P-710
LONG-TERM EFFECTS OF PHACOEMULSIFICATION ON INTRAOCULAR PRESSURE IN PATIENTS WITH PRIMARY OPEN-ANGLE GLAUCOMA AND PSEUDOEXFOLIATION GLAUCOMA 978

P-711
EARLY CATARACT SURGERY AND SINSKEY HOOK GONIOTOMY IN BLACK AND AFRO LATINO PATIENTS: 1-YEAR RETROSPECTIVE STUDY 981

P-712
IS THE TRANSFER OF SAFE TRABECULECTOMY SKILLS TO THE DEVELOPING WORLD ADEQUATE ? - AN OUTCOME OF PAKISTAN'S NATIONAL SURVEY OF TRABECULECTOMY 983

P-713
COMPARISON OF EARLY AND LONG-TERM OUTCOMES OF AHMED DRAINAGE DEVICE SURGERY ALONE AND COMBINED WITH PHACOEMULSIFICATION: A RETROSPECTIVE 10-YEAR STUDY 985

P-714
HIGH FREQUENCY DEEP SCLEROTOMY COMBINED WITH PHACOEMULSIFICATION, IN THE TREATMENT OF OPEN ANGLE GLAUCOMA. 4-YEAR FOLLOW-UP987

P-716
COMBINED PHACOEMULSIFICATION, INTRAOCULAR LENS IMPLANTATION AND ISTENT INJECT IN THE MANAGEMENT OF ADVANCED GLAUCOMA 989

P-717
SURGICAL OUTCOMES OF GLAUCOMA DRAINAGE DEVICE IMPLANTATION IN REFRACTORY GLAUCOMA PATIENTS IN THAILAND 990

P-718
SAFE PAUL TUBE PLACEMENT IN DEVELOPING WORLD AND VITREORETINAL SETTINGS 992

P-720
SURGICAL OUTCOMES OF GONIOSCOPY-ASSISTED TRANSLUMINAL TRABECULOTOMY WITH POLYPROPYLENE SUTURE IN PSEUDOEXFOLIATIVE GLAUCOMA AND OPEN ANGLE GLAUCOMA 993

P-721
THE NEW TREATMENT PARADIGM FOR AQUEOUS MISDIRECTION SYNDROME IN ANGLE CLOSURE GLAUCOMA ASSOCIATED WITH INHERITED RETINAL DYSTROPHIES 994

P-722
A RETROSPECTIVE COMPARISON BETWEEN NON-PENETRATING DEEP SCLERECTOMY VERSUS PENETRATING DEEP SCLERECTOMY IN PRIMARY GLAUCOMA995

P-723 THE MOORFIELDS SAFER SURGERY SYSTEM TRABECULECTOMY: FUNCTIONAL RESULTS OF A 10-YEAR RETROSPECTIVE STUDY 997

P-725
AQUEOUS SHUNT EXPOSURE REPAIR: OUTCOMES AND RISK FACTORS FOR RECURRENCE 999

P-726
RISK FACTORS FOR AHMED GLAUCOMA VALVE FAILURE 1001

P-727
COMBINED PHACOEMULSIFICATION AND HYDRUS MICROSTENT IMPLANTATION IN ASIAN EYES WITH MODERATE-TO-SEVERE NORMAL TENSION GLAUCOMA – 12-MONTH OUTCOMES 1002

RF

P

I

P-728
EVALUATING THE EARLY POST-TRABECULECTOMY BLEB MORPHOLOGY USING ANTERIOR SEGMENT OPTICAL COHERENCE TOMOGRAPHY AS PREDICTORS FOR BLEB FUNCTION 1003

P-729
TREATMENT OUTCOMES USING THE PAUL® GLAUCOMA IMPLANT IN A POPULATION OF SEVERE GLAUCOMA 1004

P-730
DELAYED XEN FRAGMENTATION AND DEGRADATION AFTER XEN IMPLANTATION 1007

P-731
INVERTED AUTOCONJUNCTIVAL GRAFT AS A NOVEL TECHNIQUE FOR PREVENTING BLEB FIBROSIS AROUND THE XEN45 GEL IMPLANT 1009

P-732
5 YEARS RESULTS OF ISTENT COMBINED WITH PHACOEMULSIFICATION IN PATIENTS WITH OPEN-ANGLE GLAUCOMA 1011

P-734
INCIDENCE OF HYPERTENSIVE PHASE IN PAUL GLAUCOMA IMPLANT IN A TERTIARY HOSPITAL 1013

P-735
LONG TERM RESULTS OF MINIMALLY INVASIVE MICRO SCLEROSTOMY (MIMS®) 1014

P-736
MINIMALLY INVASIVE NASAL TRABECULOSTOMY (MINT™) FOR THE SURGICAL TREATMENT OF OPEN ANGLE GLAUCOMA – REPORT OF SHORT-TERM RESULTS 1015

P-737
TWELVE-MONTHS RESULTS OF AB INTERNO TRABECULECTOMY BY MEANS OF KAHOOK DUAL BLADE IN PATIENTS WITH MEDICALLY UNCONTROLLED OPEN-ANGLE GLAUCOMA 1016

P-738
GLAUCOMA DRAINAGE DEVICE EXPOSURE: FREQUENCY, MANAGEMENT AND RISK FACTORS 1017

P-739
DOES STEROID RESPONSE EXIST AFTER A TRABECULECTOMY? A PROSPECTIVE RANDOMIZED CONTROLLED TRIAL 1018

P-740
OBJECTIVELY MEASURED CHANGES IN AQUEOUS FLARE AFTER CATARACT SURGERY WITH AND WITHOUT ENDOSCOPIC CYCLOPHOTOCOAGULATION (ECP) IN GLAUCOMA PATIENTS 1019

