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Asian Journal of OPHTHALMOLOGY
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Asian Journal of Ophthalmology is the peer-reviewed journal for The Asian Pacific Glaucoma Society (APGS), The Asia Pacific Ophthalmic Trauma Society (APOTS) and all others with an interest in Ophthalmology.

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Focus and scope

As new technologies and therapeutic interventions are continually being developed, Ophthalmology has become a field of rapid change, particularly in the Asia-Pacific region, where disease patterns and health care delivery differ greatly from those seen in the West. Asian Journal of Ophthalmology was established in 1998 with the aim of disseminating information relevant to Ophthalmology and glaucoma throughout Asia and to interested groups worldwide.

The objectives of Asian Journal of Ophthalmology are as follows:

- To provide a platform for the publication of information with a focus on Ophthalmology in Asia.
- To disseminate information that will improve the care of patients with all types of ophthalmological disorders, with a special focus on glaucoma.
- To increase the understanding of such disorders through reporting of educational activities.
- To publish the results of research programmes to expand knowledge about the causes, prevention, and treatment of ophthalmological disorders.
- To work closely with Asian and international researchers to achieve these aims.
- To provide a forum for young and relatively inexperienced researchers to present their research results as Original Articles via an international platform.
- To maintain and promote relationships with any organization with similar goals.

Although the focus of Asian Journal of Ophthalmology mainly was on glaucoma with close ties to the South-East Asian Glaucoma Interest Group (SEAGIG) in the past, the journal now focuses on the entire spectrum of Ophthalmology. This resulted in collaboration with the Asia Pacific Ophthalmic Trauma Society (APOTS).

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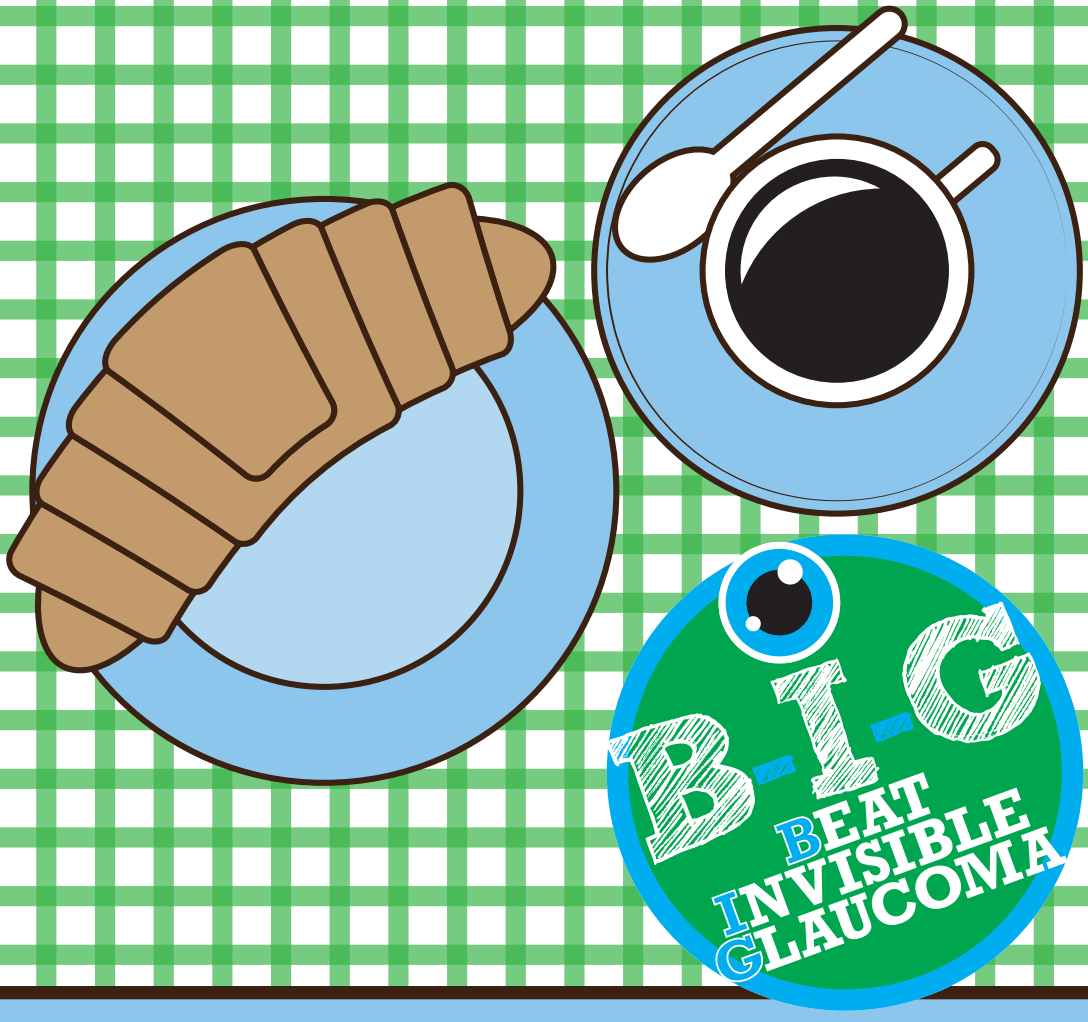

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ABSTRACTS

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FILM FESTIVAL

V1 Cyclodialysis cleft repair - a novel non penetrating technique

K.S. Lim[1], B. Shah[1], J. Low-Beer[1], S. Goyal[1]
[1]St Thomas' Hospital, London, United Kingdom

Purpose: The purpose of this video is to demonstrate a novel non penetrating approach for cleft repair which avoids the penetrating scleral flap technique previously described. This less invasive method achieved a good outcome which is reported as a 6 week follow up. The video also demonstrates the difficulty in diagnosing a cleft on gonioscopy and how this is overcome.

Methods: This video demonstrates the case of a 42 year old man with a history of fall a few months back when his right eye suffered trauma. He presented with a reduced best corrected visual acuity of 6/24 due to hypotonous maculopathy. Preoperatively, gonioscopy did not reveal any abnormalities. A cyclodialysis cleft was revealed when gonioscopy was repeated after injecting viscoelastic into the anterior. This is also demonstrated in the video. After attempting treatment with topical steroids and Atropine followed by Argon laser, the dialysis cleft remained open leading to a decision to take up a surgical approach. The technique we describe, involves pre operative identification of the site of dialysis, overlying which, a partial thickness sclera flap is created. 8-0 nylon sutures are then passed overlying the site and the underlying ciliary body is included in the bite. An animation clip in the video demonstrates this. This suture is then tied , later to be covered by the partial thickness flap. More sutures are placed, all parallel to the limbus rather than vertical sutures as previously advocated, thus reducing the number of sutures required to achieve closure as a broader area is covered with each bite. Gonioscopy is repeated throughout the procedure to ensure correct placement of sutures which is confirmed by the cyclodialysis cleft appearing progressively smaller in size. Eventually the overlying sclera flap is closed with 10-0 nylon, thus burying the 8-0 nylon sutures, ensuring patient comfort.

Results: 6 weeks post operatively, after a course of intensive topical steroids, the vision improved to 6/12 and the IOP settled at 10mmHg. There were no post operative pressure spikes in this case.

Conclusion: Our video demonstrates a safe non penetrating technique which produced good visual outcome in our patient. This technique avoids exposure of the choroid thus making it a safer alternative to the currently followed technique and also results in sutures covered by a sclera flap, resulting in better patient comfort post operatively.

V2 Deep sclerectomy - The trainees perspective

N. Anand[1]
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This video looks at the various problems encountered by the novice surgeon when trying to perform deep sclerectomy or for that matter Canaloplasty. The basic technique and surgical tips, common errors in technique including inadequate dissection and perforations of the trabeculo-Descemet's window and strategies to deal with them are shown.

V3 Ahmed valve implantation associated with 23-gauges phaco-vitrectomy: placement of valve tube directly into vitreous chamber by the 23-gauge sclerotomy

A. Moreno Valladares[1], N. Puerto Amorós[1], S. Perez Pascual[2], J.M. Ruíz Moreno[2]
[1]Glaucoma Unit, Universitary Hospital of Albacete, Albacete, Spain; [2]Retina Clinic Unit of Albacete, Albacete, Spain

Purpose: To present a combined surgical technique for secondary closed angle glaucoma in proliferative diabetic retinopathy patients with hemovitreous.

Method: This video shows as we perform a direct insertion of Ahmed® FP-7 valve tube into vitreous chamber through 23 gauges sclerotomy. We decided surgery for the eye with residual vision for a bilateral involvement patient with 40 mmHg intraocular pressure despite maximum treatment. Intravitreal bevacizumab injection was administered 48 hours before surgery to prevent intraoperative bleeding. Under peribulbar anaesthesia, we performed consecutively: super-temporal conjunctive dissection and scleral suture of valve plate 8-10 mm from the corneo-scleral limbus, 23 gauges vitrectomy microcannulas were inserted followed by phacoemulsification, intense vitrectomy and hialoidectomy, epiretinal membrane peeling and peripherical retinal photocoagulation. Finally we inserted the valve tube through one of the 23-gauges sclerotomy directly and recovered it with cadaveric scleral patch. A continuous conjunctival suture was performed.

Results: We had performed that technique in three patients and no intraoperative or postoperative complications was observed, with improvement of visual acuity and IOP control.

Conclusion: The direct placement of Ahmend valve tube by 23-gauge sclerectomy into vitreous chamber associated with intense vitrectomy is a good alternative treatment for neovascular glaucoma asociated to hemovitreous.

V4 Direct flapless cyclopexy in management of traumatic cyclodialysis cleft

J. Ho[1], I. Yeung[1], R. Ching[1], C. Chan[1]
[1]Department of Ophthalmology, Tung Wah Eastern Hospital, Hong Kong, Hong Kong

Purpose: To present 2 patients with traumatic cyclodialysis cleft undergoing direct suture repair without creation of a scleral flap.

Methods: Patient A had a 4 clock hours' cleft, mild traumatic cataract and macula folds caused by a tennis ball, while Patient B sustained a 8 clock hours' cleft, traumatic cataract, vitreous haemorrhage, macula folds and choroidal rupture caused by an explosion accident. Initial visual acuity was 0.2 (Patient A) and counting fingers (Patient B) and the intraocular pressure (IOP) was 4 mmHg (Patient A) and 2 mmHg (Patient B). Cyclodialysis cleft was confirmed clinically and by ultrasound biomicroscopy (UBM). Initial medical management was attempted. The repair was performed under general anaesthesia. The anterior chamber was filled with a small amount of viscoelastic to raise the IOP temporarily. A fornix-based conjunctival flap was created. According to the UBM findings, full-thickness radial scleral incisions at 2 mm posterior to limbus were made with a slit knife until exposure of the ciliary body (CB). Each incision was made at a length of 1.5 - 2 clock' hours, with intact sclera between incisions. Supraciliary fluid was drained passively when a significant amount of CB was exposed. Particular attention was made for the presence of vitreous. The CB was fixed to the inner side of sclera by using 10/0 nylon suture in an interrupted mattress fashion. The distance between sutures was 2 mm. The scleral incision was closed with 10/0 nylon sutures and peritomy closed with 8/0 vicryl sutures. Viscoelastic was gently flushed out at conclusion of surgery with care, to avoid re-opening of cleft. Postoperative topical atropine and corticosteroid (prednisolone acetate 1%, 4 times per day) was given. An intensive steroid treatment was avoided, in order to facilitate a tight CB-sclera apposition by inflammation.

Results: Both patients A and B had cleft closure confirmed by UBM postoperatively. Visual acuity was 0.7 (Patient A) and counting fingers (Patient B) and IOP was 14 mmHg (Patient A) and 5 mm Hg (Patient B). The cause of failure to raise IOP significantly in patient B was thought to be ciliary hypofunction despite anatomical reattachment. Vision was limited because of coexisting pathology.

Conclusion: Despite medical and laser treatment, surgical interventions are often necessary to close larger clefts. For phakic patients, this flapless, direct repair technique is relatively safe to the lens as no blind suture passing to the iridocorneal angle is involved. Dissection of scleral flap is avoided which can be challenging in hypotonous eyes.

V5 Deep sclerectomy with Esnoper Clip

N. Lopes[1]
[1] *Departamento de Oftalmologia do Hospital de Braga, Braga, Portugal*

Purpose: To present a video of deep sclerectomy with the use of the new Esnoper Clip implant (AJL, Álava, Spain) in a case of open angle glaucoma.

Methods: Video presentation of an edited video with description of the technique used for deep sclerectomy with the implantation of the new Esnoper Clip implant, and postoperative result.

Results: This procedure is successful in reducing intra-ocular pressure and sustaining it and has a low early and late post-operative complications rate as usual with deep sclerectomy.

Conclusion: Deep sclerectomy with Esnoper Clip implant is a safe and effective promising surgical combination for the treatment of open angle glaucoma.

V6 Minivitrectomy: a simple technique in the treatment of refractory pseudophakic malignant glaucoma

M. Pakravan[1], **E. Ghahari**[1], **S. Yazdani**[1]
[1]*Ophthalmic Research Center, Shahid Beheshti University, Tehran, Iran*

Purpose: To present and popularized a simple and efficient procedure for the treatment of pseudophakic malignant glaucoma.

Method: When conservative management with medical treatment, and laser capsulotomy and hyaloidotomy were not effective in pseudophakic malignant glaucoma management, we performed minivitrectomy via clear cornea. After incising peripheral cornea and iris with a super sharp stab knife, vitrectome probe was introduced into the eye and a limited irido-zonulo-hyaloido-vitrectomy performed. We introduced the vitrectome probe via existing peripheral iridectomy if there was one. At the same time we introduced an inflow conula via a clear cornea stab incision for anterior chamber maintenance.

Result: We performed this technique in 16 cases with complete resolution in all but one, which needed further intervention.

Conclusion: Minivitrectomy is a very simple procedure that can break the pathologic misdirected aqueous very efficiently and could be considered in the management of refractory pseudophakic malignant glaucoma. It is a very short and easy procedure; there is no need to touch the conjunctiva, and can be done by any eye surgeon comfortably.

V7 Gunenc trabecular shunt implant for the drainage of aqueous humor in glaucoma surgery

U. Gunenc[1], **G. Arikan**[1], **O. Donmez**[1], **M. Kaya**[1]
[1]*Department of Ophthalmology, Dokuz Eylul University, School of Medicine, Izmir, Turkey*

Purpose: To demonstrate a novel glaucoma drainage implant for the treatment of refractive glaucoma cases.

Methods: Gunenc trabecular shunt is a new glaucoma drainage implant made of hydrophobic acrylic. In this video two different surgical techniques for the implantation of the drainage device were demonstrated. In both techniques the implant was placed beneath a partial-thickness scleral flap. In the first technique implant allows drainage of aqueous humour from anterior chamber into the subscleral space. In the second technique, by using the same implant, drainage of the aqueous humor into the suprachoroidal space is provided.

Results: With the two surgical techniques drainage of aqueous humor was provided successfully. No serious intraoperative or postoperative complication was observed.

Conclusion: Gunenc trabecular shunt implant is a promising device for the drainage of aqueous humor in refractory glaucoma cases.

V8 Glaucoma drainage device "pull-through" suture - facilitating watertight and consistent tube insertion through 25-gauge (orange) needle tract

D. Lindfield[1], A. Kulkarni[1]
[1]Kings College Hospital, London, United Kingdom

Purpose: The need to avoid early post-operative hypotony has forced many changes to glaucoma drainage device (GDD) technique. Non-valved tubes are frequently ligated with suture which either absorbs or can be trans-conjunctivally lasered, or shunts are stented with 3-0 Supramid sutures. Despite these measures entry site leak can still occur causing early hypotony which can be difficult to manage.

Methods: Traditionally a 23-gauge (blue) needle was recommended for anterior chamber (AC) entry. A 23-gauge needle has a 0.64 mm outer diameter which theoretically allows a perfect fit for both the Baerveldt (0.64 mm external diameter) & Ahmed (0.635 mm) tubes. However, in reality the conduit created by a 23-gauge needle often exceeds 0.64 mm especially in myopic eyes. A 25-gauge (orange) needle has a 0.51mm external diameter allowing a tight and watertight fit for Baerveldt insertion. However, due to the tight fit insertion is often difficult.

Results: This video illustrates the use of a 10/0 double-armed Prolene suture on a straight needle to "pull-through" the tube tip into the anterior chamber. The tube tip is pierced proximally before both suture needles are passed through the entry site across the anterior chamber before being docked and brought out through a small paracentesis. The tube is then inserted as usual, but when resistance is met, traction on the sutures allows easy and controlled entry in to the AC. The suture is then cut and removed.

Conclusion: This technique is quick, easy and safe. It allows both Baerveldt and Ahmed tubes to be reliably and consistently passed through 25-gauge incisions. The result is a watertight fit and less risk of early post-operative hypotony and infection.

V9 "Attack of the Giant Cyst"- The surgical management of the biggest trabeculectomy complication we have ever seen!

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[1]Department of Ophthalmology, King's College Hospital, London, United Kingdom

Purpose: Antimetabolite augmentation of Trabeculectomy is common. Early fears of thin-walled avascular blend have receded with timed application and titration concentration. It remains a useful tool to prevent scarring and ensure long term drainage but complications still occur. This video illustrates a giant limbal cyst which caused significant morbidity and documents a challenging excision.

Methods: A 71 year old male patient underwent left Trabeculectomy with Mitomycin in Nigeria. Over a 2 year period he developed a white cystic lesion which grew downwards from the initial Trabeculectomy site. He presented complaining of ocular discomfort and poor cosmesis. The cyst measured 9mm in diameter and covered the superotemporal cornea encroaching on the visual axis and herniating through the palpebral aperture.

Results: The pedunculated giant cyst was excised at its base and dissected away from the cornea. There was a small aqueous leak which necessitated a pericardial patch. The conjunctiva was advanced.

Conclusion: This was a challenging surgical excision of the largest Trabeculectomy cyst we have ever encounterd. After removal of the cyst, the Trabeculectomy still appears to be functioning well with an IOP of 13. This video graphically demonstrates a very rare surgical complication and documents surgical management.

VIDEO LOOP

VL3 Outcomes of bleb revision for bleb leak and hypotony after glaucoma filtering surgery

D. Angmo[1], R. Sihota[2]

[1]Dr RP Centre, AIIMS, NOIDA, India; [2]Department of Ophthalmology, Dr RP Centre for Ophthalmic Sciences, AIIMS, New Delhi, India

Purpose: To study the long-term outcomes of a novel technique of bleb reconstruction for hypotony after glaucoma filtering surgery.

