

maps were graded according to the evidence of tomographic patterns predictive of FECD decompensation (loss of parallel isopachs, displacement of the thinnest point, and focal posterior depression) by two blind cornea specialists.

**Results** The loss of parallel isopachs was significantly less frequently evident in Pentacam pachymetry maps (4%, 95% CI [1%,15%]) compared with both the Casia (31%, 95% CI [19%, 45%],  $p=0.01$ ) and Precisio (24%, 95% CI [14%, 39%],  $p=0.04$ ). The displacement of the thinnest point was graded as most evident in a significantly higher proportion of Precisio pachymetry maps (42%, 95% CI [28%, 57%]) compared to the Pentacam (11%, 95% CI [5%, 24%],  $p=0.005$ ). There were no significant differences in the identification of focal posterior depression on posterior elevation maps across the three devices.

**Conclusions** The identification of patterns predictive of FECD prognosis on pachymetry and posterior elevation maps are possible with different devices. Significant differences exist among devices in their ability to identify specific patterns.

P-13

#### STERIOD RESPONSE IN DESCEMET'S MEMBRANE ENDOTHELIAL KERATOPLASTY (DMEK): A 7-YEAR LONGITUDINAL STUDY OF 993 NON-GLAUCOMATOUS EYES

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**Objective** To identify the incidence and risk factors for steroid response (SR) in low-risk patients who underwent routine DMEK or phaco-DMEK surgery.

**Methods** Retrospective review of 1,032 eyes which underwent DMEK surgery or combined phacoemulsification/DMEK surgery (phaco-DMEK) between 01/2014 and 12/2020 was performed and 993 eyes were included. Eyes with pre-existing ocular hypertension, glaucoma or post-operative pupillary block were excluded. Incidence and time to SR onset were determined. Association between onset of SR and agents for graft tamponade (air vs SF6), topical steroids agents and need for re-bubbling were analysed. Treatment outcomes of SR were reported.

**Results** Overall incidence of SR was 10.8% (107/993) across 7-years, of which 6.8% (67/993) for DMEK alone and 4.0% (40/993) for phaco-DMEK but the difference was not significant ( $p>0.05$ ). Majority developed within 4–6 months (30.8%), and median time to onset was 4.5 months post-operatively. 95% were still on topical dexamethasone at onset. Re-bubbling increased the risk (OR 1.85, 95% CI 0.07–1.65). There was no statistical difference between air vs SF6 tamponade and risk of SR ( $p>0.05$ ). Majority (85.0%) responded well to topical intraocular pressure treatment and change of topical steroid formulation without developing glaucoma.

**Conclusion** Incidence of SR is higher than expected even for low-risk DMEK patients with no pre-existing history of ocular hypertension but majority of these cases responded well to topical treatment. Lower potency steroid formulation should be considered at around 6-months post-operatively in low-risk DMEK grafts. Patients who require DMEK re-bubbling should be monitored more closely for SR.

P-14

#### APPARENT ABSENCE OF A SURGICAL PLANE DURING ATTEMPTED STROMAL PEELING FOR DALK IN A POST-ROTATIONAL AUTOKERATOPLASTY EYE SUGGESTS ROLE OF MIGRATION OF HOST KERATOCYTES IN THE DEVELOPMENT OF THE NATURAL PRE-DESCEMETIC PLANE OF SEPARATION

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**Case A** 58-year-old female was referred to our clinic for corneal scarring in the left eye. She previously underwent ipsilateral rotational autokeratoplasty (IRA) for herpetic keratitis in 2001. Day to day visual acuity was 0.74 logMAR and best corrected visual acuity was 0.40 logMAR. Slit lamp exam showed significant stromal scarring in the visual axis. The peripheral cornea was otherwise clear. Deep anterior lamellar keratoplasty (DALK) using the stromal peeling technique described by Bovone et al was attempted. The donor was prepared with a microkeratome (Moria SA, Antony, France) with a 400 µm head. A 9.0 mm adjustable depth vacuum trephine (Moria SA, Antony, France) was applied to the cornea to a depth of 450 microns. After repeated attempts to open a pre-descemet plane with no success, the surgery was electively converted to a 2-piece microkeratome-assisted mushroom keratoplasty with 9 mm anterior lamella secured with 16 interrupted 10–0 nylon sutures and a 6 mm posterior lamella. At 6 months postoperatively, the graft was clear. Unaided visual acuity was 0.50logMAR improving to 0.10logMAR with correction. Topographic astigmatism with sutures in situ was 5.4D. The postoperative course was otherwise uneventful. The apparent absence of a pre-descemet plane in an old IRA adds evidence that formation of this plane is dependent on the allogeneic stimulation of host keratocytes. Our working theory is that host keratocytes migrate to the pre-descemet layer of an allogeneic PK graft, thereby allowing stromal peeling in post-PK eyes along a natural pre-descemet plane of separation.

P-14

#### SURGICAL MANAGEMENT OF TRAUMATIC ANIRIDIA USING SCLERAL FIXATION OF ARTIFICIAL IRIS IMPLANT WITH PRE-EXISTING SCLERAL FIXATED IOL

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**Introduction** A 78-year-old male patient with a background of angle-closure glaucoma underwent left cataract surgery in May 2021, during which zonular dehiscence and vitreous prolapse were noted. This required an anterior vitrectomy and insertion of a GORE-TEX<sup>®</sup>-sutured IOL (Akreas Adapt AO, Bausch & Lomb). In August 2021 trauma to the same eye resulted in complete aniridia and a vitreous haemorrhage which resolved with conservative management. Complete aniridia reduced the patient's vision to 6/30, and caused constant glare symptoms.