P-741
ONE-YEAR OUTCOMES OF XEN GEL STENT OPEN CONJUNCTIVA REVISION SURGERY 1021

P-742
SURGICAL OUTCOMES OF ADDITIONAL AB INTERNO 240° TRABECULOTOMY AS THE SECOND SURGERY USING A SUTURE IN PATIENTS WITH PRIMARY OPEN-ANGLE GLAUCOMA 1023

P-743
CO2 LASER-ASSISTED SCLERECTOMY SURGERY (CLASS) - INDICATIONS, RESULTS AND POSSIBLE COMPLICATIONS 1024

P-744
SAFETY AND EFFECTIVENESS OF THE PRESERFLO MICROSHUNT DEVICE IN ASIAN PATIENTS WITH PRIMARY OPEN ANGLE GLAUCOMA 1025

P-746
LONG-TERM COURSE OF SURGICALLY INDUCED ASTIGMATISM FOLLOWING TRABECULECTOMY WITH MITOMYCIN C 1026

P-748
FIVE YEAR OUTCOMES OF THE CYPASS SUPRACILIARY MICROSTENT IN A TERTIARY GLAUCOMA CENTRE IN THE UNITED KINGDOM 1027

P-749
CURRENT TREATMENT OPTIONS FOR RESTORING A FAILING FILTERING BLEB: A SYSTEMATIC REVIEW AND NETWORK META-ANALYSIS 1028

P-750
ANATOMOPATHOLOGICAL CHANGES AND VESICLE FORMATION AT THREE MONTHS IN RABBITS' TRABECULOTOMIES USING TRANSURGICAL 20% THEALOSE VS SHAM 1030

P-751
PRESERFLO MICROSHUNT FOR THE TREATMENT OF UNCONTROLLED OPEN-ANGLE GLAUCOMA: 3-YEAR RESULTS 1033

P-752
TWO YEAR OUTCOMES OF KAHOOK DUAL BLADE COMBINED WITH CATARACT SURGERY IN PATIENTS WITH ANGLE CLOSURE DISEASE 1034

P-753
GLAUCOMA SEVERITY AND POST-TRABECULECTOMY REVIEW ADHERENCE AT A RURAL TERTIARY REFERRAL OPHTHALMIC CLINIC IN BURUNDI 1035

P-754
ENDOCYCLOPHOTOCOAGULATION VS. BANG: OUTCOMES IN MILD-TO-MODERATE PRIMARY OPEN ANGLE GLAUCOMA 1036

P-755
EFFICACY AND SAFETY OF COMBINED BENT ANGLE NEEDLE GONIOTOMY (BANG) AND PHACOEMULSIFICATION IN EYES WITH GLAUCOMA AND CATARACT 1038

P-756
OUTCOMES OF ITRACK AB INTERNO CANALOPLASTY (ABIC) IN ONE YEAR FOLLOW UP 1040

P-757
INTRODUCTION OF OUTPATIENT TRABECTOME AND PRESERFLO SURGERY TO A HIGH-VOLUME REFRACTIVE AND CATARACT SURGERY CENTER 1041

P-758
TACKLING THE TUBE IN A CASE OF REFRACTORY STURGE WEBER SYNDROME WITH SECONDARY GLAUCOMA – A SURGEONS NIGHTMARE! 1042

P-759
THE INFLUENCE OF THE SURGEON'S EXPERIENCE ON THE OUTCOME OF TRABECULECTOMY 1044

P-760
GONIOTOMY FOR NON-INFECTIOUS UVEITIC GLAUCOMA IN CHILDREN 1045

P-761
LONG-TERM OUTCOMES OF CILIARY SULCUS PLACED AGV TUBE IN REFRACTORY GLAUCOMA'S OF INDIAN EYES 1046

P-762
THE ROLE OF INFERIOR ANGLE COLLECTOR CHANNELS – IS INFERIOR HYDRUS MICRO-STENT PLACEMENT AS EFFECTIVE? 1048

P-763
EARLY OUTCOME OF BANG (BENT ANGLE NEEDLE GONIECTOMY) IN COMBINATION WITH CATARACT SURGERY OVER THE SPECTRUM OF GLAUCOMA 1049

P-764
SAFETY AND EFFICACY OF KAHOOK DUAL BLADE GONIOTOMY. OUR EXPERIENCE 1051

P-765
LONG-TERM EFFICACY AND SAFETY OF XEN45 GEL STENT IMPLANTATION IN PATIENTS WITH NORMAL TENSION GLAUCOMA 1052

P-766
ASSESSMENT OF THE MORPHOLOGIC FEATURES OF NON-PENETRATING DEEP SCLEROTOMY WITH ANTERIOR SEGMENT OPTICAL COHERENCE TOMOGRAPHY 1053

P-767
EVALUATION OF THE LONG-TERM RESULTS OF NON-PENETRATING DEEP SCLERECTOMY COMBINED WITH PHACOEMULSIFICATION VS NON-PENETRATING DEEP SCLERECTOMY ALONE 1054