Method: A prospective clinical trial consisting of 33 patients (34 eyes) underwent replacement of conjunctiva over the bleb, without bleb excision. Patients were reviewed at 1 wk, 1 mth, 3 mths, 6mths postoperatively and thereafter every 6 mths for BCVA, applanation tonometry, bleb morphology & leaks, lens status, antiglaucoma medications, perimetry & any complications.

Results: The average age of patients was 33.33 ± 22.19 yrs. The mean preoperative IOP was 6.12 ± 4.62 mmHg. The average follow up was 13.5 ± 4.7 mths, with a minimum of at least 6 mths. Postoperatively, the IOP at 6 mths was 11.47 ± 3.28 mmHg. Thereafter, the IOP at 12 mths was 12.74 ± 5.95 (27/34) & 13.33 ± 5.75 mmHg (6/34) at 18 mths. The preoperative & postoperative BCVA in LogMAR was 0.53 ± 0.25 and 0.37 ± 0.21 ($p = 0.0001$) in 23 pts, showing a significant improvement in visual acuity post surgery. In 10 pts, visual acuity was poor pre-operatively. They could not appreciate LogMAR chart preoperatively, however visual acuity was maintained post-operatively. 31 pts (91.18%) had IOP < 18 mmHg with no additional antiglaucoma medications. 2 pts (5.88%) had IOP < 18 mmHg with 1 antiglaucoma medication and 1 pt had IOP = 18 mmHg on 3 antiglaucoma medications. 2/34 developed mild ptosis after surgery. On evaluating bleb parameters according to Indiana Bleb Grading Scale, preoperatively the bleb height was high (H3) in 31/34 and medium (H2) in 3/34 whereas postoperatively, H3 in 9/34 and H2 in 27/34 was noted (0.0001). None of the eyes had a flat bleb. Preoperatively, the circumferential extent (E) of the bleb was E1 in 20/34, E2 in 13/34 and E3 in 1/34 & postoperatively, E1 in 19/34, E2 in 14/34 & E3 in 1/34 ($p = 0.56$). Preoperatively, avascular cystic blebs(V1) were seen in 34 eyes and postoperatively, V1 was seen in 1/34, mild vascularity (V2) in 27/34 eyes and moderate vascularity (V3) in 6/34 eyes ($p = 0.0001$). Preoperatively, bleb sweating (S1) was seen in 30/34 and leaking bleb (S2) in 1/34 & postoperatively, none of the eyes showed a leak or sweating on Seidel's on follow up. Additionally, the presence and extent of thin, transparent areas of the bleb were recorded. Preoperatively, no thin areas (TA0) were noted in 3/34, < 1 clock hour (TA1) in 10/34, 1-2 clock hours (TA2) in 15/34 and > 2 clock hours (TA3) in 16/34 eyes. Postoperatively, TA0 were noted in 30/34, TA1 in 2/34, TA2 in 2/34 eyes and TA3 in none of the eyes ($p = 0.0001$).

Conclusion: Replacing the conjunctiva over the bleb without bleb excision is safe and maintains the bleb function.

VL4 Combined iTrack 360º trabeculotomy-trabeculectomy in congenital glaucoma

N. Lopes[1]

[1]Departamento de Oftalmologia do Hospital de Braga, Braga, Portugal

Purpose: To present a video of 360-degree trabeculotomy with iTrack catheter (iScience International, Menlo Park, CA) followed by trabeculectomy in a case of congenital glaucoma.

Methods: Video presentation of an edited video of the surgery of a newborn with congenital glaucoma submitted to combined 360-degree trabeculotomy and trabeculectomy.

Results: Procedure was successful with reduction of the intra-ocular pressure and clearing of corneal oedema.

Conclusion: Combined 360º trabeculotomy-trabeculectomy is a safe and effective surgical technique in the treatment of congenital Glaucoma.

VL5 Combined trabeculotomy with trabeculectomy with mytomycin-c with releseable sutures in primary congenital glaucoma

S. Dubey[1], P. Matah[1]
[1]Glaucoma Services, Dr. Shroff's Charity Eye Hospital, Delhi, India

Glaucoma in infancy and childhood is a rare but potentially blinding condition. It poses a major challenge to the treating ophthalmologist as the disease evolves through infancy to adolescence. Surgery is the accepted treatment method, with medical therapy playing only an adjunctive role before surgery. With the introduction of microsurgical techniques, prognosis of paediatric glaucoma has improved considerably. There are various surgical options described for congenital glaucoma and the success rate depends on various factors like the age of presentation and severity of glaucoma.

Goniotomy was considered to be the classic operation for congenital glaucoma. However, the trend seems to be changing and there are increasing advocates for primary trabeculotomy. The reason for this change in trend is that approximately 50% of the patients with congenital glaucoma present with variably opaque media and are therefore unsuitable for goniotomy. Large numbers of Indian children (> 80%) present with a severe cloudy cornea and goniotomy is technically impossible.

The advantages of trabeculotomy coupled with encouraging reports of primary trabeculectomy in congenital glaucoma, prompted us to combine trabeculotomy with trabeculectomy with mitomycin-C as the initial surgical procedure in our patient population. This video will demonstrate the microsurgical technique of primary trabeculotomy with trabeculectomy with mitomycin-C with releasable sutures in a step by step manner in a case of primary congenital glaucoma.

VL7 Prevention and treatment of bleb dysesthesia: role of marking 12 o'clock on slit lamp prior to surgery

S. Goyal[1], D. Lindfield[1]
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Purpose: This video presentation discusses the causes and methods of preventing and treating bleb dysesthesia. Large, nasal, overhanging blebs uncovered by lids are more likely to cause bleb dysesthesia. There is cyclotorsion (2-20 degrees) of eye during supine position hence it is important to mark the eye to guide placement of flap during surgery. In majority of cases changing from upright to supine position causes excyclotorsion that leads to nasal placement of bleb.

Methods: The cornea is marked near 12 o'clock after assessing the area of maximum coverage by the lid using a hypodermic needle on the slit lamp prior to anaesthesia and surgery. A larger area of anti-metabolite application helps to ensure diffuse blebs. Edge to edge secure conjunctival to corneal closure helps to avoid overhanging blebs.

Results: Using these techniques none of our over 200 patients in the last 3 years have needed a bleb revision for bleb dysesthesia. We discuss management of patients referred to us with bleb dysesthesia including surgical techniques like partial bleb excision, compression sutures, conjunctival cut down and autologous blood injection.

Conclusion: Diffuse blebs that are completely covered by lids can be achieved by modern trabeculectomy techniques to prevent bleb dysesthesia. Pre operative marking helps the placement of blebs where there is maximum coverage by the lids.

VL8 Dynamic tube a rare complication in Ahmed glaucoma valve implant

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Purpose: To report a rare complication of dynamic tube in Ahmed glaucoma valve (AGV) implant. Dynamic tube of glaucoma drainage device is a very rare complication and has been reported only once in a case series, but in that series the dynamic tube had not caused any intra ocular complications hence not intervened.

Methods: A 10-year-old girl who had undergone AGV implantation as a primary procedure for glaucoma in aphakia following a congenital cataract surgery. Following an accidental excision of the tube during capsulectomy for hypertensive phase, explantation of AGV was performed. A repeat AGV was performed in the same quadrant 2 weeks later which resulted in a dynamic tube in the anterior chamber with tube cornea touch and raised intraocular pressure (IOP).

Results: Excision of the offending tube and placement of a pediatric AGV in a different quadrant led to resolution of corneal edema, stable vision and well-controlled IOP.

Conclusions: Our case report highlights the possible causes of dynamic tube, its complications and management. Our case also highlights the importance of understanding the physiological phases with respect to IOP after implantation of a glaucoma drainage device.

VL11 Suprachoroidal drainage of aqueous humor in refractory glaucoma

A.T. Ozturk[1], U. Gunenc[1], G. Arikan[1], R. Yildirim[1]
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Purpose: To demonstrate examples of suprachoroidal shunt implants in patients with refractory glaucoma.

Methods: A 9 mm long silicone tube was placed into the anterior chamber and suprachoroidal space beneath a partial thickness scleral flap. Silicone tube was fixed to the sclera with 10.0 nylon suture. Suprachoroidal shunt implantation can be combined with phacoemulsification, trabeculotomy or anterior vitrectomy procedures.

Results: Drainage of aqueous humor to the suprachoroidal space was provided successfully.

Conclusion: Suprachoroidal drainage of aqueous humor with a silicone tube is a useful procedure in refractory glaucoma cases.

VL12 Tube extender for retracted tube in a child with aniridia

S. Senthil[1], P. Dave[2]
[1]LV Prasad Eye Institute, Hyderabad, India; [2]T.V Patel Eye Institute & Vaduwala Eye Hospital, Vadodara, India

Glaucoma is seen in up to 75% of patients with aniridia. Medical therapy and conventional filtering surgery often fails. Better results are obtained with glaucoma drainage devices, but in children, ocular growth may cause tube retraction leading to failure of the procedure. Tube extenders may be used successfully in such cases to salvage the retracted drainage implant.

A one year old aniridic child, post-keratoplasty and lens aspiration with posterior chamber intraocular lens, presented with secondary glaucoma and 2 failed filtering procedures. Ahmed valve implantation resulted in well controlled intraocular pressure (IOP) until the tube retracted 6 months later. A tube extender was used to salvage the implant surgery and the IOP stabilized at 12mmHg till the last follow up 6 months later.

The video shows a tube extender implantation in simple steps, which can be quickly and easily learnt.

VL14 The canaloplasty for the treatment of open angle glaucoma: 2 patients under went filtering surgery with ocular ipertension

F. Campana[1]
[1]*Department of Ophthalmology, Cuneo, Italy*

Purpose: To evaluate the efficacy of canaloplasty for the treatment of open-angle glaucoma in 2 patients already underwent filtering surgery with no IOP control.

Materials and Methods: 2 interventions were performed on 2 patients, including 1 patient with POAG underwent deep sclerectomy and subsequently Ex-Press implantation, and 1 patient with POAG underwent deep sclerectomy with T-Flux.

Results: At 3 years after canaloplasty patients present A compensated IOP sine therapy.

Conclusions: The canaloplasty is a non-penetrating surgical technique, safe and effective for the treatment of open-angle glaucoma in patients already undergoing surgery with undamaged trabecular meshwork, which aims to re-start the natural ways of filtration without seeking a subconjunctival filtration.

VL16 Fornix based trabeculectomy

M. Mansuri[1], **P. Bhagat**[1], **R. Bhatt**[1], **K. Prajapati**[1], **N. Modi**[1]
[1]*Maneklal and Jagjivan Western Regional Institute of Ophthalmology, Ahmedabad - India*

Introduction: Inspite of invention of numerous newer surgical modalities for glaucoma, Conventional Trabeculectomy still remains the gold standard.

Purpose: To teach the standard method of forming the fornix based trabeculectomy providing pearls, tips and tricks for the same.

Method: Live surgery recorded for pesentation "Fornix based Trabeculectomy". Name of Surgeon: Dr Mariam N. Mansuri (M.S. - Ophthalmology). Professor & Head, Glaucoma Unit. Place: Maneklal and Jagjivan Ujamshi Western Regional Institute of Ophthalmology, Civil Hospital, Ahmedabad, Gujarat, India. Duration: 5 min.

Result: 5 minutes video presentation showing the standard method of performing the fornix based trabeculectomy.

Conclusion: Fornix based Trabeculectomy still remains the gold standard surgery for the treatment of glaucoma, not managed by drugs.

VL19 Use of polytetrafluoroethylene (PTFE) intravenous cannula as an alternative to glaucoma drainage device

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Purpose: To report the use of polytetrafluoroethylene (PTFE) intravenous cannula as an alternative to glaucoma drainage device in a patient requiring filtering surgery.

Methods: A technique alternative to the routine glaucoma drainage devices was performed in a pseudophakic patient with primary open angle glaucoma requiring filtering surgery. The technique used a 22G PTFE intravenous cannula as a tube shunt for the drainage of aqueous into the subconjunctival space in a consistent manner.

Results: The patient had an IOP of 14, 8, 12, 10 and 12 mmHg respectively at 2, 4, 8, 12 and 24 weeks of postoperative follow-up with well formed anterior chamber and a well functioning diffuse bleb. Preop vision was maintained. Gonioscopy and Anterior segment OCT showed the presence of tube.

Conclusion: Filtration surgery performed using a 22G PTFE intravenous cannula described in our technique can be evaluated as a potential cheap alternative to glaucoma drainage devices used in present day glaucoma surgeries.

FREE PAPERS

FP1 Clinical outcomes of eye with aqueous shunt implants after phacoemulsification

R. Puertas[1], D. Plemel[1], K. Barton[2]
[1]NIHR Biomedical Research Centre for Ophthalmology, Moorfields Eye Hospital, London, United Kingdom; [2]Department of Genetics and Epidemiology, UCL Institute of Ophthalmology, London, United Kingdom

Purpose: To assess the effect of cataract surgery on IOP and glaucoma medication usage in eyes previously implanted with aqueous shunts.

Study Design: Consecutive interventional case series of eyes that underwent aqueous shunt implantation followed by phacoemulsification under the care of one surgeon between 1998 and 2010

Methods: Eligible patients were identified from a prospectively acquired electronic database of aqueous shunt implants. Patients implanted outside the study period, under the age of 16 years, pseudophakic or aphakic at the time of shunt implantation or phakic without subsequent phacoemulsification, were excluded. Records of eligible patients were reviewed and the following collected: visual acuity, intraocular pressure (IOP), glaucoma medication usage and further glaucoma surgical procedures. Data were collected before phacoemulsification and postoperatively at 1 day; 1 week; 1, 3, 6, 12, 24 months; and at last follow-up. Comparisons were made using a two-tailed Student t test where a p value of 0.05 was used to determine statistical significance.

Results: A total of 532 patients of 16 years or greater were implanted during the study period. Of these, 65 (12.29%) eyes subsequently underwent phacoemulsification and met the inclusion criteria, of which 49 records were available for review and therefore included. The mean age was 57.1 ± 14.8 years (range 20-83 years). Phacoemulsification was performed 14.7 ± 11.00 months (mean ± SD) (range 4-60 months) after aqueous shunt insertion and followed-up for an average of 47.6 ± 33.8 months (mean ± SD) (range 9-150 months) after phacoemulsification. Aqueous shunt insertion was the first glaucoma procedure in 27 eyes (55.10%). Visual acuity improved from 1.18 ± 0.79 logMAR (mean ± SD) to 0.49 ± 0.56 (mean ± SD) 3 months after phacoemulsification. The average visual acuity at last follow-up 0.65 ± 0.76 (mean ± SD). Intra-ocular pressure at last follow-up was 13.7 ± 4.4 (mean ± SD) compared to 14.69 ± 5.45 mmHg (mean ± SD) before phacoemulsification (NS). Intra-ocular pressure was significantly lower than before phacoemulsification at the one week time-point, at 12.26 ± 6.32 mmHg (p = 0.02) but not otherwise. The mean number of glaucoma medications has not increased: 1 (0.8) ± 1.01 before phacoemulsification and 1 (0.9) ± 1.07 (mean ± SD) at last follow-up (p = 0.45).

Conclusion: Phacoemulsification in eyes previously implanted with aqueous shunts for glaucoma improves visual acuity without significantly altering the IOP or the number of medication used.

FP2 Safety and efficacy of concomitant prophylactic posterior sclerostomy with cataract surgery in eyes with nanophthalmos

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Background: Ocular surgery in nanophthalmos is associated with potentially blinding complications like intra operative and delayed suprachoroidal haemorrhage. The Outcome and complications of cataract surgery with or without prophylactic sclerostomy was prospectively compared in eyes with visually significant cataracts associated with nanophthalmos.

Methods: 32 eyes of 32 patients with nanophthalmos with visually significant cataract and patent laser iridotomies were randomly assigned to either cataract surgery alone (Cataract only Group) or cataract surgery with concomitant prophylactic sclerostomy (concomitant Sclerostomy Group). Visual acuity, IOP, axial length, retino choroidal thickness, operative and post operative complications were compared between the two groups.

Results: 17 eyes were randomized to Cataract only Group and 15 eyes to the Concomitant Sclerostomy Group. The mean age was 54.5 years. The mean axial length was 18.34 and mean lens thickness was 4.38. 60% of eyes underwent phacoemulsification, 31% underwent small incision cataract surgery and 3% underwent ECCE. Post operatively, there was no significant differences between the Groups in visual acuity improvement, IOP reduction and in decrease of retino choroidal thickness. 10 of 32 eyes (31%) developed complications. 9 eyes in the Cataract only Group (53%) and 1 (7%) in the Concomitant Sclerostomy Group developed intra operative complications. Four eyes in the Cataract only Group as compared to none in the Sclerostomy Group had posterative choroidal effusions.

Conclusions: The potential for surgical complications like expulsive haemorrhage and choroidal effusion is high in nanophthalmic eyes. Preoperative reduction of intraocular pressure , and combining cataract surgery with concomitant prophylactic posterior sclerostomy can minimize the risk of intraoperative and postoperative complications and improve the surgical success in eyes with nanophthalmos. .

FP3 The effect of trabeculectomy on anterior chamber drainage angle and peripheral anterior synechiae formation

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Purpose: To examine the macroscopic effect of trabeculectomy surgery on the drainage angle in terms of peripheral anterior synechiae formation and Shaffer score.

Methods: Subjects for this analysis were enrolled in a prospective, randomised placebo-controlled trial of the effect of 5 Fluorouracil (5-FU) augmented trabeculectomy. All subjects had gonioscopic examination before trabeculectomy surgery and at month 36. All subjects were phakic at trial entry - indication for cataract surgery was the presence of a lens opacity deemed to be a cause of decreased vision by the examining ophthalmologist and request from the patient for the cataract to be removed following informed consent. Subjects were examined at regular intervals for 36 months. For data analysis, subjects were divided into 4 groups according to diagnosis (open angle glaucoma (OAG) or primary angle closure glaucoma (PACG) and lens status (phakic or pseudophakic at 36 months).

Results: There were 173 patients who had data recorded at baseline (pre-trabeculectomy) and month 36 for presence of PAS and Shaffer score for all 4 quadrants. Overall, mean PAS score increased from 3.1 ± 4.3 at baseline to 4.0 ± 4.3 at month 36 (p=0.009). The Shaffer score did not change significantly apart from in the superior quadrant where there was narrowing of the angle (p = 0.043). In the OAG group, there was a significantly greater proportion of subjects with PAS at month 36 (46.9%) than at baseline (12.5%), p = 0.001; this was not seen in the PACG group.