**Iris Replacement** A Scleral-fixated HumanOptics artificial iris (CustomFlex<sup>®</sup>) was inserted in September 2023. As the pre-existing sutured IOL was sutured approximately 2.8 mm posterior from the limbus, the iris implant was fixated at 1.8 mm posterior to the limbus. The surgery achieved excellent anatomical results and improved symptoms. However, there was a persistently high intraocular pressure (IOP) (maximal IOP = 50 mmHg) despite maximal medical management necessitating Ahmed valve implantation in November 2023. Visual acuity improved from 6/30 pre-op to 6/19 postoperatively and at last review IOP was 8 on no medications.

**Conclusion** Artificial iris implants can be safely inserted in eyes with pre-existing scleral-fixated IOLs, provided close monitoring is undertaken to ensure issues with raised IOP are managed promptly.

P-15

### CHANGING INDICATIONS FOR PENETRATING KERATOPLASTY AND 5-YEARS SURVIVAL OUTCOMES – A SINGLE TERTIARY CENTRE EXPERIENCE

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**Purpose** To investigate long-term graft survival rates of penetrating keratoplasties, patient characteristics and co-morbidities in a single tertiary care centre on the South Coast.

**Methods** Retrospective, non-comparative case series review of 5-year follow-up for patients who underwent penetrating keratoplasty between 2008 and 2018. The primary outcome measures were 5-year corneal graft survival, graft surgery indications, and co-morbidities identification.

**Results** 198 penetrating keratoplasties were performed, of which 32 were excluded from further investigation because of insufficient follow-up data. 60 (36%) grafts in 45 patients did not survive a 5-year follow-up. In this group, the mean age of transplant recipients was 64 years (range 18–90, median 67), with a male-to-female ratio of 5:4. 27 (45%) were re-graft surgeries, and 10 (17%) had more than three penetrating keratoplasties. The failure group often included more than one indication for surgery. Of these, the most prevalent were infective/therapeutic grounds (52%), bullous keratopathy (20%), herpes simplex keratitis (10%), corneal ectasia (8%) and trauma-related (5%). The most common co-morbidities in the graft failure group were glaucoma (47%), infectious keratitis (42%), glaucoma surgery (20%), anterior chamber intraocular lens (13%) and retinal detachment surgery (13%). Most patients in the failure group (78%) were of advanced age of more than 65 years old.

**Conclusions** It was found that most penetrating keratoplasties failed due to infective keratitis. Patients in our graft failure group had high rates of ocular and medical co-morbidities, requiring multiple procedures and multidisciplinary care from various ophthalmic and medical subspecialties.

P-16

### HOW TO ASSESS THE EFFECTIVENESS OF CORNEAL CROSS-LINKING FOR KERATOCONUS: NEED OF A SHARED PROTOCOL

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**Objective** Comparing definitions of progression in keratoconus (KC) patients after corneal cross-linking (CXL).

**Methods** Retrospective case series of KC eyes underwent CXL. Keratoconus progression after CXL treatment was defined based on either the widely accepted standard criteria (i.e., maximum keratometry (Kmax), increase >1 Diopter (D) or thinnest corneal thickness (ThCT) reduction >20 mm) or the ABCD progression criteria.

**Results** Thirty-seven KC eyes underwent CXL. Kmax showed a significant reduction from baseline values after CXL ( $p < 0.01$ ), while no difference in ThCT ( $p = 0.12$ ) and in CDVA ( $p = 0.1$ ) was found. Applying standard criteria for progression 18.9% (7/37) of eyes were classified as progressed and 43.2% (16/37) according to the ABCD method.

**Conclusions** Different definition of progression leads to increased misclassification, there is a need of a shared protocol to assess the effectiveness of CXL.

P-17

### TRI-LAMELLAR MINI-DSEK FOR REPAIR OF INTRACTABLE CORNEAL PERFORATIONS

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**Introduction** Recurrent corneal perforations can be challenging to treat, especially in cases of chronic ocular inflammation. We highlight a novel technique for the definitive treatment of corneal perforations not amenable to therapy with cyanoacrylate glue.

**Methods** We report two cases of large corneal perforations secondary to active rheumatoid arthritis. The cases had perforations that failed to seal after several attempts of cyanoacrylate glue and bandage contact lenses. A novel technique- Tri-lamellar tectonic Mini-Descemet Stripping Endothelial Keratoplasty (Mini-DSEK) along with amniotic membrane transplant (AMT) was used to restore anatomical integrity with success in both cases. In addition to the mini-DSEK patch, an overlay stromal cap was harvested from the same donor tissue and used as a patch graft, 'sandwiched' in between the DSEK tissue and the AMT. The AMT and patch were secured in position with fibrin glue, sutures and a BCL that provided additional strength. The sutures were removed at one month.

**Results** Both had deep anterior chambers with no leak post operatively. The stromal cap is thin, transparent and adds tissue in the area of thinning. This tri-lamellar technique provides structural integrity, transparency, has anti-inflammatory properties, promotes re-epithelialization and ocular surface healing.