P-769
OUR RESULTS WITH I-STENT INJECT® IMPLANT IN PATIENTS WITH GLAUCOMA 1055

P-770
SURGICAL OUTCOMES AFTER VIRNA GLAUCOMA DRAINAGE DEVICE IMPLANTATION: CASE SERIES1057

P-771
A RETROSPECTIVE ANALYSIS OF OUTCOMES OF ISTENT (G2) COMBINED WITH PHACOEMULSIFICATION 1058

P-773
A CASE OF A SPONTANEOUS INTRAOPERATIVE POSTERIOR CAPSULAR RUPTURE IN PHACOMORPHIC GLAUCOMA WITH WELL-CONTROLLED PRE-OPERATIVE INTRAOCULAR PRESSURE 1059

P-774
SEVERE HYPOTONY AND INTRA-OCULAR INFLAMMATION AFTER A NON-VALVED GLAUCOMA DRAINAGE DEVICE IMPLANTATION: A CASE SERIES 1060

P-776
SAFETY AND EFFICACY OF IRRIGATING GONIECTOMY (TRABECTOME) IN A SOUTH-AMERICAN POPULATION WITH MOSTLY MODERATE/ADVANCED PSEUDOEXFOLIATION GLAUCOMA 1062

P-777
TWO YEAR OUTCOMES OF KAHOOK DUAL BLADE COMBINED WITH CATARACT SURGERY IN PATIENTS WITH OPEN ANGLE GLAUCOMA 1064

P-778
ONE-YEAR OUTCOMES OF AB EXTERNO XEN45 GEL STENT IMPLANTATION WITH AN OPEN CONJUNCTIVA APPROACH IN PATIENTS WITH OPEN-ANGLE GLAUCOMA 1065

P-779
TUBE VS TRAB IN UVEITIC GLAUCOMA PATIENTS – IOP AND INFLAMMATION CONTROL 1066

P-780
TWO-YEAR LONGITUDINAL EVALUATION OF ISTENT INJECT® SYSTEM FOR OPEN-ANGLE GLAUCOMA IN SOUTH EAST ASIAN EYES 1068

P-781
COMPARISON OF OUTCOMES OF GONIOTOMY ALONE OR IN COMBINATION WITH CANALOPLASTY IN PRIMARY ANGLE CLOSURE GLAUCOMA 1071

P-783
SAFETY AND EFFICACY OF THE PRESERFLO MICROSTENT DURING THE INITIAL LEARNING CURVE 1073

P-784
RESULTS OF CATARACT SURGERY WITH PHACOEMULSIFICATION AND TRABECULECTOMY WITH APPLICATION OF SUBCONCJUNTIVAL MITOMYCIN-C 1075

P-786
DOES THE OUTCOME OF COMBINED ISTENT INJECT IMPLANTATION IN THE FIRST EYE SERVE AS A PREDICTOR FOR THE OUTCOME IN THE SECOND EYE? 1076

P-787
SHORT TERM SAFETY AND EFFICACY OUTCOMES OF PRESERFLO MICROSHUNT SURGERY IN GLAUCOMA PATIENTS FOLLOWING FAILED DEEP SCLERECTOMY 1077

P-788
12-MONTH OUTCOMES OF COMBINED PHACOEMULSIFICATION AND ISTENT INJECT W IMPLANTATION IN ASIAN EYES WITH PRIMARY OPEN ANGLE GLAUCOMA 1078

P-789
POSTOPERATIVE CORNEAL EPITHELIAL REMODELING AFTER PHACOEMULSIFICATION AND ISTENT INJECT® W: AN OPTICAL COHERENCE TOMOGRAPHY STUDY 1079

P-790
ABINTERNO INFERIOR CYCLODIALYSIS TECHNIQUE IN GLAUCOMA SURGERY 1081

P-791
SAFETY AND EFFICACY OF GONIOTOMY WITH TRABEX DEVICE IN COMBINATION WITH PHACOEMULSIFICATION IN A LATIN-AMERICAN COHORT 1082

P-792
THREE-YEAR OUTCOMES OF XEN GEL STENT IMPLANTATION IN PATIENTS WITH OPEN-ANGLE GLAUCOMA 1084

P-794
TRIALS AND TRIBULATIONS OF FILTERING SURGERY IN A CASE WITH LOW SCLERAL RIGIDITY 1085

P-795
SMALL POSTERIOR CONJUNCTIVAL INCISION LIMBAL-BASED (SPCIL) TRABECULECTOMY – A REVIVAL OF THE LIMBAL-BASED TRABECULECTOMY 1087

P-796
MEDIUM-TERM VISUAL AND REFRACTIVE OUTCOMES IN PATIENTS WITH PSEUDOEXFOLIATION IMPLANTED WITH A TORIC INTRAOCULAR LENS 1088

P-798
THE ROLE OF VITREOUS ON AHMED GLAUCOMA VALVE SUCCESS FOR AMYLOIDOSIS SECONDARY GLAUCOMA 1089

P-799
A SEVERE CASE OF RECURRENT ENCAPSULATION AFTER AHMED GLAUCOMA VALVE IMPLANTATION: SURGICAL APPROACH 1090

P-800
12 MONTHS OUTCOME OF PRESERFLO™ MICROSHUNT 1092

P-801
COMPARISON OF THE SURGICAL ONE-YEAR OUTCOMES BETWEEN EX-PRESS DEVICE IMPLANTATION AND TRABECULECTOMY IN PATIENTS WITH OAG AFTER PARS PLANA VITRECTOMY 1093

P-802
BAERVELDT GLAUCOMA IMPLANT SURGERY FOR SECONDARY GLAUCOMA IN PATIENTS WITH HEREDITARY TRANSTHYRETIN AMYLOIDOSIS 1094