Conclusions: Trabeculectomy surgery results in increased amount of PAS formation at 3 years in subjects with OAG and narrowing of the drainage angle in subjects with PACG that have not had cataract surgery. This may compromise outflow of aqueous via the conventional route which will have adverse effects on IOP control should trabeculectomy fail.

FP4 A new filtering procedure. Technique and results

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Purpose: Evaluation of a newly developed filtering procedure in comparison to trabeculectomy, a retrospectuve case control study.

Methods: Schlemms canal is unroofed using a two layered scleral flap approach. Filtration through the ostia is created by trabeculotomy with Mackensen probes while preserving the trabecular meshwork at the site of the scleral flap. With this technique, a two layered outflow resistance is created. Thirty operations with this technique were prospectively followed for 1 year and compared to 87 trabeculectomies matched for age and IOP. All operations were performed by one surgeon (FG). Primary endpoints were IOP reduction for complete and qualified success (EGS-WGA criteria: > 30% and ≤ 18 mmHg).

Results: IOP one year after surgery was 10.9 ± 3.4 mmHg in the new filtration procedure and 11.7 ± 2.9 in trabeculectomy. Complete success was 79.3% in the new filtration procedure and 83.3% in trabeculectomy. Qualified success was 86.2% and 83.3%, respectively. Taking all timepoints together, the new procedure resulted in significantly lower mean IOPs than trabeculectomy, while at 1 year postoperatively, there was no significant difference.

Conclusions: In this case control study, the IOP reduction of the new procedure was equal to trabeculectomy. The advantage of this method is a more damped flow at the filtration site by using a two-layered resistance with broader and more diffuse filtration blebs as well as the avoidance of an iridectomy thus preserving the normal aqueous flow around the lens.

FP5 Using intraoperative intraocular pressure during trabeculectomy predict to predict postoperative pressure

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Purpose: To study the association of intraoperative intraocular pressure (IOP) at the conclusion of primary trabeculectomy with postoperative IOP on days 1, 7 and 30 and report the ability of intraoperative IOP to predict those postoperative IOPs.

Design: Prospective, observational, case series.

Methods: Ninety-eight consecutive patients with primary open angle or angle closure glaucoma undergoing primary trabeculectomy were recruited. The scleral flap was sutured to allow "equilibrium", or flow on gentle pressure over the posterior lip of the flap. Intraoperative IOP was measured at the conclusion of surgery. Clinical details and complications were recorded over a 30-day follow-up period. The patients were analyzed as groups A (intraoperative IOP ≤ 10.0 mm Hg), B (> 10, ≤1 5.0 mmHg) and C (> 15 mmHg).

Results: Mean age was 60.8 ± 9.9 years. 41.3% of patients were males. Eighty-two (84.5%) had PACG. Mitomycin-c (MMC) was used in 75 (77.3%) eyes for a median of 2.0 minutes (range: 2.0 to 4.0). The follow-up rates on days 1, 7 and 30 were 100%, 91.8% and 79.4%, respectively. Mean IOP in group C was significantly higher than group A at all visits ($p < 0.05$); it was not significantly different from group B. Postoperative IOP was associated with intraoperative IOP, age, duration and dose of MMC in univariate regressions. On multivariable analysis the intraoperative IOP was associated with postoperative IOP's on day 1 (regression coefficient $b = 0.24$, $p = 0.039$, $R2 = 0.24$) and day 7 ($b = 0.47$, $p < 0.001$, $R2 = 0.42$), but not on day 30 ($b = 0.22$, $p = 0.065$, $R2 = 0.12$). IOP on day seven was predicted by -8.6 + 0.47* (intraoperative IOP) + 0.27*age - 11.7* (dose of MMC in mg/ml). Prediction for day 30 = 9.8 + 0.27* intraoperative IOP.

Conclusions: In patients undergoing uncomplicated primary trabeculectomy intraoperative IOP is associated with and can predict early postoperative IOP. Adjusting the IOP during the operation may optimize postoperative IOP.

FP6 Evaluation of illuminated microcatheter assisted circumferential trabeculotomy in primary congenital glaucoma

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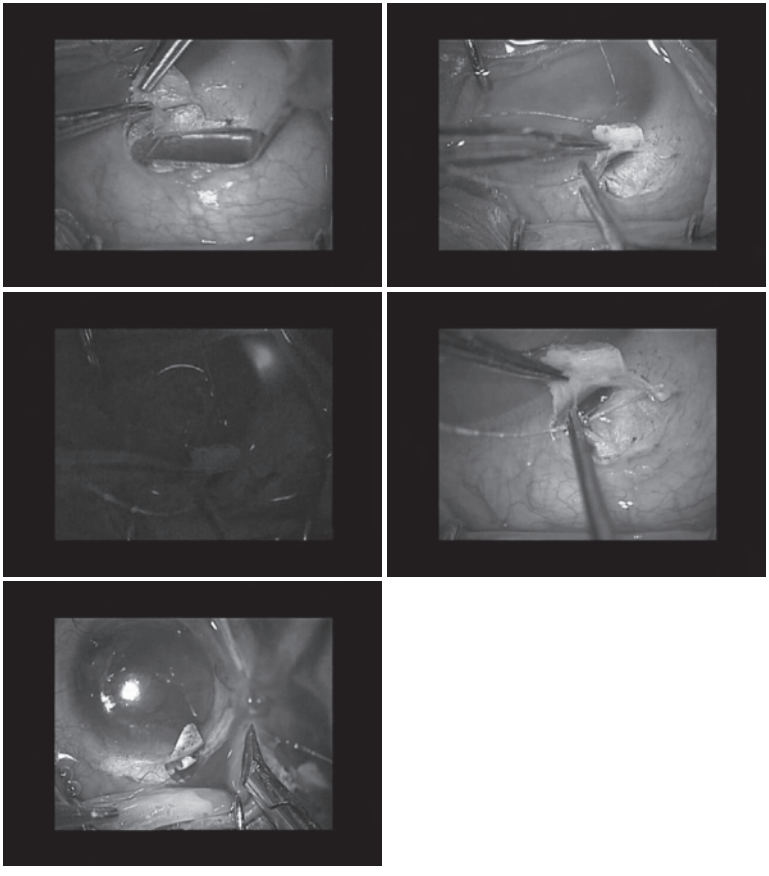
Purpose: To evaluate the surgical outcomes, safety and efficacy of Illuminated microcatheter assisted circumferential trabeculotomy in Primary Congenital Glaucoma (PCG).

Methods: A prospective interventional study was carried out in 25 eyes of 16 patients with PCG aged ≤ 2 years at the time of surgery. Trabeculotomy was performed via an illuminated microcatheter with an intent to perform complete 360^0 catheterisation. In cases where complete catheterisation of the Schlemm's canal could not be achieved, ab-externo trabeculotomy was performed using a Harms trabeculotome. All patients were followed up for a period of 12 months with examination under anaesthesia at 4 weeks, 12 weeks, 24 weeks and 12 months. The primary outcome parameter evaluated was intra ocular pressure (IOP) control. The secondary outcome parameters evaluated were corneal diameters, optic disc status, complications and the need for antiglaucoma



medication to control IOP. *Absolute success* of the surgery was defined as an IOP < 15 mmHg and a *Qualified success* was defined as an IOP < 15 mmHg with the use of topical anti-glaucoma medications any time during the follow-up.

Results: 11 out of the 16 patients (68.75%) had bilateral disease. Mean age of patients at presentation was 6.63 ± 5.79 months (9 days to 23 months, median of 5 months). 12 patients were males (75%) and 4 patients were females (25%). Family history of congenital glaucoma was present in 2 patients (12.5%). At the time of presentation, mean IOP was 21.53 ± 8.65 mmHg (on a single topical antiglaucoma medication), mean corneal diameters were 13.23 ± 1.52mm (horizontal) and 12.68 ± 1.31 mm (vertical), mean cup to disc ratio was 0.75 ± 0.15 . Of the 25 eyes, a complete 360^0 catheterisation and circumferential trabeculotomy was achieved in 20 (80%) eyes and a partial catheterisation (between 120^0 to 270^0) in 5 (20%) eyes with the need of conversion into an usual trabeculotomy due to obstruction in the Schlemm's canal . Mild transient hyphema was found in 23 (92%) eyes and total hyphema in 2 eyes and 1 eye required drainage of the hyphema. No other intraoperative complications were noted. Mean IOP at 4 weeks, 12 weeks, 24 weeks and 12 months was 10.23 ± 2.48, 10.27 ± 1.46, 10.46 ± 2.27, 10.39 ± 3.46. There was 48.28% decrease in IOP (p = 0.003) and 17.5% reversal of cup to disc ratio (p = 0.01) at the end of 12 months follow-up compared to the preoperative values. No postoperative complications were noted during the entire follow-up. Single topical antiglaucoma medication to control IOP was needed in 2 eyes in which partial trabeculotomy was performed. At the end of 12 months follow-up, an *absolute success* was seen in 92% of eyes and a *qualified success* was seen in 100% of eyes. No patients required a second surgery to control IOP at 12 months follow-up. Corneal diameters remained static throughout the follow-up.

Conclusion: Circumferential trabeculotomy performed with an illuminated microcatheter is a safe and effective technique to reduce IOP in PCG. It can be advocated as a primary surgery in the treatment of primary congenital glaucoma.

FP7 CO2 Laser Assisted Sclerectomy Surgery (CLASS) – Long term results of multinational clinical study

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Purpose: To report long term (up to 5 years) results of multinational clinical study of the CO2 Laser-Assisted Sclerectomy Surgery (CLASS) in open angle and pseudoexfoliative glaucoma patients.

Settings: A prospective, non randomized, non comparative, multi-center, multi-national clinical study.

Methods: CLASS was performed using CO2 laser and the IOPtiMateTM system (IOPtima, Tel-Aviv Israel) in 9 sites in 7 countries. Intraocular pressure (IOP), surgical complications and use of anti-glaucoma medications were recorded.

Results: One hundred and eleven patients were enrolled and successfully completed the operations. 82 patients completed 12 months follow-up; 52, 29 and 8 patients completed 2,3 and 5 years follow-up. A deep sclerectomy preserving a thin Trabeculo-Descemet membrane was clinically achieved in most cases. Mean preoperative IOP dropped from a mean of 25.7 mmHg to 13.6, 13.1 14.6 and 13.5 mmHg at 1,2,3 and 5 years respectively. Average hypotensive medications use was reduced from 2.3 to 0.5 at 2 years and 0.8 at 5 years. Complication rate was significantly lower than conventional filtration procedures and there were no device-related intraoperative complications.

Conclusions: Long-term clinical results demonstrated that CLASS is a safe, highly effective and a relatively simple surgical procedure.

FP8 Ahmed glaucoma valve versus gold micro shunt implants - Five years results of a prospective randomized clinical trial

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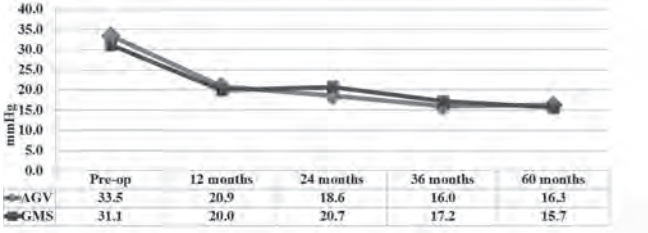
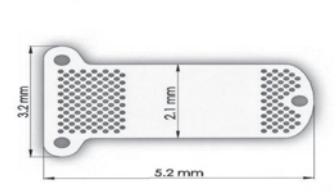
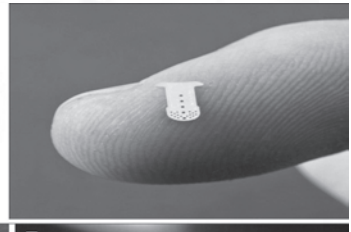
Introduction: We describe the results of a novel approach that enhances uveoscleral outflow to reduce IOP in patients with glaucoma. This concept involves implantation of an ultrathin 24-karat (K) Gold Micro Shunt (GMS) that contains tubules to facilitate aqueous flow between the AC and the supraciliary/suprachoroidal space without the creation of a bleb. The implantation of the GMS was proven to be safe and effective method and resulted in a significant decrease in IOP in the short term of one year follow-up.

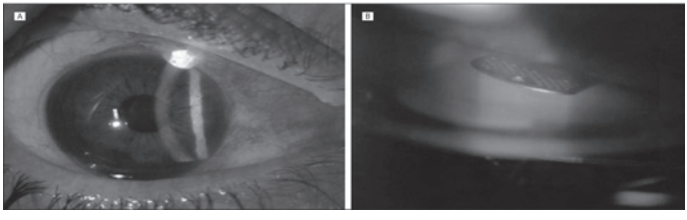
Material and Methods: Inclusions criteria: (1) age of 21 years or older (2) 1 or both eyes diagnosed with primary open-angle glaucoma, pseudoexfoliation glaucoma or pigmentary dispersion glaucoma; (3) an average baseline IOP of 22 mmHg or more while on maximally tolerated medical treatment; (4) at least 60 days since prior incisional glaucoma surgery; and (5) visual field defect (mean deviation [MD] score, < 0 dB on the Swedish Interactive Threshold Algorithm [SITA] Standard 24-2 Humphrey analysis). Patients were examined pre operative and after 1 day, 1 week, 3 months, 6 months, 1, 2, 3 and 5 years postoperatively.

Gold Shunt Design: The is a non valved flat-plate drainage device made from 24-K medical-grade (99.95%) gold. The shunt has a long rectangular shape, with rounded edges and fin-like tabs on the distal end for anchoring the device in the suprachoroidal space. The proximal end provides the ingress for aqueous humor. The distal end provides drainage through the micro channels of the fluid from the AC into the suprachoroidal space. Two models were studied: the GMS and GMS Plus. The GMS model is a 6.2 mg, 60 µ-thick structure concealing 19 tubules, of which 10 are closed and 9 are open, each of which is 25µ wide and 44µ high. The GMS-Plus model weighs 9.2mg and has larger channels (68 µ high). The shunt is designed to increase uveoscleral outflow from the anterior chamber into the suprachoroidal space through the channels.









Results: 32 patients articipated in the study. 22 patients (68.8%) had POAG, 10 patients (31.3%) had PXFG. 9 patients had an AGV implantation and 23 patients had an GMS implantation. Cumulative probabilities of success at 1 year were: 77.8% for the AGV group, and 78.3% for the GMS group. At 5 years, successes were 77.8% for the AGV group, and 69.6% for the GMS group. The AGV group had a similar rate of success compared to the GMS group ($p < 0.01$). Both groups showed a statistically significant decline in IOP and number of glaucoma medications after surgery. At 5 years after the operation, the AGV group had a mean IOP of 16.3 ± 1.9 mmHg on 2.1 ± 0.6 medications, whereas the GMS group had a mean IOP of 15.7 ± 2.1 mmHg on 2.5 ± 0.8 medications. No major complications were reported in both groups.

Conclusions: GMS implantation into the supraciliary space is a safe and efficient way of controlling IOP in Refractory Glaucoma. Our study has shown comparable results to AGV implant, without major complications. We believe that the new design of the GMS, which comprises of posts replacing tubes, a concave anterior contour and larger windows - will provide better long term results. A study evaluating this new type of GMS is currently under clinical investigation.

FP9 Prevalence and the Incidence of Glaucoma in Boston type I keratoprosthesis

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Purpose: To evaluate the prevalence and incidence of glaucoma and to study the associated risk factors for the development of glaucoma in eyes following Boston type 1 keratoprosthesis.

Methods: 43 eyes of 43 subjects had undergone Boston type 1 keratoprosthesis (Boston Kpro) between July 2009 and April 2012 at a tertiary eye care facility. Eight eyes had preexisting glaucoma at the time of surgery. We evaluated the incidence of glaucoma in 33 eyes without preexisting glaucoma at the time of surgery and the risk factors for development of glaucoma in this cohort. Glaucoma was defined as raised digital intraocular pressure (IOP) on 2 visits and or glaucomatous disc damage with or without corresponding field defect. The factors evaluated for their association with development of glaucoma were number of previous intraocular surgeries, type of corneal pathology, previous keratoplasties, aphakia or pseudophakia, postoperative inflammation.

Results: Mean age of subjects without preexisting glaucoma at the time of Boston Kpro was 31.41 ± 17.8 (range: 1.3 to 79 years). Median follow up was 13.4 months (interquartile range: 6.8, 26.1 months). Preoperative corneal pathology was limbal stem cell deficiency (LSCD) due to chemical injury in 19/33 eyes (57%), LSCD due to non-chemical causes in 5/33 (15%) and graft failure in 9/33 (27%). Fifteen eyes developed glaucoma (45%, 95% confidence intervals: 27 to 63%) with a median time to development of 3.5 months (interquartile range: 0.13 and 19.2 months). All 15 eyes had digitally high IOP, 5 of these eyes also had glaucomatous disc damage and 4 eyes had corresponding visual field defect. All the eyes with glaucoma were treated medically; four eyes with disc and field progression during follow-up underwent Ahmed glaucoma valve implantation. At final follow up the visual acuity was similar ($p = 0.32$) in eyes with (median 20/50, interquartile range 20/30, 20/400) and with out glaucoma (median 20/50, interquartile range, 20/40, projection of rays). None of factors evaluated were significantly associated with development of glaucoma in this cohort.

Conclusion: Glaucoma is a frequent complication in eyes with Boston keratoprosthesis. Nearly half of the subjects in our series developed glaucoma during the first year of follow-up and quarter (25%) progressed needing glaucoma drainage implant for the management of glaucoma.

FP10 Two Year Follow Up of an Ab-Internal, Trans-Scleral Aqueous Drainage Implant in Open-Angle Glaucoma

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Purpose: To establish the safety and efficacy of the minimally-invasive ab-interno subconjunctival implant in reducing IOP in mild, moderate and severe open angle glaucoma patients. 121 subjects from 18 surgeons were followed for two years, and their outcomes for mean IOP, IOP change, reduction in medications, and safety were recorded.

Setting: Surgeries were performed by 18 surgeons (outside the U.S.) in hospital or private surgery centers.

Methods: Prospective, IRB approved evaluation in which a novel 25g needle/inserter deposits a durable (cross-linked gelatin) trans-scleral aqueous drainage tube, connecting the anterior chamber to the subjconjunctival space. The tube's dimensions create a sufficient pressure gradient to avoid hypotony. No dissection of a conjunctival or a scleral flap is involved, reducing induced inflammation. Effectiveness was assessed by comparing baseline IOP and glaucomatous medications to postoperative values through 24 months (enrollment closed, follow up ongoing).

Results: The mean preoperative IOP on full tolerated medical therapy was 21.9 mmHg. The mean postoperative IOPs were: 15.5 at 12 months, 14.0 at 18 months, and 14.6 at 24 months. The mean decrease in IOP was -6.5 (-28% reduction) at 12 months, -8.2 (-35% reduction) at 18 months, and -7.8 mmHg (-33% reduction) at 24 months. At 12 and 18 months anti-glaucomatous medications were reduced by > 65% from the preoperative median of 2.7 (patients not washed out pre-surgery), and by >55% at 24 months. No major adverse events were reported, and only 6% (7 eyes) had another surgical glaucoma procedure by 24 months.

Conclusion: This minimally-invasive procedure achieved IOP adequate pressure control in most subjects and substantially reduced the need for medical therapy in early through refractory glaucoma patients out to two years. The strategy of using a trans-scleral tube with a small internal diameter allows one to achieve a predictable trans-scleral resistance, sufficient to avoid hypotony and shallow chambers, and by avoiding the need for either scleral or conjunctival dissection reduces the stimulus for post-operative fibrosis in the conjunctiva-Tenons.

FP11 Trans-scleral selective laser trabeculoplasty (SLT) without a gonioscopy lens

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Purpose: To evaluate whether direct trans-scleral application of SLT irradiation to the perilimbal area is effective in reducing Intraocular Pressure (IOP), eliminating the need for gonioscopy during the procedure.

Methods: A randomized, masked, controlled trial was performed on open angle and pseudoexfoliative glaucoma patients. The control group underwent conventional SLT delivering 100 laser spots through a gonioscope for 360 degrees directly on the trabecular meshwork (TM). The trial group underwent irradiation by the same laser at the same irradiation parameters. A similar number of applications were administered all around the limbus on the sclera overlying the TM. IOP and adverse events were measured for 6 months.

Results: In the trial group (N = 11), IOP decrease from an average of 20.90 mmHg before treatment to 15.89 at 2 months and 15.00 at 6 months. The corresponding numbers for the control group (n = 10), were 20.50 mmHg, 14.71 and 7 (one patient) respectively. There was no statistical difference

between the two groups in IOP reduction. Success, defined as > 20% IOP reduction, was attained in 7 patients of each group without a statistically significant difference between the groups [p = 0.757, Fisher].

Conclusions: Laser coherency, lost in tissue transmission, is not required for the therapeutic effect and the mechanism of action of the external laser irradiation studied is probably similar to that of the conventional one. It seems that gonioscopy is not necessary for SLT. The novel method will simplify and shorten the SLT procedure considerably, eliminate the corneal and gonioscopy-induced side effects and may enable treatment of angle closure glaucoma.

FP12 Excimer laser trabeculostomy (ELT): five year post-op observations

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Purpose: To evaluate long-term intra-ocular pressure (IOP) lowering efficacy of ELT based on patient observations made over a period of five years. ELT (fiberoptic, ab interno delivery, 308 nm) creates five to ten channels through the trabecular meshwork and inner wall of Schlemm's canal to lower outflow resistance and thereby lower IOP.

Methods: 46 eyes of 46 patients aged 64 ± 18 years (mean ± SD) (M/F: 9/37) participated in this prospective, single site, single surgeon (UG) study. **Diagnosis:** Primary open-angle glaucoma: 35 eyes; Ocular hypertension: 7; Secondary glaucoma: 2; PEX glaucoma: 2. Patients were selected on the basis of inadequate intraocular pressure control on maximally tolerated medications. The IOP was measured by applanation, without wash out, pre-op, 1day, 1 month (M), 3, 6, 12 M, 2 years (Y), 3, 4, 5 Y post op. Surgical procedure: Under peribulbar anesthesia, following paracentesis, the ELT probe (diameter 0.5 mm) traverses the anterior chamber to contact the trabecular meshwork and excise ten, 200 µ channels into Schlemm's canal in the lower nasal quadrant. Number of eyes observed at: 6 M: 46; 1Y: 45; 2Y: 44; 3Y: 41; 4Y: 32; 5Y: 28.

Results: IOP (mm Hg): pre-op: 25.5 ± -6.3; post-op 1 day: 13.3 ± 4.5; 1M: 16.3 ± 4.3; 3M: 16.0 ± 2.8; 6M: 16.22 ± 5.5; 12M: 16.0 ± 3.8; 2Y: 15.6 ± 3.0; 3Y: 15.2 ± 3.7; 4Y: 15.2 ± 3.4; 5Y: 15.9 ± 3.0 Statistical tests: ANOVA with repeated measurements and t-tests. SPSS 17.0 (Bonferroni correction). At all times, the IOP values were highly significantly lower than the pre-op values (alpha: $p < 0.001$). The number of IOP lowering medications also decreased from 1.9 ± 0.9 pre-op to 0.9 ± 1.1 at 5 years. There were no intraoperative or postoperative complications.

Conclusion: Significant IOP reduction following ELT, over 35% at all times, has been documented to remain stable in these patients for at least 5 years post op. Additionally, following ELT, the number of IOP lowering medications was significantly reduced.

FP13 A new stainless steel spiral device for Schlemm's canal dilation in management of open angle glaucoma: 3 months clinical results

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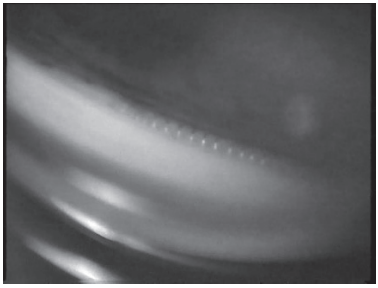
Purpose: To evaluate the efficacy of a new stainless steel spiral device (SSSD) implanted in Schlemm's canal (SC) in decreasing intraocular pressure (IOP) in patients with open angle glaucoma (OAG).

Methods: This is a retrospective non-comparative case series study of patients with OAG, who underwent implantation of a new SSSD in the lumen of SC between October 2012 and April 2013. Inclusion criteria were: OAG, coexisting pathology (cataract and glaucoma), IOP more than 21 mmHg on maximum antiglaucoma medication and minimum follow up period 3 months. Cases with previous glaucoma or cataract surgeries were not excluded from the study. IOP was measured

with Maklakov's tonometer and converted to P0 using special table provided for the purpose. Target IOP (Pt) was calculated using a software application "target IOP" for every patient. Five to 6 mm long SSSD was made from 0.05 mm thick medical grade soft Vanadium stainless steel wire by winding it on 0.2 mm thick stainless steel microprobe, having curvature as of SC. Surgical technique included exposure of SC after dissection of 8 mm fornix based conjunctival flap, 1/2 thickness superficial (5X5 mm) and deep scleral flaps (3X3 mm) upto ciliary body. Further 5-6 mm of unexposed part of SC was dilated with a cohesive viscoelastic device (1.4% sodium hyaluronate) and microprobes of varying diameters (0.2-0.3 mm). The SSSD mounted on microprobe was inserted into dilated SC and held there with a second instrument followed by removal of the microprobe. The flaps were sutured back water tightly. In patients with coexisting pathology combined one stage surgery – phacoemulsification with implantation of a foldable intraocular lens (IOL) and implantation of SSSD in the lumen of SC was performed. Efficacy measures were IOP changes, complication rate, additional antiglaucoma medication and need for reoperation. Success was defined as an IOP of 5-18 mmHg or decrease in IOP > 25% or achievement of Pt with ("qualified") or without ("complete") the use of antiglaucoma medications. Cases were evaluated at 1week, 1 month and 3 months postoperatively.

Results: Within the mentioned period a total of 20 patients were operated upon. Out of these 13 cases qualified for inclusion in the analysis. Mean age was 69.9 ± 6.7 years and 53.8% were male. Combined surgery was performed in 7 cases (53.8%). Out of these in 4 cases of phacodonesis prior to IOL implantation a capsule tension ring was implanted in the capsular bag to stabilize it. Mean follow-up was 20.4 ± 6.6 weeks. Mean IOP before surgery was 26.6 ± 5.7 mmHg and mean antiglaucoma medication -2.7 ± 0.8 meds/patient. Complete and qualified success after surgery were achieved in 76.9 and 23.1%, 61.5 and 38.5% and 53.8 and 46.2% cases at 1 week, 1 month and 3 months respectively. None of the cases required reoperation. Mean IOP after 1 week, 1 month and 3 months after surgery was 13.8 ± 5.6 mmHg, 12.4 ± 5.1 and 12.7 ± 5.3 mmHg with a decrease by 47.9 ± 16.5%, 51.9 ± 22.1% and 52.2 ± 15.3% from the baseline values respectively. Use of antiglaucoma medication decreased to 0.7 ± 0.8 meds/patient ($p < 0.05$). Surgical complications were few and included 2 cases of micro-perforation of trabecular meshwork in areas other than exposed SC. Complete insertion of the device into SC could be achieved in 8 cases, partial - in 5 cases. Water tight closer of scleral flaps was achieved in 53.8% cases (7 patients) only. In early postoperative period in 46.2% cases (6 patients) a diffuse low bleb was observed. In 1 case there was high IOP, which responded only to YAG laser goniopuncture of trabecular meshwork in SSSD area. Gonioscopically, SSSD was located in SC in 12 cases without any sign of inflammation, in 1 case the device ruptured trabecular meshwork and its body was lying in the anterior chamber and ends in the lumen of SC. There were no cases of hypotony, endophthalmitis, or shallow AC.

Conclusion: Preliminary results prove the efficacy of the new device to significantly decrease the IOP and medication use from baseline values in OAG.



FP14 What causes blebs to fail - Capsular porosity changes with fluid challenge

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Purpose: Capsular porosity is the key determinate of glaucoma surgery success. Good porosity is maintained with no fluid flow through the capsule, whereas there is poor implant cap porosity with aqueous flow after four weeks in the NZW rabbit model. The current paradigm for describing the processes of failure of glaucoma blebs is wound healing. However there is good evidence that hydraulic stress causes fibroblastic proliferation and extracellular matrix deposition and these factors may be important in bleb failure. We wished to explore this using the double tube implant model we have previously described.

Methods: We implanted novel double tubed implants into the subconjunctival space of NZW rabbits. Neither tube was implanted into the AC and both were obstructed. After four weeks the implant cap porosity was tested using direct cannulation attached to a pressure gated pico-litre pump. Porosity (implant 'facili ty') was tested using a standardised protocol. Three days later the implant cap porosity was retested, and this process was repeated at least one further cycle. As a control the anterior chamber of NZW rabbits was cannulated repeatedly (3) using the same protocol and outflow facility measured. Eyes were taken for standard staining at the last testing point.

Results: Anterior chamber re-cannulation shows no difference in outflow facility through repeated testing. Trend suggests a marginal increase in facility of outflow. Implant cap porosity (implant 'facility') shows marked reduction in porosity which remains down after repeated testing. There is no macroscopic evidence of inflammation in the blebs. Histology shows overall peri-implant cap on hydraulic stressed implants that is not markedly thicker than the 'no-flow' implants. There is no evidence of wound-healing histologic features.

Discussion: Fluid stress induces a greater than 80% reduction in cap porosity within 3 days of hydraulic stress in a model where a preformed cap exists. This loss of porosity appears to occur in the absence of evidence of classical wound healing features. The fluid used to stress the bleb is BSS and without cytokines and the pressures used were physiologic. This suggests that hydraulic stresses have a significant role to play in the failure of blebs via a pathway that is not classical wound healing. Repeated stress in the anterior chamber does not produce a change in outflow facility, suggesting that healthy trabecular meshwork can withstand repeated hydraulic stress without changing in porosity. These findings have implications for glaucoma surgery and cataract surgery with functioning blebs.

FP15 Long-term outcome of primary trabeculectomy in iridocorneal endothelial syndrome

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Purpose: To report the long term outcomes of primary trabeculectomy in patients with iridocorneal endothelial (ICE) syndrome.

Methods: We reviewed records of patients with ICE syndrome who underwent trabeculectomy between August 1989 and July 2013. Those who had glaucoma surgery performed elsewhere, those who underwent combined cataract and glaucoma surgery and those with less than 6 months follow-up were excluded from the study. Trabeculectomy was performed in 42 eyes (41 patients) during the study period of which 25 eyes (24 patients) fit the inclusion criteria. The primary outcome measure was cumulative success probability, defined as complete if the intraocular pressure (IOP)

was > 5 and £ 21 mmHg without anti-glaucoma medications or additional surgery and qualified if the IOP was > 5 and £ 21 mmHg with anti-glaucoma medications. Failure was defined as IOP < 5 and > 21 mmHg on medical therapy or if additional glaucoma surgical intervention was performed.

Results: The mean age was 39 ± 9.5 years and a mean follow-up of 61.4 months. 15 patients were female and 9 patients were male. 13 eyes had essential iris atrophy, 10 eyes had Chandler's syndrome and 2 eyes had Cogan-Reese syndrome. 17 eyes underwent trabeculectomy with mitomycin C and 8 eyes underwent trabeculectomy as a primary procedure. Mean IOP reduced from 31.7 ± 14 mmHg to 15.6 ± 12 mmHg (p = 0.0005) postoperatively. Mean number of antiglaucoma medications reduced from 1.7 ± 1.5 to 0.6 ± 1.1 (p = 0.002) postoperatively at last follow-up. 15 eyes had complete success, 18 eyes had qualified success and 7 eyes had failure. Complete success probability at the end of 6 months was 75%, 69% at 1 year, 55% at 3 years, and 46% at 5 years. One eye had choroidal detachment and one eye had wound leak as complication which resolved with conservative management. Of the 7 failed eyes, 3 eyes had trabeculectomy and 2 eyes had Ahmed glaucoma implant as a second surgery.

Conclusion: Trabeculectomy offers moderate surgical success in patients with ICE syndrome. There was no sight threatening complication in our series.

FP16 Goniotomy for childhood glaucoma at Moorfields Eye Hospital: one-year outcomes

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Purpose: Paediatric glaucoma is a relatively uncommon disease with poor visual prognosis. We present the one-year outcomes of goniotomies performed for childhood glaucoma.

Methods: Retrospective consecutive goniotomies performed at Moorfields Eye Hospital between 01/01/2008 till 31/12/2010, all undertaken by experienced consultant surgeons.

Using our electronic system of recording operations we identified 83 eyes that underwent goniotomy in this time frame. However, in view of missing observations for several variables considered in our study, we only included 75 eyes of 45 patients. We defined success an intra-ocular pressure (IOP) of 17 mmHg or less without need for eye drops one year after the initial goniotomy. Qualified success is an IOP of 17 mmHg or less with the patient having to instill eye drops. Failure is defined as IOP of 18 mmHg or above with the patient requiring drops or further surgery one year after the original goniotomy. For the statistical analysis we used a) descriptive statistics and b) logit regression analysis.

Results: 61.33% were male. The mean age at first goniotomy was 22.57 months. Primary congenital glaucoma was the diagnosis in 94.67% of the cases, followed by 2.67% with Sturge-Weber syndrome and 2.67% with uveitic glaucoma. The disease was bilateral in 80.00% of our cohort and consanguinity was present in 5.33% of all cases. Of patients with bilateral disease, 6.67% were operated in only one eye. The mean IOP pre-operatively was 24.67 mmHg and the average number of topical medications required pre-op was 1.68. The mean IOP was 14.44 mmHg at one-year post surgery. 57.33% of patients were unqualified success, 16.00% were qualified success and 26.67% failed. One year after the original surgery 33.33% were still using eye drops. In the first year 49.33% underwent at least one additional surgery and the mean time between onset of symptoms to the first operation was 4.01 months. Regression analysis shows that a larger time difference between onset of symptoms and surgery leads to a higher likelihood of failure (odds ratio 1.08, CI 1.02 - 1.14). The likelihood of failure also increases in the presence of consanguinity (odds ratio 10.02, CI 1.45 - 69.17). The effect of age, gender, the particular eye operated (left or right) and whether one or two eyes are affected, on the likelihood of failure are all statistically insignificant.

Conclusion: Goniotomy remains a safe and successful operation for the majority of children with paediatric glaucoma and achieves sufficiently low IOPs. Collection of robust evidence remains a challenge in this group of patients.

FP17 Combined surgery for cataract and glaucoma: canaloplasty versus non-penetrating deep sclerectomy - safety and efficacy study; 12 month follow-up

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Purpose: To compare outcomes of combine procedures: phaco-canaloplasty (PC) versus phaco-nonpenetrating deep sclerectomy (PNDS) with HealaFlow.

Methods: A randomized, prospective study. The study included eyes after PC (29 eyes) and PNDS (30 eyes). The indication was uncontrolled primary open angle glaucoma (POAG) and cataract. Best corrected visual acuity (BCVA), intraocular pressure (IOP), anterior and posterior segments of the eye, number of medications were examined. Follow-up examinations were done on days 1 and 7 and at 1, 3, 6, 12 months. Complete and qualified success was defined as an IOP ≤ 18 mmHg. For statistical analyses Mann-Whitney U test, Student's t-test, analysis of variance were used; survival analysis was performed using the Kaplan-Meier method.

Results: After 12-month follow-up, mean IOP decreased in the PC group from 19.0 ± 6.9 mmHg to 12.6 ± 2.9 mmHg and in the PNDS group from 19.1 ± 5.8 mmHg to 14.3 ± 3.5 mmHg ($p < 0.05$). In both groups preoperatively and postoperatively at 12-month follow-up there were no significant differences in IOP ($p > 0.05$). There was no statistically significant difference between the number of medications used in either group ($p > 0.05$). Complete success rates were 79.0% and 76.9%, respectively ($p = 0.701$) and qualified success rates were 79.0% vs 76.9%, respectively ($p = 0.701$). The most frequent postoperative complication in PC was hyphema, which was observed in 58% of subjects. In PNDS postoperative care additional procedures where used, such as suturolysis, 5-FU subconjunctival injection, needling and goniopuncture.

Conclusions: Both PC and PNDS lead to an effective decrease in the IOP in short-term follow-up and demonstrate similar efficacy and safety. However, much higher quality of life in case of PC is to be emphasised.

FP18 Nonpenetrating deep sclerectomy with SK-gel implantation combined with cataract surgery - midterm results

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Purpose: To show that nonpenetrating deep sclerectomy with SK-gel implantation combined with cataract surgery allows to achieve efficient lowering of intraocular pressure (IOP) in intermediate follow-up. Performing a nonpenetrating deep sclerectomy (NPDS) avoids a full-thickness perforation of the anterior chamber, and therefore minimizes the risk of complications after a classical trabeculectomy. After de-roofing of Schlemm's channel, aqueous humor can percolate through the semi-permeable trabeculo-Descemet's membrane (TDM). TDM can minimize the risk of hypotony and subsequent complications. A very important part of NPDS is the intrascleral decompression space which is created during the operation. To preserve this space, implants are inserted.