P-803
CLINICAL RESULTS OF MICROHOOK AB INTERNO TRABECULOTOMY COMBINED WITH CATARACT SURGERY 1095

P-804
ONE YEAR RESULTS OF DEEP SCLERECTOMY WITH UVEOSCLERAL IMPLANT WITH AND WITHOUT MITOMYCIN C IN TWO EUROPEAN CENTERS 1096

P-805
STAB INCISION GLAUCOMA SURGERY 1097

P-806
LENS EXTRACTION IN ACUTE ANGLE CLOSURE GLAUCOMA PATIENTS 1098

P-807
CONJUNCTIVAL BLEB COMPRESSION SUTURES: AN EFFECTIVE METHOD OF ADDRESSING SYMPTOMS OF BLEB DYSTHESIA AFTER TRABECULECTOMY 1100

P-808
FACTORS THAT PREDICT INTRAOCULAR PRESSURE CHANGE AFTER PHACOEMULSIFICATION IN TRABECULECTOMIZED EYES 1101

P-809
GONIOTOMY USING A NEW AB INTERNO IRRIGATING TRABECULOTOMY DEVICE (TRABEX PRO) FOR TREATMENT OF OPEN-ANGLE GLAUCOMA: INITIAL RESULTS 1102

P-810
CLINICAL FEATURES ,MANAGEMENT AND OUTCOMES OF EXPULSIVE CHOROIDAL HAEMORRHAGE DURING CATARACT SURGERY 1103

P-811
XEN GEL STENT IMPLANTATION IN TREATING GLAUCOMA - POSTOPERATIVE LONG-TERM RESULTS 1104

P-812
RETROSPECTIVE EVALUATION OF XEN® AND KAHOOK DUAL BLADE® 1105

P-813
REAL WORLD MEDIUM TERM RESULTS OF PRESERFLO GLAUCOMA SHUNT 1106

P-814
RESULTS OF 40 EX-PRESS IMPLANTATION IN OPEN-ANGLE GLAUCOMA 1107

P-815
FREE FALL- SPONTANEOUS DETACHMENT OF AHMED GLAUCOMA VALVE TUBE 1108

P-816
ONE-YEAR PRELIMINARY SURGICAL OUTCOMES OF THE PRESERFLO® MICROSHUNT IN PRIMARY OPEN-ANGLE GLAUCOMA 1109

P-817
ORBITAL CELLULITIS FOLLOWING UNCOMPLICATED GLAUCOMA DRAINAGE DEVICE IMPLANTATION: A CASE REPORT 1110

P-818
COMPARE THE SURGICAL SUCCESS AND OUTCOMES OF AADI V/S AGV IN INDIAN POPULATION 1112

P-819
A RETROSPECTIVE ANALYSIS OF BEVACIZUMAB AS AN ADJUNCT IN TUBE SURGERY 1114

P-820
OUTCOMES OF AB-EXTERNO MICROSHUNT IMPLANTATION IN THE MANAGEMENT OF COMPLEX PAEDIATRIC GLAUCOMA 1115

P-821
GLAUCOMA DRAINAGE IMPLANTATION IN A PREGNANT WOMAN WITH AXENFELD-RIEGER SYNDROME 1116

P-822
INTERMEDIATE-TERM OUTCOMES OF INTRAOCULAR PRESSURE AFTER BAERVELDT DRAINAGE IMPLANT PROCEDURE IN SECONDARY GLAUCOMA 1118

P-823
GLAUCOMA DRAINAGE DEVICE AS MANAGEMENT OF GLAUCOMA SECONDARY TO CONGENITAL ANIRIDIA: A CASE REPORT 1119

P-824
6 MONTHS OUTCOMES OF EXCISIONAL GONIOTOMY WITH TRABEX + COMBINED WITH PHACOEMULSIFICATION IN BOLIVIA 1121

P-825
SAFETY AND EFFICACY OF THE OMNI PROCEDURE DURING THE INITIAL LEARNING CURVE 1122

P-826
XEN45 GEL STENT COMBINED WITH HEALAFLOW INJECTABLE VISCOELASTIC IMPLANT 1123

P-827
4-0 NYLON THREAD GUIDED, EASY AND PRECISE INSERTION OF AHMED GLAUCOMA VALVE IMPLANT TUBE INTO CILIARY SULCUS: A CASE REPORT 1125

P-828
PAUL GLAUCOMA IMPLANTS FOR TREATING EYES WITH SILICONE OIL ENDOTAMPONADE GLAUCOMA 1126

P-829
OUTCOMES OF BLEB NEEDLING APPLIED UNDER THE SCLERAL FLAP IN THE BLEB FAILURE AFTER TRABECULECTOMY 1128

P-830
INTRAOPERATIVE INJECTION OF MITOMYCIN C DURING TRABECULECTOMY AND PHACOTRABECULECTOMY AT A TEACHING HOSPITAL: A 1-YEAR RETROSPECTIVE STUDY 1129

P-831
XEN® VS. TRADITIONAL GLAUCOMA FILTRATION SURGERIES ON LOWERING INTRAOCULAR PRESSURE: A SIX-MONTHS FOLLOW UP 1131

P-832
HYPOTONY MANAGEMENT: NOVEL USE OF A PRESERFLO MICROSHUNT TO RESTRICT FLOW OF A BAERVELDT DRAINAGE DEVICE IN A CASE OF PAEDIATRIC UVEITIC GLAUCOMA 1132

P-834
IMPLANTATION OF MOLTENO3 GLAUCOMA DRAINAGE DEVICE IN TWO YOUNG MALES WITH SEVERE OCULAR TRAUMA AND HIGH INTRAOCULAR PRESSURE – CLINICAL RESULTS 1133