Methods: A prospective case series study comprised 219 surgeries performed on 176 patients, with the mean age of 77.39. All eyes underwent NPDS with cataract surgery and SK-gel was used as the intrascleral implant. Mean observation time was 48.27 ± 12.84 months (9 - 82). The indication for surgical treatment was primary open angle glaucoma treated with maximal tolerated antiglaucoma medication without satisfying IOP control or progression of visual field changes and coexisting cataracts. In the follow-up examinations best corrected visual acuity (BCVA), IOP,

anterior and posterior segments of the eye were checked. The amount of antiglaucoma medications used, postoperative complications and procedures applied to preserve hypotensive effects were analyzed. To preserve hypotensive effects a laser Nd:YAG goniopuncture, 5-FU administration, laser suturolysis, superficial and deep needling was performed. A complete surgical success was defined as IOP ≤ 18 mmHg without antiglaucoma medications, whereas a qualified surgical success as IOP ≤ 18 mmHg with or without antiglaucoma medications. Readings of > 18 mmHg with antiglaucoma drugs, reoperation, atrophy of the eye, or loss of light perception were considered a failure. Wilcoxon's matched pair tests and ANOVA Friedman's tests were applied. Survival analysis was carried out with the Kaplan-Meier method using a log rank test. Results: Mean presurgical IOP values were 19.9 ± 5.0 mmHg and underwent reduction to 12.7 ± 3.5 mmHg after 360 days of follow-up and 13.4 ± 3.1 mmHg after 720 days. Mean IOP decreased by 35.4% ($p < 0.001$) and 31.8% ($p < 0.001$) respectively. At the end of the follow-up (60 months), mean IOP was 13.3 ± 2.7 mmHg ($p = 0.003346$). The mean number of antiglaucoma medications before surgery was 2.34 ± 0.78 and was reduced to 0.34 ± 0.72 after 360 days and to 0.62 ± 0.88 after 720 days. A complete success rate (IOP ≤ 18 mmHg) was achieved in 97.3% after 360, 70.1% after 720 days. For IOP ≤ 12 mmHg was respectively 71.2% and 43.7%. A qualified success rate (IOP ≤ 18 mmHg) was achieved in 90.5% after 360, 93.0% after 720 days. For IOP ≤ 12 mmHg was respectively 73.8% and 43.7%. After surgery the mean BCVA dropped slightly from 0.30 ± 0.27 to 0.37 ± 0.27 on the first day after surgery and improved to 0.27 ± 0.26 after 7 days. Mean BCVA stabilized after 30 days at the value of 0.11 ± 0.20. 5-FU injections were performed in 38.89%, goniopunctures were in 23.74%, suturolysis in 20.1% and needling in 18.26%. The most frequent early postoperative complication was transient hypotony (36.1%). The most frequent late complications were bleb fibrosis (21.9%), and corneal epithelial abrasions (11.4%).

Conclusions: Nonpenetrating deep sclerectomy with SK-gel implantation combined with cataract surgery allows to achieve efficient lowering of IOP in intermediate follow-up. This effect decreases with time as a result of progressive reparative effects inside the sclera and espisclera. The applied procedures of preserving the hypotensive effect are an integral element of postoperative proceedings when progressive scarring limits the postoperative effect. In cases when intraocular pressure was not normalized after surgery, the amount of antiglaucoma medications supporting the regulation of intraocular pressure is lower than before surgery. The profile of observed complications and the significant improvement of visual acuity in most of the operated eyes, shows cataract surgery with nonpenetrating deep sclerectomy as safe procedure for patients with glaucoma and cataracts.

FP19 Visual symptoms after prophylactic laser peripheral iridotomy in primary angle closure suspects

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Purpose: To study the visual disturbances that occur following prophylactic laser peripheral iridotomy (LPI) in primary angle closure suspects (PACS).

Methods: In a prospective observational study, 118 PACS patients aged over 50 years were recruited after LPI. A standard questionnaire assessed visual disturbances that occurred after the procedure; these included flashes, perception of lines and crescents. Patients also underwent slit lamp examination/photography to assess the lid position in relation to the position of the LPI, and the size of the LPI. Frequency of visual symptoms and association with LPI size and lid position in primary gaze were analyzed.

Results: Of a total of 118 patients, 34 (28.8%) experienced visual symptoms and 84 (71.2%) did not. Of these, 109 had slit lamp photographs which were analyzed. We found that the LPI was covered by the upper eyelid in 54 patients, while in 55 patients it was exposed. In the group with covered

LPI, visual symptoms occurred in 12 of 54 patients (22.2%), while in the group with exposed LPI, visual symptoms occurred in 21 of 55 patients (38.2%) (p = 0.10). Visual symptoms occurred in 21 of 93 (22.6%) with LPI size £ 500 µm, compared to 13 of 25 (52.0%) for LPI size > 500 µm (p = 0.0061).

Conclusions: One third subjects with prophylactic LPI for PACS complained of visual disturbances. The frequency of visual symptoms that occurred after LPI was greater with a larger LPI size but not associated with lid position in primary gaze.

FP20 Echographic study of the optic nerve in glaucoma

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Purpose: To study the retrobulbar optic nerve thickness(RBON) in normal and primary open angle glaucoma patients and correlate it with various optic nerve head parameters in the disc photograph.

Methods: A total of 138 eyes of 68 subjects were divided into two groups,group 1, open angle glaucoma patients(34 subjects) and group 2 ,normal subjects (34).A detailed clinical examination and investigations which included refraction,biometry, applanation tonometry,g onioscopy,static perimetry and fundus examination were performed in all.Ultrasonic measurements of the Retrobulbar optic nerve in vertical transverse position of the probe were done with a high resolution, deep focus ultrasonography machine.Fundus photography on a digital fundus camera with appropriate software was done in all subjects.The vertical and horizontal cup diameters,.cup area,cup area/disc area ratio,neuroretinal rim(NRR) thickness,cup/disc ratio and neuroretinal rim area,were measured.

Results: The demographic profile of the two groups was similar.The mean axial length in group1 was23.23+_1.22 mm.and23.59+_0.82 mm. in group2.Mean thickness of RBON by ultrasound in the control group was 3.37+_0.26 mm.and 2.33+_0.26 in the glaucoma group. The mean cup vertical diameter,as measured on the fundus photo in group 1 was 1.48+_ 0.42mm and 0.91+_0.31 mm in group2.Correlation between these two was not found to be statistically significant in either group. Mean value of the cup/disc ratio in group 1 was 0.67+_0.08 and in group 2, 0.47+_0.47.Mean value of cup area/disc area ratio in group 1 was 0.4+_0.12 and in group 2 ,0.24+_0.08. Negative correlation between RBON thickness and cup area /disc area ratio was found in both groups which was statistically significant only in group 1 (p=0.01)Mean NRR area in group 1 was 2.26+_0.64 mm2 and 2.76+_0.35mm2.Statistically significant positive correlation between RBON thickness and NRR area was found in both groups (p value=0.001 and 0.02,respectively).

Conclusion: Mean thickness of RBON for glaucoma group(1) was 2.33+_0.26 mm and 3.37+_0.32 for the control group(2).The difference between the two was statistically significant by paired t-test(p=.001).RBON thickness has statistically significant negative correlation with cup area by disc area ratio in group 1,and statistically significant positive correlation with NRR area both in group 1(p=0.001)and group2(p=0.02).

The diagnosis of glaucoma by optic disc morphometry may be difficult in the presence of media opacities or in cases of tilted or small disc. Ultrasonographic measurement may therefore, help us to measure and correctly diagnose glaucoma in such situations.

FP21 Outcome of surgical bleb revision using scleral patch graft for bleb related complications following trabeculectomy

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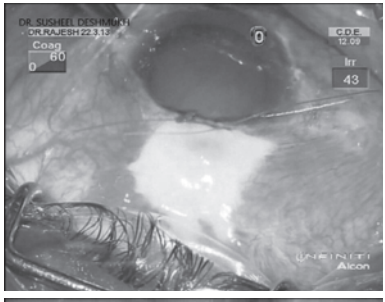
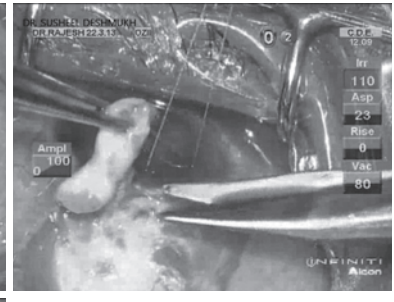
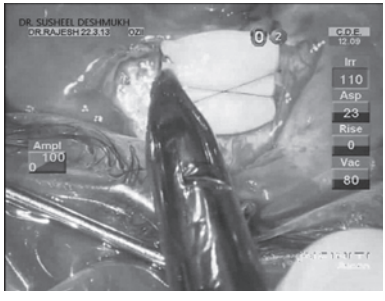
Purpose: To describe the results of surgical bleb revision with scleral patch graft for complication following Trabeculectomy.

Methods: A retrospective analysis of all the subjects who underwent bleb revision with scleral patch graft between August 2007-October 2011 at Aravind Eye Hospital, Coimbatore was undertaken. Institutional review board approval to review patient records without informed consent was obtained. A total of 46 case records were retrieved from the medical records department. 20 eyes of 20 patients who had other bleb modifying procedures. Patients who had undergone other forms of bleb modifying procedures like needling, flap restoring, bleb revision without sclera patch graft were excluded from the study were excludedTwenty-six eyes of 26 patients were included. Success of bleb revision was defined as complete when there was resolution of presenting indication for revision, with IOP ≥ 6 mmHg and ≤ 18 mmHg without need for further antiglaucoma medications. Qualified success met the same criteria but with the need for antiglaucoma medications. Failure was defined as persistent bleb leak, IOP less than 6 mmHg or more than 18 mmHg despite medical treatment, resurgery for bleb leaks, or the occurrence of blebitis or endophthalmitis.

Results: Mean age of the patients was 60 years. Sixty-one percent of the patients were male. The diagnosis was primary open angle glaucoma (POAG) in 42.31%, primary angle closure (PACG) in 23.08%, congenital glaucoma in15.4%, secondary glaucoma's in 7.7% of patients. Diagnosis was not known in 11.55% of patients. The indications were cystic bleb with (a) leak in 23.07%, (b) blebitis in 19.23%, (c) hypotony in 23.07%, (d) dysthetic bleb in 3.84%, and (e) traumatic rupture in 11.53% of patients. The median follow-up was 30 weeks. Last surgical procedure prior to bleb revision were phaco-trabeculectomy in 7 (27.92%) eyes, combined Small incision cataract surgery with IOL implantation and trabeculectomy in 7 (27.92%) eyes, Trabeculectomy in 7 (27.92%) patients, Phacoemulsification with IOL in 5 (19.23%) patients. Five out of 7 trabeculectomy surgeries were done elsewhere. During the procedure preceding the revision, mitomycin-C had been usedin 14 eyes (53.84%) and data was not available for 12 eyes (46.15%). The vsual acuity increased in 38%, decreased in 19.2% and remained the same in 42.3% of patients. The mean IOP prior to the procedure and on last follow up was 9.03 mmHg and 14.75 mmHg respectively ($p < 0.0005$). Absolute success was achieved in 50%, qualified success in 30.76%, and failure in 11.53% patients.







Conclusion: The anticipated use of sclera patch graft in all our cases was in view of replacing the atrophic scleral flap over sclerostomy, reinforce some outflow resistance to prevent hypotony induced complications and also to alleviate bleb related infection. In conclusion, bleb revision with scleral patch graft is an effective method to manage late bleb related complications with preservation of bleb function and minimum post operative complications.

Keywords: Bleb revision, Sclera patch graft, AGM (anti glaucoma medication), Hypotony

POSTER

• EPIDEMIOLOGY

P1 Uveitis-associated secondary glaucoma, a therapeutic challenge: analysis of 824 cases at a university hospital

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Purpose: To describe the incidence, clinical features, treatment, and need for surgery in patients with uveitis-associated secondary glaucoma.

Methods: Retrospective review of medical records of 824 patients with uveitis between January 2009 to January 2013. Analyzing demographic characteristics of patients, follow-up time, type of uveitis, evolution, medical treatment and surgery.

Results: 857 patients with uveitis, mean age of 47 years 95% (42.62 - 49.95), 197 men (49.4%) and 202 women with a mean 54.4 months of evolution (42.62 - 66.47). 152 (15.04%) patients and 205 eyes developed glaucoma during the evaluation. The most common type of uveitis in these patients was anterior uveitis (52.6%), followed by panuveitis (29.51%), uveitis intermeida (6.56%) and posterior uveitis (11.48). The most common etiologies were idiopathic uveitis (31.15%), herpes simplex virus (HSV) (19.67%), herpes zoster virus (VHZ) (9.84%), uveitis associated with systemic disease (25.49%) and other exogenous infections (14.75%). The patients who developed glaucoma mean intraocular pressure was 27.35 ± 2.146 and only in 15.76% of the increases were associated directly with steroids use. All patients required topical treatment, the most common combination was an alpha agonist associated with a beta-blocker fixed combination (41.38%) and almost one third of the patients required the use of three topical drugs (28.74%). Of these 124 (81.57) patients achieved IOP below 21 mmHg. 26 patients (17.1%) required surgery, 50% of them needed a filtrating valve implant, 23.08% not perforating deep sclerectomy, 11.54% trabeculectomy and 15.38% transscleral diode laser cyclophotocoagulation.

Conclusion: Uveitis-associated secondary glaucoma is a condition that potentially can cause blindness and requires an aggressive management for proper control. The multiple different disorders that can cause obstruction of aqueous humor filtration in uveitic glaucoma difficult to achieve this objective. Despite that most patients achieve good control of intraocular pressure with topical hypotensive therapy associated with uveitis treatment. However, a significant number of patients required surgical management to achieve this goal.

P2 Relationship of intraocular pressure with risk factors of metabolic syndrome

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Purpose: To evaluate the relationship of intraocular pressure with risk factors of metabolic syndrome in healthy Korean population.

Methods: A total of 30893 healthy participants underwent automated multi-phasic test including tonometry, fundus photography, body mass index measurement and metabolic syndrome risk variables such as systolic and diastolic blood pressure, total cholesterol, high density lipoprotein, triglyceride and fasting blood glucose. The subjects were divided into six age groups by decades ranging from 20~29 years to over 70 years. The relationship between IOP and metabolic syndrome risk variables was examined using multiple regression analysis.

Results: The mean IOP was 15.5 ± 3.2 mmHg, and was significantly higher in men than in women at 20-69 years aged groups ($p < 0.05$). IOP was associated with systolic and diastolic blood pressure, total cholesterol, triglyceride, body mass index and fasting blood glucose ($p < 0.05$). Systolic and diastolic blood pressure, total cholesterol, triglyceride and fasting blood glucose values had significantly positive relation with IOP ($p < 0.05$), and high density lipoprotein had significantly negative relation. In analysis, intraocular pressure had significant relation with age, gender, systolic and diastolic blood pressure, total cholesterol, triglyceride and fasting blood glucose, but there was no significant relation with body mass index and high density lipoprotein ($p > 0.05$).

Conclusions: As increased IOP was associated with metabolic syndrome risk variables, it is necessary to control increased total cholesterol, triglyceride, and blood glucose levels in the normal population to prevent or control the IOP elevation

P3 A study of cases of bullous keratopathy

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Aim: The aim of the study was to evaluate incidence, various etiological factors and various clinical presentations of bullous keratopathy.

Methods: This was a prospective study conducted over a period of three year. Demographic data with proper history regarding presenting complaints of the patient, etiological factors and clinical presentation were evaluated.

Results: There were 50 eyes of 50 patients with 25 (50%) males and 25 (50%) female. The incidence was more in 51-60 yrs (44%) age group; more so in pseudophakics 31 (62 %) followed by glaucoma 6(12%), aphakic bullous keratopathy 4(8%), post traumatic bullous keratopathy 3(6%), corneal graft failure 2 (4%), endothelial dystrophy 2 (4%) and vitreous touch 2(4%). Diminished vision was the most consistent symptom present in all patients. According to clinical classification, Grade III bullous keratopathy was present in 21 (42%) patients followed by Grade II with 15 (30%) patients.

Conclusions: Pseudophakic bullous keratopathy being the most common cause, patients with clinically compromised cornea should be meticulously evaluated for endothelial cell count prior to any intraocular intervention. Perioperative management should also be modified accordingly.

P4 Cost analysis of Goldmann and tonosafe disposable prism heads

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Introduction: Applanation tonometry has been standard practice in UK eye units for measuring intraocular pressures (IOP) and the Goldmann tonometer has been widely regarded as the gold standard. These tonometers require the fitting of prisms and up to recent times non-disposable prisms were the preferred choice in the majority of eye departments in the UK. Outbreaks of epidemic viral (adenovirus, HSV, HIV and hepatitis), parasitic (acanthamoeba), and prion (CJD) related ocular infections in ophthalmic clinics worldwide have been previously reported. Insufficient disinfection of Goldmann tonometer prism heads has been postulated as a possible significant cause of transmission. In addition, improper sterilisation techniques can also increase the risk of corneal insult due to residual cleaning agent on reusable prism heads. A recent publication by Haag Streit, a leading manufacturer of Goldmann tonometers, showed that the mean age of non-disposable prisms in the UK was 9.8 years with 56% of these being damaged or scratched. These factors, along with the recommendations by the Medical Device Agency that "components of ophthalmic devices that touch the surface of the eye should be restricted to single patient use where practicable and where this does not compromise clinical outcome" led to the introduction of disposable prism heads, which were felt to be safer, as effective and equally reliable to the standard ones. The authors feel that this notion of "perceived safety" and the numerous studies showing similar accuracy and cost between both prism heads have led to a gradual but definite shift to the

use of disposable prisms worldwide. The purpose of this study was to review the current practices in the UK in terms of tonometer heads used, their duration of use and to ascertain the actual cost benefit for using disposable prism in a UK based NHS setting.

Method: A telephone survey was conducted of all ophthalmology units with training recognition in England, Northern Ireland, Scotland and Wales. This was concluded with a cost benefit analysis.

Results: A total of 155 eye units were identified and contacted. 55% of departments reported exclusive use of the disposable Tonosafe prisms whilst 15% departments used Goldmann non-disposable prisms exclusively. 22% of departments used a combination of both and one department used mainly Tonojet prisms. There was an average replacement rate of 26.5% per year for non-disposable prisms.

Discussion: We performed a cost benefit analysis using current pricing for tonometers and a variety of settings. Our calculations show that there is a potential to save at least £2 million nationwide if we only use non disposable prisms therefore canconclude that there is a clear cost benefit to using non disposable prisms.

P5 Incidence of neovascular glaucoma [NVG] in patients of proliferative diabetic retinopathy [PDR] managed by standard treatment protocol

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Purpose: To detect incidence of neovascular glaucoma [NVG] in patients of proliferative diabetic retinopathy [PDR] who have undergone standard treatment protocol.

Methods: Longitudinal, observational study. 297 eyes of 158 patients referred to tertiary eye care centre for management of PDR were included in this study. Eyes with non treatable burnt-out retinopathy [13 eyes] & eyes with non-proliferative diabetic retinopathy or only diabetic maculopathy [6 eyes] were excluded. All eyes underwent detailed history, clinical evaluation including gonioscopy and investigations including fundus fluoresceine angiography [FFA] and optical coherence tomography [OCT]. They were divided into two groups:

Group 1: This included eyes with attached retina and clear media. They underwent standard protocol pan-retinal photocoagulation [PRP] over 4-5 sittings. These were followed up every month for 6 months and there after every 3 months for the next 18 months for stability of retinopathy and detection of NVG. Group 2: This included eyes with non-resolving vitreous haemorrhage, tractional retinal detachment [TRD] & combined tractional & rhegmatogenous retinal detachment. They underwent pars plana vitrectomy [PPV] with pre-operative injection of avastin [Bevacizumab] 5 to 7 days prior to surgery. Intra operative endolaser PRP was done for all eyes undergoing vitrectomy. They were initially followed every week for 4 weeks and thereafter every 3 months till the completion of two years. The follow-up included stability of retinopathy and detection of NVG. Eyes which did not confirm to the group at the end of the study were excluded.

Results: Of the 297 eyes in the study 232 eyes underwent only PRP [78.11%] and 65 eyes [21.89%] underwent Intravitreal Avastin followed by PPV with PRP. 21/297 [7.07%] eyes developed NVG over a follow up period of 24 months. In the patients who developed NVG, 15 eyes were from group 1 and 6 eyes were from group 2. In the group 1, 15/232 [6.46%] and in group 2, 6/65 [9.23%] developed NVG.

Conclusion: Incidence of NVG in eyes with PDR treated promptly and according to standard protocol of PDR management was noted to be significantly less as compared to earlier studies.

P6 Elucidation of compliance rates amongst glaucoma patients in a tertiary health care centre and the reasons for non-compliance in the same cohort.

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Purpose: To elucidate the compliance rates amongst glaucoma patients in a tertiary health care centre , the reasons for their non-compliance and response-based-solutions to improve compliance in the same cohort.

Materials and Methods: In this cross-sectional descriptive epidemiological study , information was obtained by random selection from 500 patients attending the Speciality Glaucoma Clinic , Department Of Ophthalmology , V.M.M.C & Safdarjung Hospital . The patients were intercepted at the entry point where they get their intraocular pressure(IOP) checked wherein they were asked to fill an exhaustive questionnaire. At the same setting, they were also asked to demonstrate how they(or their relatives or helpers) instill eye drops following which any irregularities were brought to notice and corrected.

Results: Non-compliance rates were determined based on the number of patients who did not instill anti-glaucoma medications as per prescribed dosage or frequency schedule . The non-compliance rates were then evaluated for any association with

distributions based on age, sex, diet, duration of treatment, associated co-morbidities, social structure, number of medications, daily dosage frequency, cost of medications, any previous history related to glaucoma and side-effects experienced by patients. In case a positive association was found , the correlation co-efficient was further calculated to know the strength of this association. No association of non-compliance rates was found with distributions based on diet , associated co-morbidities, daily dosage frequency and side-effects experienced by patients (Chi-square test). Even though a positive association of non-compliance was found with distributionsbased on age, sex, duration of treatment, social structure and number of medications ($p < 0.05$ by Chi-Square test); the correlation co-efficients were very weak ($c < 0.3$). However, cost of medications not only had a positive association but also had a very strong correlation co-efficient of 0.9188 proving that cost of medications had a modest bearing on compliance rates.

Conclusions: The barrier to free communication can be broken down if ophthalmologists take a lead. Besides availability of medications at a reasonable cost, simplification of the treatment regimen and interactive health education appear to be the most important factors for improving compliance so that patients do not feel guilty or inadequate because they have problems while administering their eyedrops. The availability of a suitable device will also help patients achieve safe administration and improve compliance.

P7 The epidemiology of glaucoma in Asia

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Purpose: To bring together information on the prevalence, risk factors, economic and public health implications of glaucoma in Asia, as there have been an increasing number of population studies on glaucoma in Asian populations but no recent review of these major studies.

Methods: Review and synthesis of literature from 1975 through July 2013, including the major eye studies in Asia. These include both rural and urban populations in India (Aravind Comprehensive Eye Survey, Andhra Pradesh Eye Disease Study, Chennai Glaucoma Study), China (Beijing Eye Study, Yunnan Minority Eye Study), Singapore (Tanjong Pagar Survey), Myanmar (Meiktila Eye Study), and Japan (Tajimi study).

Results: The prevalence of primary open angle glaucoma in Asia varied from 0.4% to 3.9%, similar to that in western populations. Primary angle closure glaucoma however had a higher prevalence among Asians, with different ethnic groups exhibiting different prevalence rates and angle closure mechanisms, and prevalence ranging from 0.05% to 2.5%. Prevalence varied between different study groups in the same country due to the different ethnicities and populations (urban and rural) that existed within each country. Other factors were lack of uniformity in glaucoma definitions, different ways of intraocular pressure (IOP) measurement, non-standardized visual field examinations and variation in participation rates in each study. Risk factors for POAG in Asian populations included higher IOP, myopia, and older age, while that for PACG include female gender, increasing age, Inuit or East Asian ethnicity, shallow anterior chamber, shorter axial length, and genetic factors. Vision loss from glaucoma has an important impact on quality of life, with the overall burden increasing as glaucomatous damage and vision loss progresses. Increased costs have shown to be related to increased severity or lack of control of IOP in European and American countries, although there are no Asian figures available.

Conclusion: Glaucoma is one of the leading causes of irreversible blindness in the world, with an estimated half of the world's population with glaucoma residing in Asia. It has important public health implications as a preventable cause of blindness and as an economic burden. Epidemiological research, hampered by methodological weakness and in past studies, is fortunately seeing an increasing standardization of examination techniques and adoption of international standards in the clinical diagnosis and management of glaucoma. A continued review of its epidemiology, risk factors and public health implications in Asia and worldwide is necessary for better understanding and control of this important condition.

P8 Unilateral glaucomas case studies of three different representations

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Objective/Purpose: The Purpose was to present the varied kind of clinical presentation of UNILATERAL Glaucoma with pictures.

Materials/Patients: Case 1. Male patient aged 56, high IOP and Cataract OS, Visual Acuity 20/25 and 20/400, with IOP 14 and 48 mmhg in OD and OS respectively. Normal OD. OS had NVI and Immature cataract. Gonio- open Angles with no NVA. Fundus OD drusen, OS hazy view, disc showed significant cupping. No PAS in BEs, No ocular medical history or diabetes or Hypertension or known cardiac problems. B scan was normal in BEs. Patient was treated medically and posted for Phaco IOL with ECP. Post op IOP was 12 mmhg,vision was 20/50. Disc showed almost total cups, very thin NRR. In the next few months of follow up, NVE and NVI was noted with increasing IOP. patient was referred to Retina for work up. FFA showed extensive retinal ischemia. I Carotid Occlusive desease was ruled out. PRP was done. AGV was implanted. Last examination IOP 10 mmhg. Case 2. 65 year old male patient was referred after Phaco surgery, post-operative findings of 0.8 CD ratio in the operated eye and IOP of 30 mmhg. On examination his RE, AS was unremarkable except for NS. LE was pseudo phakic. PS showed- OD had normal disc but showed extensive arteriolar attenuation in BEs, with waxy pallor of the optic disc. Extreme periphery showed occasional pigments. On retrospective history the patient complained of night blindness since very young age. Patient was treated medically and as the IOP remained high, he was implanted with AGV. Case 3. A middle age female of 44 years was referred with high IOP in her RE. On examination, RE showed RAPD, IOP was 44 mmhg, with No Light Perception. PS showed total glaucomatous optic atrophy. LE examination was un-remarkable. No Ocular history, or Medical history. B scan was normal.

Methods: Clinical Examination with other diagnostic and Surgical intervention as needed by these patients.

Results and Conclusion: Case 1. After a thorough investigation we thought this could be possibly a case of subclinical Vein occlusion which progressed to Open angle glaucoma, and then to Neovascular glaucoma. Case 2. We have not come across this kind of presentation in literature, where the patient has Bilateral Retinitis Pigmentosa Sine Pigment, and with Unilateral Advance Glaucoma. Case 3. We suspect this case to be Possner Schlossman Syndrome, Completely unilateral, and ending with Absolute glaucoma.

• OCULAR IMAGING

P9 Postoperative ultrasound biomicroscopic evaluation of the anterior segment of the eye after glaucoma surgery in children

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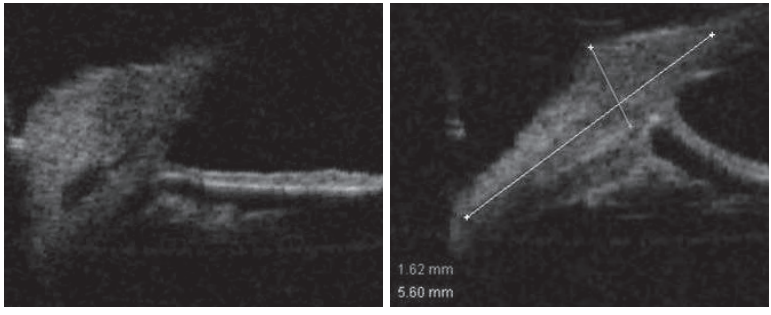
Purpose: Ultrasound biomicroscopy (UBM) is an imaging technique that utilizes high-frequency sound waves to produce high-resolution, 2-dimensional cross-sectional images of the anterior segment to a depth of approximately 5 mm. In this study, ultrasound biomicroscopy was used to evaluate the anterior segment of the eye after glaucoma surgery in children.

Methods: The study included 15 eyes of 11 children attending the Ophthalmology Outpatient Clinic at Alexandria Main University Hospital, who had undergone glaucoma surgery in the past . The children aged 28.6 (±11.6) months (average (±SD)) with the preoperative diagnosis of primary congenital and aphakic glaucoma. The glaucoma surgical procedures performed were trabeculotomy (1, 6.6 %), trabeculectomy with mitomycin C (4, 26.6 %), combined trabeculotomy-trabeculectomy with mitomycin C (7, 46.6 %), combined trabeculotomy-trabeculectomy with mitomycin C with releasable sutures (2, 13.3 %) and combined trabeculotomy-trabeculectomy with mitomycin C with releasable sutures with a limbal conjunctival approach (1, 6.6 %). Informed consent was obtained from the parents of the patients after explanation of the risks and benefits of the procedure. All examination was conducted under general anaesthesia. A portable slit lamp was used to assess the morphology of the bleb, noting the colour (vascularity), elevation (low vs high), cystic appearance, as well as area (diffuse vs localized). Perkins' tonometer was used to measure the intraocular pressure. The UBM probe with the 35 MHz tip was then used to obtain radial scans through the bleb, moving sideways to include the full width of the bleb, remaining perpendicular to the ocular surface as much as was feasible, as well as moving downwards towards the inferior limbus to image the angle of the anterior chamber opposite the surgery site if possible.

Results: The study eyes showed an average (±SD) intraocular pressure (IOP) of 6.8 (±4.0) mmHg. Studying the bleb morphology revealed a high bleb in 11 (73%) eyes and a low bleb in 3 (20%) eyes, pale blebs in 13 (87%) eyes and one (6%) vascularised bleb, diffuse blebs in 5 (33%) eyes, multicystic blebs in 5 (33%) eyes and 3 (20%) solitary cysts. Ultrasound biomicroscopy (UBM) data revealed a heterogenous internal acoustic structure of the bleb in 10 (67%) eyes, a mostly high



reflectivity of the bleb in 5 (33%) eyes and a mostly low reflectivity of the bleb in 5 (33%) eyes, 4 eyes with multiple variable spikes, diffuse blebs in 3 (20%) eyes, a multicystic bleb in 10 (67%) eyes and a solitary cyst in 1 (7%) eye.

Conclusions: UBM is a valuable tool in the evaluation of anterior segment anatomy in children after glaucoma surgery and a correlation exists between bleb morphology as detected by UBM and IOP control.

P11 Measurement of perifoveal ganglion cell complex thickness by spectral domain optical coherence tomography in patients with primary open angle glaucoma

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Purpose: To evaluate the ganglion cell complex (GCC) thickness in primary open angle glaucoma with a 3.4 mm circular optic coherence tomography section focused on the central fovea.

Material and Methods: Sixty eyes of 30 primary open angle glaucoma patients who were treated in the glaucoma unit of our clinic and 32 eyes of 16 controls were enrolled. Peripapillary retinal nerve fiber layer (RNFL) thickness was measured in all patients with a spectral domain optic coherence tomography (SD-OCT) (Heidelberg Spectralis HRA/OCT). The scan was repeated after the center of the 3,4 mm circular OCT section was focused on central fovea. Ganglion cell complex thickness was measured by changing the outer reference line of RNFL to the outer border of inner plexiform layer manually. The results of glaucomatous eyes were compared with controls. Mean deviation (MD) values of the visual field were also recorded with standard automated perimetry (Humphrey Field Analyzer II, Model 750) and SITA-standard test. T-test and Pearson correlation test were used in statistical analysis of dependent and independent samples.

Results: Mean age of all enrolled subjects was 55.4 ± 8.2 years (range, 38-75 years). Mean peripapillary RNFL thickness was measured as 105.9 ± 17.5 µm and 115.9 ± 9.4 µm in glaucoma and control group, respectively. The RNFL was statistically thin glaucomatous eyes when compared to control group ($p = 0.003$). Mean GCC thickness was recorded as 85.6 ± 19.6 µm and 98.1 ± 9.5 µm in glaucomatous eyes and control group, respectively. GCC was also significantly thinner in the glaucoma group ($p < 0.001$). There was a high positive correlation between GCC and RNFL thickness in glaucomatous eyes ($r^2 = 0.806$). There was also correlation between MD and perifoveal GCC as well as beween MD and peripapillary RNFL thickness ($r^2 = 0.528$ and $r^2 = 0.490$, respectively).

Conclusion: Perifoveal ganglion cell complex thickness is thinner in glaucoma compared with normal eyes. This can be a parameter in early diagnosis and management of glaucoma.

P12 Evaluation of anterior chamber parameters with ultrasound bio microscopy (UBM) following cataract extraction in primary angle closure glaucoma with patent iridotomies

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Purpose: To study the role of Ultrasound Biomicroscopy in assessing anterior chamber parameters in primary angle closure glaucoma.

Methods and Materials: It was a prospective study of 20 eyes with primary angle closure glaucoma having patent iridotomies and significantly increased lens thickness on UBM (Formula for normal lens thickness, LT = 4+ (age/100)). All cases underwent a detailed eye examination including visual acuity, slit lamp biomicroscopy (Zeiss), +90 D fundus examination (Volk), applanation tonometry (Perkin's), gonioscopy (Goldmann two mirror), automated perimetry (octopus 900) and UBM (OTI scan 2000 model – Ophthalmic Technology incorporation, Toronto, Canada). Patients underwent

cataract extraction with IOL implantation in the bag. Anterior chamber parameters were compared pre and post operatively at 6 weeks. Patients were divided on basis of anterior chamber angle on UBM. Group A: 10- 15 degrees; Group B: 16-20 degrees; Group C: 21-25 degrees

Results: The outcomes measured were visual improvement, changes in IOP, AC depth and Angle opening, pre and post operatively. Following observations were recorded: 1) Decrease in IOP from mean value of 24.60 (range 18 to 30) mm Hg pre-operatively to 17.29 (12 to 22) mmHg post-operatively; 2) On UBM, increased anterior chamber depth from mean value of 1.62 (0.5 to 2.02) mm pre-operatively to2.8 (1.88 to 3.24) mm post-operatively; 3) On UBM, increased anterior chamber angle from mean value of 18 (range 12 to 24) degrees pre-operatively to 30 (24 to 36) degrees post-operatively; 4) Visual acuity improved significantly.

Conclusion: UBM is an important tool in evaluation of anterior segment parameters, lens thickness and its association in PACG. It helps to isolate cases where cataract extraction can improve anterior segment parameters. It thus plays a significant role in the management of PACG. It also avoids unnecessary trabeculectomy.

P13 Function and morphology of filtering blebs. Implant of Ex-Press device vs non perforating deep sclerectomy

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Purpose: To compare anatomical and functional results of filtering blebs formed by two different surgical techniques: The Ex-Press device implant and the Non Perforating Deep Sclerectomy (NPDS) with implant of Esnoper.

Methods: Review of 21 patients who underwent glaucoma surgery. Ten patients underwent the technique of Ex-Press device implant, and 11 patients underwent the NPDS technique. Intraocular pressure (IOP) was measured the first postoperative day, first month and two months after surgery. Photos of the filtering bleb and spectral domain optic coherence tomography (SDOCT) images the first month and 2 months were also performed. Blebs were imaged using an adapted SDOCT system (CirrusHD-OCT, Carl Zeiss Meditec, Inc., Dublin, CA, USA). Photographs of the blebs were classified according to Indiana classification system. Complications and additional maneuvers were also analyzed.

Results: In the Ex-Press group the mean age was 72 years (range between 57 and 85 years), 7 eyes with primary open angle glaucoma (POAG) and 3 eyes with chronic angle-closure glaucoma (CACG). NPDS was previously performed in 2 eyes of this group, and combined surgery (cataract phacoemulsification with implantation of intraocular lens and trabeculectomy) was previously performed in one eye. Five combined surgeries were performed in this group (Ex-Press device implant plus phacoemulsification with intraocular lens implant). In the NPDS group the mean age was 77 years (range between 67 and 85 years), 9 eyes with POAG, 2 eyes with CACG. Trabeculectomy was previously performed in one eye. Nine combined surgeries were performed in this group (NPDS plus phacoemulsification with intraocular lens implant). The preoperative mean IOP in the Ex-Press group was 20 mmHg, 16 mmHg the first postoperative day, 14 mmHg the first month and 15 mmHg at two months follow up. The preoperative mean IOP in the NPDS group was 24 mmHg, 14 mmHg the first day, 15 mmHg the first month and 14 mmHg at two months follow-up. Two eyes of the Ex-Press group presented postoperative Seidel, one resolved spontaneously and another required sutures. One eye presented early fibrosis of the bleb in the NPDS group. In the Ex-Press group, 4 eyes required suturolisis and one eye required injection of 5-fluorouracil (5-FU). In NPDS group, four eyes required nd:yag goniopuncture, two eyes underwent 5-FU injections and one eye required needling in the operating room. Regarding the morphology of the blebs 2 months follow-up in the Ex-Press group: 86% had a height between low and medium, 86 % had an extension between 1 and 4 hours and 100% presented vascularization between mild and moderate. In the NPDS group, 90% of the blebs had a height between low and medium, 100%

had an extension between 1 and 4 hours and 90% presented vascularization between mild and moderate. The analysis of the SDOCT bleb images shown that 50% of the Ex-Press group blebs presented an image of scleral lake, in addition to surface hyporreflective areas. In the NPDS group we did not find images of scleral lake, we found hyporreflective areas in 72.7%.