P-835
A NOVEL APPROACH OF GONIOSYNECHIALYSIS FOR PACG: TIME SAVING, NO GONIOLENS, NO TILT MICROSCOPE, 360 DEGREE COVERED 1134

P-836
ENDOCYCLOPHOTOCOAGULATION: SHORT TERM OUTCOMES IN PRIMARY VERSUS SECONDARY/REFRACTORY GLAUCOMA 1136

P-837
REFRACTIVE ERRORS AFTER DEEP NON-PENETRATING SCLERECTOMY: A SINGLE SURGEON SERIES 1138

P-838
AHMED GLAUCOMA VALVE IMPLANTATION THROUGH THE CILIARY SULCUS IN 'PHAKIC' EYES WITHOUT LENSECTOMY 1140

P-839
COMPARING THE EFFECTIVITY OF TRABECULECTOMY AND PRESERFLO MICROSTENT IMPLANTATION IN PRIMARY OPEN-ANGLE GLAUCOMA IN THE INTERMEDIATE TERM 1141

P-840
THE PAUL GLAUCOMA IMPLANT (PGI) AS A FIRST-CHOICE GLAUCOMA DRAINAGE DEVICE: 6-MONTHS FOLLOW-UP 1142

P-841
EARLY POSTOPERATIVE INTRAOCULAR PRESSURE AS A PROGNOSTIC FACTOR IN GLAUCOMA SURGERY1143

P-842
SUPRA CILIARY DRAINAGE WITHOUT ENTERING THE ANTERIOR CHAMBER AND WITHOUT BLEB: 12 MONTHS FOLLOW-UP RESULTS 1144

P-844
PSEUDOPHAKIC MALIGNANT GLAUCOMA-CASE REPORT 1146

P-845
SAFETY AND EFFICACY OF IRRIGATING GONIECTOMY (TRABECTOME) IN A SOUTH-AMERICAN GLAUCOMA POPULATION 1147

P-847
COLCHICINE FOR FIBROSIS CONTROL 1149

P-848
FACTORS ASSOCIATED WITH AVOIDING TRABECULECTOMY IN SECONDARY GLAUCOMA ASSOCIATED WITH OCULAR INFLAMMATORY DISEASE 1150

P-849
ASSESSING HYPOTONY DEFINITIONS USED AS FAILURE CRITERIA IN GLAUCOMA SURGICAL STUDIES 1151

P-850
XEN 63, AN EFFECTIVE AND SAFE OPTION IN AN ONLY EYE CASE WITH MICROPHTHALMIA AND APHAKIC GLAUCOMA 1152

P-851
AB INTERNO CANALOPLASTY AND TRABECULOTOMY COMBINED WITH PHACOEMULSIFICATION IN GLAUCOMA PATIENTS IN A UK HOSPITAL SETTING: 24 MONTH OUTCOMES 1155

P-852
CYCLODIALYSIS REVIVAL OF AN ABANDONED TECHNIQUE IN GLAUCOMA SURGERY 1156

P-853
SECONDARY GLAUCOMA DUE TO MUCOPOLYSACCHARIDOSIS: A CASE REPORT 1157

P-855
GONIOSCOPY - STILL A SILENT GUARDIAN, A WATCHFUL PROTECTOR AND A DARK KNIGHT IN MODERN DAY PRACTICE 1158

P-857
RETROSPECTIVE ANALYSIS OF G1 ISTENT SURGICAL OUTCOME OVER 8 YEARS 1160

P-858
SMART MATERIALS FOR THE 3RD GENERATION IMPLANTS IN GLAUCOMA TREATMENT 1161

P-859
IOP REDUCTION IN BILATERAL CATARACT EXTRACTION WITH CONCOMITANT MIGS IN ONLY ONE EYE 1163

P-860
OVER-FILTERING TRABECULECTOMY BLEB WITH HYPOTONY INDUCED MACULOPATHY 1165

P-861
CASE REPORT: PFEIFFER SYNDROME WITH SEVERE OPHTHALMIC MANIFESTATIONS 1167

P-862
STEROID INDUCED ANGLE CLOSURE GLAUCOMA: A CHALLENGING CASE REPORT 1169

P-863
EFFECT OF LOW-COST AQUEOUS DRAINAGE DEVICE AND TRABECULECTOMY ON CORNEAL ENDOTHELIUM AND ANTERIOR CHAMBER FLARE: A PROSPECTIVE RANDOMIZED STUDY 1170

P-864
MANAGEMENT OF TRAUMATIC HYPOTONY DUE TO CILIARY BODY DETACHMENT FROM MEDICAL TREATMENT, LASER THERAPY TO SURGICAL APPROACH, A CASE REPORT 1171

P-865
STUDY OF THE OCULAR SURFACE IN GLAUCOMA PATIENTS AFTER EX-PRESS IMPLANTATION 1172

P-866
RISK OF SUDDEN LOSS OF VISION (WIPE-OUT) FOLLOWING FILTRATION SURGERY IN END-STAGE GLAUCOMA - DR SYBIL MESHRAMKAR 1173

P-868
CLINICAL OUTCOMES OF COMBINED PARS PLANA VITRECTOMY WITH SCLERAL FIXATED IOL OR POSTERIOR CHAMBER FOLDABLE LENS USING 23 AND 25 GAUGE'S 1174

P-869
EVALUATION OF ISTENT COMBINED WITH CATARACT SURGERY IN OPEN-ANGLE GLAUCOMA 1176

P-870
PARTIAL THICKNESS GLYCEROL-PRESERVED CORNEAL TISSUE AS A PATCH GRAFT FOR PERSISTENT GLAUCOMA DRAINAGE TUBE EXPOSURE 1177