Conclusion: Decrease of IOP in both groups was similar at the first and two months follow-up. The biomicroscopy study showed no differences between both groups. The SDOCT images show a tendency of the Ex-Press blebs to form intrascleral Lake, while the NPDS blebs tend to present more superficial microcysts. Both groups presented only minor complications. We think the implant of Ex-Press device seems to be as safe as NPDS.

P14 In vivo corneal confocal microscopy in glaucoma patients after antiglaucoma treatment.

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Purpose: The aim of the study was to evaluate the corneal endothelial cells changes with the use of confocal microscope caused by trabeculectomy, laser iridotomy or selective laser trabeculoplasty in glaucoma patients.

Setting: University Hospital N°5 Ceglana, Department of Ophthalmology.

Material and Methods: The study group of 22 patients with glaucoma (30 eyes) was diagnosed with the use of confocal microscope CS4 (Nidek Technologies, Italy) before and after antiglaucoma treatment. Measures include number of corneal endothelial cells, as well as polimegatism and pleomorphism of these cells.

Results: Mean corneal endothelial cell density before and after antiglaucoma treatment was 2920 cells/mm2, and 2727 cells/mm2 respectively. The mean percentage of polimegatism was 49,97% before and 53.28% after treatment and mean percentage of pleomorphism was 40.50% before and 42.98% after the treatment.

Conclusions: As a chronic disease glaucoma causes damages not only in the optic nerve but also in corneal tissue. It is highly probable that negative changes, leading to irreversible endothelial cell loss, are caused by elevated intraocular pressure, toxicity of topical treatment and surgical procedures. In vivo confocal microscopy can be a useful diagnostic tool which allows non-invasive, precise and repetitive deep insight into the corneal structure.

P15 Evaluation of RGC defects in glaucoma with spectral domain OCT

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Purpose: To characterise and correlate patterns of Retinal Ganglion Cell defects, with Spectral Domain OCT in different types of Glaucoma.

Methods: Observational, cross-sectional study. 166 Eyes of 101 consecutive patients who reported for glaucoma evaluation at Tertiary Eye Care centre between October 2012 and 15 August 2013 were studied for patterns of RGC + IPL defects. Glaucoma evaluation included Gonioscopy, Intraocular Pressure measurement with applanation tonometer, Visual fields with Humphrey Visual Field Analyser IIi [Carl Zeiss Meditech Inc], HD OCT imaging [Carl Zeiss Meditech Inc, Dublin, CA] for ONH, RNFL and Macula & central corneal thickness measurement. Patients between 20 to 78 years of age were included in this study. Eyes with macular diseases, retinal pathology and other Optic nerve diseases were excluded from the study. Eyes with Myopia more than 1 Dioptre and Hyperopia more than 3 Dioptres were excluded from the study. Macular Imaging [Macular cube 200x 200] was done for study eyes with the help of Cirrus HD OCT. [Carl Zeiss Meditech Inc, Dublin, CA]. They were assigned into two major groups. Group I. Eyes with OPEN angles on Gonioscopy: Primary Open Angle Glaucoma, Normal Pressure Glaucoma, Steroid induced glaucoma, angle recession glau-

coma. Group II. Eyes with NARROW angles on Gonioscopy: Primary Angle Closure Suspect [PACS], Primary Angle Closure [PAC], Primary Angle Closure Glaucoma[PACG] & Status post acute angle closure attack [Relative Pupillary Block & Phacomorphic]. Eyes with any other types of glaucoma were excluded from the study. RGC + IPL defects were evaluated by two independent observers. RGC defects were identified with RGC deviation map provided by RGC analysis data.RGC defects were classified as follows: 1. Localised defects- involving one or more sectors, 2. Diffuse circumferential defects - around the inner circle of annulus of RGC scan, 3. Dense, 360 degree defects – involving all area of the annulus of RGC scan. Localised defects were further divided into different groups depending upon involvement of one or more sectors.

Results: Group I consisted 111 eyes of 72 patients whereas Group II had 55 eyes of 29 patients. Localised defects [39.75% - 66/166] were predominantly found in Group I. They were commonly found in patients having early to moderate glaucoma. Numbers of sectors involved by RGC defects were proportional to the severity of glaucoma. In this group the distribution of eyes was as follows: Primary open angle glaucoma 43/66 [65.15 %] Normal pressure Glaucoma 17/66 [25.75 %], Steroid induced glaucoma 4/66 [6.06%] & Angle recession Glaucoma 2/66 [3.23%]. 60/66 eyes [90.91 %] in this group had involvement of inferotemporal sector either as a single sector or along with other sectors. Diffuse circumferential defects [28.31% - 47/166] were found in Group II in early to moderate stages. There was evidence of RGC damage even in eyes with Primary Angle Closure Suspect & Primary Angle Closure. This was similar but to lesser degree as compared to the eyes with Primary Angle Closure Glaucoma & after Acute angle closure. Distribution of RGC defects in this group was as follows PACS 31/47 [65.95%], PAC 9/47 [19.14%], PACG 4/47 [8.51%] & after acute angle closure 3/47 [6.38%]. Dense 360 degree defects [31.93% - 53/166] were found in patients having advanced glaucoma of any aetiology. In this category 45/ 53 eyes [84.90%] were in group I and 8/53 [15.09 %] were in group II.

Conclusion: Analysis of RGC defects on HD - OCT in glaucoma helps in identifying different patterns of RGC defects. Distinctly different patterns were seen in eyes having glaucoma with open angles and in eyes with narrow angles especially in early to moderate stages. {Abbreviations used: OCT - Optical Coherence Tomography; RGC + IPL- Retinal Ganglion Cell + Inner Plexiform Layer; ONH - Optic Nerve Head; RNFL - Retinal Nerve Fibre Layer; PACS - Primary Angle Closure Suspect; PAC- Primary Angle Closure; PACG - Primary Angle Closure Glaucoma}.

P16 Retinal nerve fiber layer imaging with spectral-domain optical coherence tomography: impact of media opacities on RNFL measurement

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Purpose: To investigate the impact of posterior capsular opacities (PCO) on measurement of the retinal nerve fiber layer thickness (RNFL) obtained with two spectral-domain optical coherence tomography with different scanning wavelengths (870 nm and 840 nm).

Methods: Eyes were imaged by the Cirrus HD-OCT (Carl Zeiss Meditec, 840 nm wavelength) and the Spectralis OCT (Heidelberg Engineering, 870 nm wavelength) right before and approximately 30 minutes after Nd:YAG capsulotomy. The relationship between the changes in RNFL thicknesses and signal-to-noise ratio of the OCT images, and the agreement of average RNFL thickness before and after laser capsulotomy were evaluated with correlation analysis and Bland Altman plot, respectively.

Results: A total of 40 eyes from 40 individuals (including 33 normal and 7 glaucomatous eyes) with posterior capsular opacity were recruited. After excluding eyes with no RNFL signal from the Cirrus HD-OCT, segmentation failure of the RNFL and motion artifact, 28 eyes were finally included for analysis. After laser capsulotomy, the average RNFL thickness increased from 82.25 ± 10.98 μm to 86.93 ± 10.53 μm ($p < 0.001$) and the signal strength increased from 5.29 ± 1.38 to 6.96 ± 1.04

($p < 0.001$) for the Cirrus HD-OCT. The change in average RNFL thickness was correlated with the change in signal strength ($p < 0.001$). While the signal intensity of the OCT images also increased from 21.79 ± 5.58 dB to 26.39 ± 3.80 dB for the Spectralis OCT ($p < 0.001$), there was no change in the RNFL measurement (92.04 ± 14.58 µm versus 91.93 ± 14.40 µm) ($p = 0.764$). The span of the 95% limits of agreement of average RNFL thickness before and after laser capsulotomy was smaller for the Spectralis OCT (7.4 µm) than the Cirrus HD-OCT (24.4 µm).

Conclusions: The 870 nm Spectralis OCT was less susceptible to the impact of media opacities on RNFL measurement compared with the 840 nm Cirrus HD-OCT.

P17 The effect of myopic optic disc tilt on measurement of spectral-domain optical coherence tomography parameters

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Purpose: To compare the spectral-domain optical coherence tomography (SD-OCT) parameters, ganglion cell-inner plexiform layer (GCIPL) thickness, peripapillary retinal nerve fiber layer (pRNFL) thickness, and optic nerve head (ONH) parameters between eyes with myopic tilted optic disc and non-tilted optic disc, and to investigate the effect of myopic optic disc tilt on the glaucoma diagnostic performance of these OCT parameters.

Design: Retrospective, cross-sectional study.

Methods: The study included 106 patients with glaucoma and 45 normal subjects. Macular GCIPL and pRNFL thicknesses and ONH parameters were measured in each participant, and their diagnostic abilities were compared.

Results: The spherical equivalent was more myopic in the tilted disc group than in the non-tilted group ($p < 0.001$). The ONH parameters, except in the rim area, in the tilted disc group were significantly smaller than in the non-tilted disc group (all $p < 0.001$). The temporal quadrant RNFL was significantly thicker and the nasal quadrant RNFL was significantly thinner in the tilted disc group compared to the non-tilted group ($p < 0.001$ and 0.015, respectively). In addition, the diagnostic capability of the average cup-to-disc area (CDR), vertical CDR, cup volume, and temporal RNFL thickness in the tilted disc group were inferior to that in the non-tilted disc group ($p = 0.006$, 0.014, 0.001, and 0.002, respectively). However, there were no significant differences in average and sectoral GCIPL thicknesses between the two groups, and both groups had similar nasal sectoral GCIPL thickness ($p = 0.783$), in contrast to temporal RNFL thickness. Furthermore, the diagnostic capability of GCIPL thickness in the tilted disc group was comparable to that in the non-tilted disc group, unlike ONH parameters and the temporal RNFL thickness.

Conclusions: The myopic optic disc tilt should be considered when diagnosing and monitoring glaucoma with the Cirrus HD-OCT. GCIPL measurement provides more reliable parameters compared to pRNFL thickness or ONH parameters in eyes with myopic tilted optic disc.

P18 Anterior segment spectral-domain optical coherence tomography (OCT) analysis of bleb morphology following deep sclerectomy versus trabeculectomy

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Purpose: To investigate the intraocular pressure (IOP) lowering mechanisms of deep sclerectomy using anterior segment spectral-domain optical coherence tomography (OCT).

Methods: Eyes from consecutive patients with open-angle glaucoma that underwent primary deep sclerectomy (n = 13) or trabeculectomy (n = 15) between January 2012 and March 2013 by a single surgeon were prospectively enrolled. At the 3 month post-operative visit, all blebs were graded using the Indiana Bleb Grading Scale (IBGS) and imaged using OCT. Outcome measures on OCT included bleb height, bleb cavity, intra-conjunctival cysts and presence of posterior flow.

Results: Three months following surgery, mean IOP reduced from 26.4 ± 10.4 mmHg to 12.0 ± 4.8 mmHg following deep sclerectomy and 21.3 ± 11.9 mmHg to 6.4 ± 3.9 mmHg following trabeculectomy. Grading using the IBGS revealed deep sclerectomy was associated with shallower (1.3 v 2.0, $p < 0.01$), narrower (1.77 v 2.53, $p < 0.01$) and more vascular blebs (2.13 v 1.53, $p < 0.01$) compared to trabeculectomy. On OCT, deep sclerectomy blebs were shallower (95.3 v 318.4 microns, $p < 0.01$) and less likely to contain a bleb cavity (23.1% v 86.7%; $p < 0.01$), contain intra-conjunctival cysts (53.8% v 86.7%; $p < 0.01$) or demonstrate posterior flow (30.8% v 82.4%; $p < 0.01$). There was a trend towards a thinner conjunctiva/tenon's membrane following deep sclerectomy (224.6 v 299.1 microns, $p = 0.09$).

Conclusions: In this series, both deep sclerectomy and trabeculectomy were associated with significantly reduced IOP in the short term. At 3-months, clinical grading and anterior segment OCT shows bleb morphology following deep sclerectomy differs from trabeculectomy.

P19 Comparison of new objective measurements of optic disc tilt using heidelberg retinal tomography

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Purpose: We aim to compare 2 new Heidelberg Retinal Tomography (HRT)-based methods with the more established disc ovality measurement in determining optic disc tilt.

Methods: As part of the Singapore Cohort study of Myopia study, HRT scans were performed for 109 children's right eyes and 32 eyes had clinically-determined disc tilt. The first HRT-based require an observer to manually measure the degree of rotation on 3-dimensional images of the disc. Disc tilt was defined by the angle subtended by the horizontal plane of the retina and the plane of the optic disc. The second method utilised a new automated HRT-3 program to calculate the disc tilt from a reference plane using the retinal plane. Based on the topographical images, minimum (MIN) and maximum (MAX) disc diameters were measured and disc ovality calculated (MIN/MAX). For both methods studied, the optimal cut-off point for tilt degree was determined by receiver operator curves (ROC).

Results: The demographic parameters were: mean age 13 years (standard deviation [SD] 8) and 51.4% male. By manual measurement, the mean disc tilt degree for non-tilt group was 5.17 ± 0.46 compared to 10.81 ± 0.78 in the disc tilt group ($p < 0.001$). Using the automated HRT-3 program, the mean disc tilt degree for non-tilt group was 4.31 ± 3.32 compared to 5.49 ± 3.16 in the disc tilt group ($p = 0.065$). By the disc ovality method, the mean disc tilt degree for non-tilt group was 0.87 ± 0.06 compared to 0.85 ± 0.07 in the disc tilt group ($p = 0.31$). The optimal cut-off point for significant disc tilt was equal to or more than 10.0 degrees, 3.49 degrees and 0.76 for the manual measurement, automated HRT-3 program and disc ovality respectively. The area under ROC were 0.650, 0.635 and 0.488 manual measurement, automated HRT-3 program and disc ovality respectively.

Conclusion: Our study described 2 objective and simple HRT-based method of measuring optic disc tilt which took into account the 3-dimensional nature of tilt. These 2 new methods had better diagnostic accuracy compared to disc ovality.

Keywords: optic disc tilt, Heidelberg retinal tomography, glaucoma

P20 Morphological differences between fornix and limbal-based trabeculectomy with anterior segment ocular coherence tomography (AS-OCT)

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Purpose: To investigate the early post-operative morphological and functional differences between a limbal and a fornix-based bleb with the anterior segment ocular coherence tomography (AS-OCT).

Methods: Prospective study of 40 patients that underwent either limbal or fornix-based trabeculectomy with Mytomycin C at St Eriks Eye Hospital in Stockholm. Early success was defined an IOP > 18 mmHg or IOP reduction by 30% or more without any medication 3 months after the surgery. Bleb height, presence of microcysts, filtration route beneath the scleral flap were assessed by AS-OCT for both groups and related to an early (3 months after the surgery) success rate.

Results: Preoperatively mean IOP 31.6 ± 10.6 mmHg. At 3 months the IOP was 12.4 ± 4.2 mmHg for the limbal-based group and 13.1 ± 3.1 mmHg for the fornix-based group that was not statistically significant. Success rate was 90% in limbal-based group and 85% in the fornix-based group. Ninety % on the limbal group and 70% on the fornix group developed a microcystic pattern while a visible route beneath the scleral flap was present in 90% of cases in both groups. There was not a statistical significant difference in bleb height between the 2 groups. Failed blebs exhibited a low bleb height and a not visible route beneath the scleral flap in both groups.

Conclusions: Limbal and fornix-based groups showed a similar morphological pattern on AS-OCT which was reflected on a similar success rate for both groups. Microcystic pattern was more present in the limbal group.

P21 Characterizing blebs through ocular thermography - A Pilot Study

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Aim: To identify ocular surface temperature characteristics of cystic avascular blebs versus flat scarred blebs.

Methods: In this case-control series, we included 12 participants (and 24 eyes). Seven eyes of 7 (58.3%) patients had undergone trabeculectomy (4 of which were identified to have cystic avascular blebs and 3 of which were documented to have flat scarring blebs clinically). In this group, the lowest ocular surface temperature of the blebs (7 eyes), highest temperature of the conjunctiva surrounding the bleb (7 eyes), and lowest temperature of the corresponding conjunctival area of the fellow non-trabeculectomized eyes (7 eyes) were measured using thermography. For the 5 control patients, the lowest ocular surface temperatures of the nasal and temporal conjunctiva of both eyes were obtained, and the difference in ocular surface temperature of corresponding conjunctiva in both eyes were calculated. The following were parameters examined in this small case series: Lowest absolute ocular surface temperature over bleb (TPbleb) in post-trabeculectomized eye, Temperature gradient (TG) in post-trabeculectomized eye = Highest ocular surface temperature of surrounding conjunctiva – Lowest ocular surface temperature of bleb, Temperature difference (TD) = Lowest temperature of corresponding conjunctiva (to site of bleb) in the fellow non-trabeculectomized eye – Lowest ocular surface temperature of bleb in post-trabeculectomized eye. Intraocular pressures of 24 eyes.

Results: Mean TPbleb of cystic avascular blebs was 34.38 (SD 0.29) °C. Mean TPbleb of flat scarred blebs was 34.73 (SD 0.25) °C. Mean TG for the cystic avascular group was 0.45 (SD 0.13) °C, while the mean TG for the flat scarred blebs was 0.27 (SD 0.06) °C. Mean TD was 0.02 (SD 0.04) °C, 0.23 (SD 0.05) °C and 0.13 (SD 0.23) °C for controls, cystic avascular blebs and flat low scarred blebs respectively. TD is higher for cases compared to controls with statistical significance from Kruskal Wallis test, p = 0.0445. We examined the correlation between intraocular pressures of post-trab-

eculectomized eyes and non-trabeculectomized eyes, and intraocular pressures were found to correlate with the ocular surface temperatures of non-trabeculectomized eyes (Spearman correlation coefficient: 0.7568, p = 0.0489).