P-871
BLEB REVISION WITH CONJUNCTIVAL AUTOGRAFT AFTER FIBROSIS POST-TRABECULECTOMY 1179

P-872
ORIGINAL TECHNIQUE TO MANAGE AHMED VALVE TUBE EXPOSURE 1180

P-873
OUTCOMES OF TRABECULECTOMY SURGERY IN SUDAN 1181

P-874
SPONTANEOUS SUPRACHOROIDAL HEMORRHAGE IN A PATIENT WITH MULTIPLE RISK FACTORS. MEDICAL MANAGEMENT AND SURGICAL APPROACH 1182

P-875
FUNCTIONAL AND STRUCTURAL CHANGES AFTER ISTENT INJECT IMPLANTATION USING SPECTRAL DOMAIN OPTICAL COHERENCE TOMOGRAPHY 1185

P-876
PRESEFLO MICROSHUNT REPLACEMENT SEVERAL MONTHS AFTER THE INITIAL SURGERY 1187

P-877
12-MONTH OUTCOMES OF COMBINED PHACOEMULSIFICATION AND ISTENT INJECT W IMPLANTATION IN ASIAN EYES WITH NORMAL TENSION GLAUCOMA1189

P-879
THE CHALLENGES OF GLAUCOMA MANAGEMENT IN PETERS ANOMALY: A CASE REPORT 1190

P-881
EFFICACY OF XEN 45 DEVICE IN PROGRESSING GLAUCOMA IN DAILY CLINIC AND INTRAOPERATIVE OCT IMAGING UTILITY FOR TUBE IMPLANTATION 1191

P-882
ADDITIONAL AHMED GLAUCOMA VALVE IMPLANTATION USING THE UPSIDE-DOWN TECHNIQUE ACHIEVED ADEQUATE IOP CONTROL IN A PATIENT WITH NEOVASCULAR GLAUCOMA 1192

P-883
SURGICAL OUTCOME AFTER LASER PERIPHERAL IRIDOTOMY AND CATARACT SURGERY IN ACUTE PRIMARY ANGLE CLOSURE PATIENTS 1193

P-884
LATE ENDOPHTHALMITIS IN PATIENTS WITH 20-YEAR-OLD TRABECULECTOMIES: A CASE SERIES 1194

P-885
SMALL EYE, BIG CHALLENGE: GLAUCOMA MANAGEMENT IN A PATIENT WITH NANOPHTHALMOS 1197

P-886
ATYPICAL CASE OF SECONDARY GLAUCOMA DUE TO CONGENITAL PUPILLARY SECLUSION. CASE REPORT 1198

P-887
SEQUENTIAL TRABECULECTOMY AND CATARACT SURGERY IN FUNCTIONAL MONOPHTHALMOS PATIENTS 1200

P-888
ANTERIOR SEGMENT OCT IMAGING AFTER TRABECULECTOMY AND PRESERFLO MICROSHUNT: A MULTICENTRE, PROSPECTIVE, MASKED, QUANTITATIVE INTEROBSERVER STUDY 1201

P-889
GONIOSCOPICALLY ASSISTED TRANSLUMINAL TRABECULOTOMY- A YEAR 2 ANALYSIS AND OUTCOMES 1203

P-890
CHARACTERISTICS OF BLEBS THAT PREDICT INTRAOCULAR PRESSURE CHANGE AFTER CATARACT SURGERY IDENTIFIED VIA ANTERIOR SEGMENT OPTICAL COHERENCE TOMOGRAPHY 1204

P-892
TRABECULECTOMY BLEB NEEDLING REVISION - OUTCOMES AND PREDICTIVE FACTORS FOR SUCCESS 1205

P-893
CANALOPLASTY AND TRABECULOTOMY IN EYES WITH OPEN-ANGLE GLAUCOMA (OAG): TWO YEAR OUTCOMES FROM THE ROMEO STUDY 1206

P-894
CORNEAL ENDOTHELIAL SAFETY PROFILE OF THREE DIFFERENT MINIMALLY INVASIVE GLAUCOMA SURGERY STENTS 1207

P-895
THE EFFECT OF BLUE-LIGHT FILTERING INTRAOCULAR LENSES ON THE DEVELOPMENT AND PROGRESSION OF GLAUCOMA 1209

P-896
FREQUENCY AND TYPE OF POSTOPERATIVE INTERVENTIONS FOLLOWING PRIMARY TRABECULECTOMY IN THE TREATMENT OF ADVANCED GLAUCOMA STUDY (TAGS) 1211

P-897
COMPARISON OF PHACOEMULSIFICATION COMBINED WITH HYDRUS TRABECULAR MESHWORK BYPASS MICROSTENT ALONE OR IN COMBINATION WITH CANALOPLASTY 1212

P-898
LONG TERM FOLLOW-UP MORE THAN 10 YEARS AFTER TRABECULECTOMY: OUTCOMES AND FACTORS FOR VISUAL FIELD PROGRESSION 1214

P-899
CORNEAL ENDOTHELIAL CELL DENSITY LOSS AFTER GLAUCOMA SURGERY ALONE OR IN COMBINATION WITH CATARACT SURGERY: A SYSTEMATIC REVIEW AND META-ANALYSIS 1216

P-900
BLINDNESS AND PROGNOSTIC FACTORS IN LONG-TERM FOLLOW-UP AFTER TRABECULECTOMY WITH MITOMYCIN C IN OPEN-ANGLE GLAUCOMA 1217

P-901
A SYSTEMATIC REVIEW AND META ANALYSIS OF EFFICACY AND SAFETY OF GONIOSCOPY ASSISTED TRANSLUMINAL TRABECULOTOMY AFTER ONE YEAR 1218

P-902
DEFINING THE ANATOMICAL LEVEL OF FAILURE IN TRABECULECTOMY AND DEEP SCLERECTOMY SURGERY 1222

P-903
ONE-YEAR RESULTS OF A MULTICENTER STUDY: COMBINED PHACOEMULSIFICATION, GONIOSYNECHIALYSIS AND GONIOTOMY FOR ADVANCED PACG WITH CATARACT 1224

P-904
REAL-WORLD OUTCOMES OF THE PRESERFLO MICROSHUNT IN FROM A LARGE SINGLE-CENTRE RETROSPECTIVE STUDY 1226

P-905
LONG-TERM OUTCOMES OF DESCEMET STRIPPING AUTOMATED ENDOTHELIAL KERATOPLASTY IN EYES WITH AN AHMED GLAUCOMA VALVE 1227

P-907
ASSESSMENT OF ANTERIOR CHAMBER ANGLE AND INTRAOCULAR PRESSURE CONTROL AFTER PHACOEMULSIFICATION IN PRIMARY ANGLE CLOSURE WITH DIFFERENT MECHANISMS 1228

P-908
ANGLE-BASED MINIMALLY INVASIVE GLAUCOMA SURGERY IN NORMAL TENSION GLAUCOMA – A PILOT SYSTEMATIC REVIEW AND META-ANALYSIS 1229

P-909
ONE-YEAR OUTCOMES OF PRESERFLO MICROSHUNT IMPLANTATION VERSUS TRABECULECTOMY FOR PSEUDOEXFOLIATION GLAUCOMA 1230

P-910
BLEB VESSEL DENSITY AS A PREDICTIVE FACTOR FOR SECONDARY SURGICAL INTERVENTIONS AFTER SANTEN PRESERFLO MICROSHUNT IMPLANTATION 1231

P-911
IMPACT OF DIFFERENT MITOMYCIN-C APPLICATION METHODS DURING TRABECULECTOMY ON BLEB MORPHOLOGY AND FUNCTION 1232

P-912
SIX MONTHS SURGICAL OUTCOMES OF THE PRESERFLO MICROSHUNT WITH MITOMYCIN C IN MODERATE TO ADVANCED GLAUCOMA: REAL WORLD DATA 1233

P-913
RETROSPECTIVE COMPARISON OF POSTOPERATIVE PRESSURE REDUCTION: PRESERFLO MICROSHUNT VS. TRABECULECTOMY 1234

P-914
COMPARISON OF EFFICACY AND SAFETY BETWEEN THE VALVED (AGV) AND NON-VALVED (BGI AND PGI) GLAUCOMA DRAINAGE DEVICES AFTER SIX MONTHS OF FOLLOW-UP 1235

P-915
PATIENTS WITH SMALLER ANGLE PARAMETERS MAY NEED FASTER OPERATION: COMPARISON OF ANGLE AND INTRAOCULAR PRESSURE DIFFERENCE AFTER CATARACT OPERATION 1236

P-917
ANTERIOR SEGMENT OPTICAL COHERENCE TOMOGRAPHY (AS-OCT) IMAGING FOLLOWING SUPRACILIARY MINIJECT IMPLANTATION IN OPEN-ANGLE GLAUCOMA 1237

P-919
COMPARATIVE TRIAL ON EFFECTIVENESS OF COMBINED TRABECULOTOMY AND TRABECULECTOMY VERSUS GATT IN THE MANAGEMENT OF PCG 1238

P-920
MEDIUM-TERM SAFETY AND EFFICACY OF PRESERFLO™ MICROSHUNT IN GLAUCOMA PATIENTS: FURTHER FOLLOW-UP FROM A MULTICENTRE RETROSPECTIVE COHORT STUDY 1239

P-921
LONG-TERM OUTCOMES OF MITOMYCIN-C AUGMENTED TRABECULECTOMY USING SUBCONJUNCTIVAL INJECTIONS VERSUS SOAKED SPONGES: A RANDOMIZED CONTROLLED TRIAL 1240

P-922
MIGS: ARE THEY SAFE & WHAT HAPPENS NEXT? LONG-TERM SAFETY PROFILE AND FURTHER PROCEDURE DATA FROM THE REAL-WORLD SPECTRUM HYDRUS® MICROSTENT REGISTRY 1242

P-923
IMPACT OF INCORPORATING INTRAOCULAR SURGERY TRAINING IN A HIGH-VOLUME OPHTHALMIC SURGERY CENTER WITH A NEW RESIDENCY PROGRAM 1243

PLB-029
MODIFIABLE SURGICAL PARAMETERS ASSOCIATED WITH MEDICATION-FREE SUCCESS IN TRABECULECTOMY SURGERY 1244

PLB-030
OUTCOMES OF EARLY VERSUS DELAYED TRABECULOTOMY FOR PRIMARY CONGENITAL GLAUCOMA 1246

PLB-031
EFFICACY AND SAFETY OF HIGH FREQUENCY DEEP SCLEROTOMY (HFDS) IN PATIENTS WITH OPEN-ANGLE GLAUCOMA AND CATARACTS 1248

PLB-032
OUTCOMES OF GONIOSCOPY-ASSISTED TRANSLUMINAL TRABECULOTOMY (GATT) COMBINED PHACOEMULSIFICATION SURGERY IN PATIENTS WITH OPEN ANGLE GLAUCOMA 1250

PLB-033
GATT IN SILICON OIL GLAUCOMA 1251

PLB-034
OUTCOMES OF GONIOSCOPY-ASSISTED TRANSLUMINAL TRABECULOTOMY (GATT) SURGERY IN PATIENTS WITH GLAUCOMA 1252

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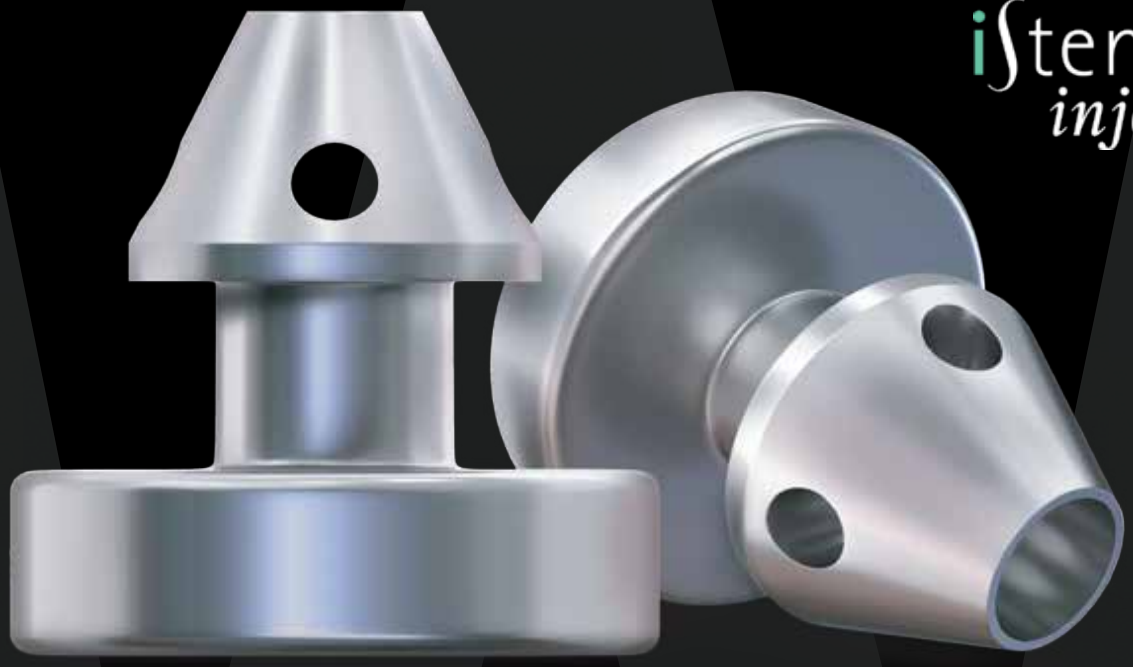
Hindawi, Journal of Ophthalmology Volume 2022, Article ID 5675793 https://doi.org/10.1155/2022/5675793

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INDICATION FOR USE: The iStent *inject* W, is intended to reduce intraocular pressure safely and effectively in patients diagnosed with primary open-angle glaucoma, pseudo-exfoliative glaucoma or pigmentary glaucoma. The iStent *inject* W, can deliver two (2) stents on a single pass, through a single incision. The implant is designed to stent open a passage through the trabecular meshwork to allow for an increase in the facility of outflow and a subsequent reduction in intraocular pressure. The device is safe and effective when implanted in combination with cataract surgery in those subjects who require intraocular pressure reduction and/or would benefit from glaucoma medication reduction. The device may also be implanted in patients who continue to have elevated intraocular pressure despite prior treatment with glaucoma medications and conventional glaucoma surgery. **CONTRAINDICATIONS:** The iStent *inject* W System is contraindicated under the following circumstances or conditions: • In eyes with primary angle closure glaucoma, or secondary angle-closure glaucoma, including neovascular glaucoma, because the device would not be expected to work in such situations. • In patients with retrobulbar tumor, thyroid eye disease, Sturge-Weber Syndrome or any other type of condition that may cause elevated episcleral venous pressure. **WARNINGS/PRECAUTIONS:** • For prescription use only. • This device has not been studied in patients with uveitic glaucoma. • Do not use the device if the Tyvek® lid has been opened or the packaging appears damaged. In such cases, the sterility of the device may be compromised. • Due to the sharpness of certain injector components (i.e. the insertion sleeve and trocar), care should be exercised to grasp the injector body. Dispose of device in a sharps container. • iStent *inject* W is MR-Conditional; see MRI Information below. • Physician training is required prior to use of the iStent *inject* W System. • Do not re-use the stent(s) or injector, as this may result in infection and/or intraocular inflammation, as well as occurrence of potential postoperative adverse events as shown below under "Potential Complications." • There are no known compatibility issues with the iStent *inject* W and other intraoperative devices. (e.g., viscoelastics) or glaucoma medications. • Unused product & packaging may be disposed of in accordance with facility procedures. Implanted medical devices and contaminated products must be disposed of as medical waste. • The surgeon should monitor the patient postoperatively for proper maintenance of intraocular pressure. If intraocular pressure is not adequately maintained after surgery, the surgeon should consider an appropriate treatment regimen to reduce intraocular pressure. • Patients should be informed that placement of the stents, without concomitant cataract surgery in phakic patients, can enhance the formation or progression of cataract. **ADVERSE EVENTS:** Please refer to Directions For Use for additional adverse event information. **CAUTION:** Please reference the Directions For Use labelling for a complete list of contraindications, warnings and adverse events.

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