Conclusions: This small study suggests that thermography may serve as a possible investigatory tool in post- and non-trabeculectomized eyes. Larger prospective series may further clarify the clinical role of thermography imaging.

P22 Evaluation of retinal nerve fibre layer and ganglion cell layer thickness in normal Indian population using cirrus spectral domain OCT

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Purpose: To evaluate the change in thickness of Retinal Nerve Fibre Layer (RNFL) and Ganglion Cell Layer (GCL) with age using optical coherence tomography (OCT) in normal Indian population above 30 years.

Methods: A cross-sectional study was conducted using cirrus spectral domain OCT in 408 eyes of normal healthy subjects in four age groups (30 to 40 years, 40 to 50 years, 50 to 60 years, 60 and above). The parameters evaluated were Central Macular Thickness (CMT), Ganglion cell layer thickness- GCT (average, supero nasal, supero temporal, infero nasal, infero temporal, superior and inferior) Retinal nerve fibre layer thickness (RNFLT) in superior, inferior, temporal and nasal quadrants.

Results: The central macular thickness for group 1, 2, 3 and 4 were 245.86 ± 13.62, 243.70 ± 14.15, 242.47 ± 19.02 and 244.16 ± 13.39 and the values were clinically significant (p value) and average RNFL thickness were 92.59 ± 6.40, 92.71 ± 6.46, 92.55 ± 5.29 and 91.65 ± 6.0 for the groups 1,2,3 and 4 respectively . Average values for Ganglion Cell Layer Thickness were 83.10 ± 3.7, 82.17 ± 3.70, 82.20 ± 4.32 and 82.25 ± 4.10 for the groups 1,2,3 and 4 respectively.

Conclusion: RNFL thickness analysed using OCT in normal population showed decrease in central macular thickness with age which was clinically significant but other quadrant RNFL and GCT parameters did not show clinically significant difference with the increasing age.

P23 Iris volume in Asian Indian eyes with angle closure

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Purpose: To compare iris volume (IRV) in Asian Indian eyes with angle closure and those with open angles.

Methods: In this prospective observational comparative study, subjects with primary angle closure (including angle closure suspects (PACS), angle closure (PAC) and angle closure glaucoma (PACG)) and normals were enrolled. All subjects underwent gonioscopy and imaging with Fourier-domain source-swept anterior-segment optical coherence tomography (Casia SSOCT, Tomey, Nagoya, Japan) under standardized dark room conditions. IRV was computed with reference to the cross-sectional iris area measured in 128 B-scans. The instrument software automatically segments the anterior and posterior boundaries of the iris. Imaging was performed in angle closure subjects prior to laser iridotomy.

Results: One hundred and twenty four eyes (112 subjects) with gradable images (determined by scleral spur detection) were analyzed; 64 eyes (54 subjects) had angle closure and 58 eyes (58 normal subjects) had open angles. IRV was found to be significantly lesser in angle closure eyes compared to those with open angles (32.79 mm^3, 95% C.I, 31.40-34.17, vs. 34.46 mm^3, 95% C.I, 33.97-36.94) (p = 0.02). Sub-group analysis comparing PACS with those with open angles revealed no difference (p = 0.07), but showed significant difference between disease (PAC and PACG) and open angles (p = 0.04). However, there was no difference between sub-groups of angle closure (p = 0.4).

Conclusions: In this cohort of Asian Indians, IRV was lesser in angle closure eyes when compared to normal eyes. This parameter might be a determinant in angle closure pathogenesis.

P25 Learning curve of automated perimetry in glaucoma patients

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Purpose: To determine the minimum number of visual field tests needed for accuracy in glaucoma patients, using the Humphrey® automated perimetry for visual field testing (HVF).

Methods: A retrospective case note review of 31 patients in a glaucoma clinic was carried out. Three criteria were selected as the basis for deciding whether a field was of sufficient accuracy, using the manufacturer's standard for a reliable field: fixation loss rate must be under 20%, false negative response rate and false positive rate must both be under 33%. If a printout fails to meet this criteria, the results of that field test was deemed unreliable. Visual field test for the right eye of each patient was included and the number of HVF was counted from the first HVF done by the patient. Demographic data was collected and the number of visual field testing needed to attain accuracy was determined for each patient.

Results: Of the 31 patients, 67.7% were male and the majority were of Chinese ethnicity (83.4%). The median age was 65 years and the median number of HVF needed to achieve the reliability indices stated was 1. Primary open angle glaucoma was diagnosed in 11 out of 31 patients (35.5%) and 22.6% of patients suffered from primary angle closure glaucoma.

Conclusion: Contrary to popular belief that two or more visual field tests are needed to attain a reliable HVF for diagnosis of glaucoma, based on the manufacturer's standard for a reliable field, the majority of our patients obtained reliable HVF on their first test. This important finding could result in fewer visual field tests for our glaucoma patients and reduce the economic burden that glaucoma has on our patients.

P26 Assessment of angle parameters in primary angle closure suspects pre and post peripheral iridotomy

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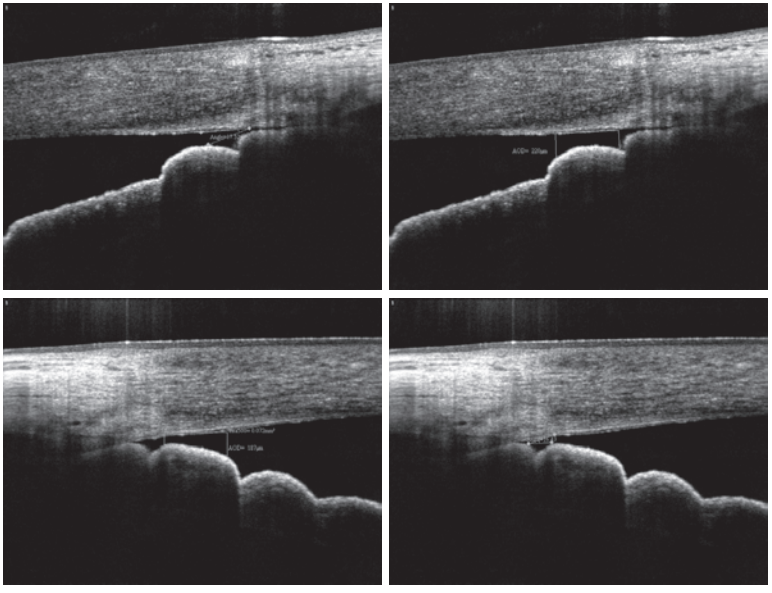
Purpose: To evaluate the angle parameters using anterior segment optical coherence tomography (AS-OCT) and compare the same with gonioscopic findings in primary angle closure suspect patients.

Method: 20 eyes of 11 patients noted to have occludable angles on gonioscopy underwent angle assessment on OCT RTvue before and after undergoing a peripheral laser iridotomy. Parameters evaluated were angle opening distance at 500um (AOD 500), trabeculariridо-surface area at 500 um (TISA 500) and recess angle, each in nasal and temporal quadrant. The mean nasal AOD 500 changed from 249.09 ± 68.534 to 363.0 ± 74.925 ($p < 0.0002$; paired t test); and mean temporal AOD 500 from 247.81 ± 57.586 to 345.45 ± 81.158 (p0.029). The recess angle was noted to increase significantly in both nasal (20.97 ± 3.275 to 29.22 ± 6.464, p 0.0017) and temporal (19.022 ± 3.461 to 30.61 ± 6.792, $p < 0.0001$) quadrants whereas the TISA 500 did not show any significant change in either quadrant. The Shaffer system of angle grading was used for statistical comparison with angle noted on ASOCT, however the correlation was weak. Gonioscopy could identify occludable angles (opening on manipulation) more than ASOCT, probably due to the difficulty in identification of scleral spur on ASOCT.

Conclusion: Although the angles opened post laser iridotomy, which was documented both gonioscopically and on AS-OCT, the change was not noted significant for TISA500. This could be attributable to the persistence of convexity of iris configuration, documentable on gonioscopy as

well as angle OCT which could be an indication towards the role of lens in angle closure dynamics. In retrospect the evaluation of anterior chamber depth, lens thickness and axial length should have been done to further highlight the above.



- **ANGLE CLOSURE GLAUCOMA**

P27 Acute angle closure attack in a patient with chronic infantile neurologic cutaneous articular syndrome

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Purpose: To report a case of acute angle closure attack in a patient with chronic infantile neurologic cutaneous articular (CINCA) syndrome

Background: CINCA syndrome is an autoinflammatory disease that often presents at a young age, which involves the central nervous system, the skin and the joints. Patients with CINCA syndrome often have anterior segment features of uveitis, corneal opacities and cataract. There has been no reporting of cases of raised intraocular pressure (IOP) or glaucoma in CINCA syndrome to date.

Findings: In this report we describe a case of a 44-year-old man with CINCA syndrome presented with unilateral subacute onset of blurring of vision without classical symptoms and signs of acute angle closure including pain, headache and seeing halo. The affected eye was found to have IOP up to 44 mmHg without anterior chamber activity and no mid-dilated pupil.

Gonioscopy revealed bilateral 360 degrees angle closure of grade zero with no peripheral anterior synechiae or neovascularization. Ultrasound biomicroscopy confirmed bilateral angle closure with flat iris configuration and no abnormalities of the iris or ciliary body. IOP was controlled with laser peripheral iridotomy with argon laser peripheral iridoplasty together with topical medication. He was treated as acute on chronic angle closure and suspected uveitic component causing raised IOP.

Conclusion: To the best of our knowledge, this is the first reported case of raised IOP in CINCA syndrome.

P28 Clinico-pathological study of residual glaucoma after lens extraction in eyes with primary angle-closure glaucoma

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Purpose: Lens extraction (LE) or LE and intraocular lens (IOL) implantation (LE-IOL) are believed to be effective surgical procedures for releasing trabecular iris contact in eyes with primary angle-closure glaucoma (PACG). No aqueous irrigation in the trabecular meshwork caused by iris contact to the entire length of the trabecular meshwork from the iris root to the tip of the trabecular meshwork may impair trabecular cell function resulting in fusion of the meshwork and occlusion of the Schlemm's canal.[1] Eyes with PACG in which IOP is still uncontrolled even after laser iridotomy (LI), LE, or LE-IOL are referred to as "residual glaucoma". The purpose of this present study was to investigate the clinical and histological characteristics in eyes with residual glaucoma post LE-IOL.

Materials and Methods: Seventeen eyes of 15 patients were retrospectively investigated. All eyes received trabeculectomy due to uncontrolled IOP post cataract surgery. Clinical data including IOP, visual field, history of acute attack, LI, anterior chamber depth (ACD), and angle configuration obtained by the ultrasound biomicroscopic (UBM) and anterior segment optical coherence tomography (AS-OCT) examinations pre/post LE-IOL were evaluated. All trabeculectomy specimens were processed for paraffin and epon embedding. As for the paraffin embedding, thin sections were used for immunohistochemical staining of D240 (podoplanin), CD 68, and thrombomodulin. Specimens embedded in epon were used for transmission electron microscopy.

Results: None of the 17 eyes had a previous history of acute attack. All eyes except 4 showed angle closure more than 180 degrees. Iritis accompanied with high IOP followed by LE-IOL was observed in 6 eyes, and a large amount of lens cortex remained post cataract surgery in 3 of those 6 eyes. The rest of 3 eyes showed very slight inflammation with small cell infiltration into the anterior chamber. IOP prior to trabeculectomy ranged from 24 to 52 mmHg. Two eyes had no LI prior to IOL implantation. ACD in all eyes except 2 exceeded 2.50 mm prior to trabeculectomy. Of the 14 eyes examined by AS-OCT or UBM prior to trabeculectomy, 13 showed plateau-like iris configuration. Histological results of the trabeculectomy specimens were categorized into one of the following two types: 1) normal outflow routes with or without inflammatory cells, and 2) occlusion of Schlemm's canal and fusion of the trabecular meshwork with extreme loss of trabecular cells.

Conclusion: Iritis followed by LE-IOL and occlusion of the main outflow routes which may be caused by whole length of trabecular iris contact for an extremely long period may be a cause for residual glaucoma. Plateau iris like configuration may be more likely to cause residual glaucoma post cataract do to the patient not experiencing any signs or symptoms until the advanced stage of the disease.

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P29 After water drinking of Laser peripheral iridotomy to intraocular pressure after eater drinking in angle closure patients

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Introduction: The intraocular pressure (IOP) peaks and fluctuation are important risk factors for visual field (VF) progression. Water drinking test has been predictor for VF progression in Primary Open Angle Glaucoma. It has been suggested that IOP elevation caused by elevation of episcleral venous pressure and choroidal engorgement may cause edema of the ciliary body and iris root

leading to alteration in outflow facility. Angle closure patients could be affected by those mechanism and resulted in IOP fluctuation. In one previously unpublished study correlating IOP after water drinking in angle closure patients, it was found that ingestion of water in Primary angle closure suspect (PACS), Primary angle closure (PAC) and Primary angle closure glaucoma (PACG) patients could result in IOP rising.

Objective: To determine whether there is a correlation between IOP and water drinking in pre-post treatment with laser peripheral iridotomy (LPI) in angle closure patients.

Methods: Forty eyes with PACS, PAC and PACG patients were included. They submitted to ingestion of 1,000 ml of water, divided into 250 ml, 4 times, 15-minute intervals. IOPs were measured every time after drinking water by Goldman tonometry and treated by LPI afterwards. After the inflammation was resolved, approximately 3 weeks, IOP was measured in the same fasion like before LPI.

Results: The mean IOP fluctuation before and after LPI in PACS, PAC, PACG group were 2.0 mmHg (SD = 0), 4.7 mmHg (SD = 2.21) 3.9 mmHg (SD = 1.79) and 4 mmHg (SD = 2), 4.7 mmHg (SD = 1,11) 3.7 mmHg (SD = 1.42), respectively. There was no significant difference in mean IOP pre-post LPI treatment after drinking water in angle closure patients ($p > 0.05$).

Conclusions: Based on the results of this study, there is not enough evidence to conclude that LPI can prevent rising in IOP after the water drinking.

P30 Lens vault as a novel parameter in pathogenesis of primary angle closure

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Purpose: Primary Angle Closure is characterized by occludable angles with elevated IOP (appositional) and/or PAS (synechial) and/or iris atrophy, distortion of iris pattern, excessive pigment deposition on trabecular surface. Various biometric parameters like Axial Length(AL), Anterior Chamber Depth(ACD) and Lens Thickness(LT) have been associated with increased risk of PAC as demonstrated by previous studies. In this study we studied the role of a novel parameter Lens Vault(LV) in the pathogenesis of Primary Angle Closure, further pointing towards the crucial role of the lens in the development of Angle Closure Disease.

Methods: 40 patients with Primary Angle Closure were recruited and they underwent Gonioscopy and Anterior Segment Optical Coherence Tomography(AS-OCT; Carl Zeiss). Lens Vault was calculated using in-built software. LV was defined as the perpendicular distance between the anterior pole of the crystalline lens and the horizontal line joining the two scleral spurs, on horizontal AS-OCT scans. A- Scan Biometry was used to measure ACD and LT and to calculate Lens Position (LP) [defined as {ACD + ½ LT}]. For comparison, 40 normal healthy controls with open angles were also included in the study and they also underwent A Scan Biometry and gonioscopy as well as AS-OCT.

Results: 40 patients with Primary Angle Closure with mean age 49.55+5.27 years and 40 normal controls with mean age 52.9+7.43 years were included in the study. Significant differences between PAC and normal controls were found for ACD [2.48+0.15mm in PAC vs. 3.00+0.06mmin controls; $p<0.001$], LT [4.59+0.26mm in PAC vs. 3.72+0.21mm in controls; $p<0.001$] and LV [1.38+0.08mm in PAC vs. 0.67+0.13mm in controls; $p<0.001$]. No significant difference in Lens Position in cases of PAC vs. normal controls was noted [4.77+0.2mm in PAC vs. 4.86+0.08mm; $p<0.076$].

Conclusion: As compared to normal healthy controls, eyes with Primary Angle closure have shallower anterior chamber, thicker lenses and an increased Lens Vault.

P31 A different perspective of gonioscopy with multi-dimensional risk assignment

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Purpose: Primary Angle Closure Glaucoma (PACG) & Primary Open Angle Glaucoma (POAG) have distinct clinical features and clinical course. Various genetic and embryologic developmental factors would be responsible for the natural history and Glaucomatous Optic Neuropathy. Factors related to PACG & POAG may coexist in an individual and several other factors may add on to the risks present in an individual eye. As the biometric parameters like Axial Length, Anterior Chamber Depth increase, there is an opening up of the angles and an increase in freedom from risk of PACG. Gonioscopy plays a key role in distinguishing the pathways and assignment of management protocols. There are several well established methods of classification and risk assignment for the Gonioscopic findings. Gonioscopy by indentation is a well-established tradition and widely preferred modality in diagnosis. The cut-off levels for moving the individuals into PACG are well defined with earliest entity being Primary Angle Closure Suspect (PACS). While the underlying factors and processes in Glaucomas are essentially continuous, one is obliged to mark cut-off levels on statistical considerations. Alternative methodologies aimed at increased sensitivity and specificity parameters often lead to increased complexity and becomes unfriendly at end-user-levels. Our endeavor is for some movement towards more holistic, accurate, maneuverable assessment & assignment system in pursuit of improvements in efficiency in clinical and research works.

Methods: We entered variables related to Gonioscopic Normal and Indention views in 2-dimensional tables. We plotted the Initial Angle Opening Views along X-axis and the Increased Angle Openings following Gonioscopic Indentation on Y-axis. Stages of opening named along X-axis are: (1) "0-G", standing for no visible angle structures; (2) "1-G", standing for visible Schwalbe's Line (SL) or Anterior Trabecular Meshwork (ATM); (3) "2-G", standing for Posterior Trabecular Meshwork (PTM) & (4) "3-G", standing for Scleral Spur (SS) or Ciliary Body Band (CBB). Thus there are 1+3 = 4 major "G-categories". This Initial sub-division of angle opening parallels several standard classifications with some differences; major one being that no distinction is attempted between SL or ATM, and SS or CBB. The least open (i.e., most severely pathologic) part of the angle gives the categorization (for risk- / stage- grade) for the eye. Before moving on to next more-open-and-free Gonio-anatomic Category, a subdivision with cut-off line at half point has been made for all the major G-categories, so as to give synchronize with the standard ISGEO definition of PACS. Example: if PTM were visible (opened up and free) in less than 2 Quadrants (i.e., up to 179.9' degrees) the designation would be 1.1, & if PTM were visible in 2 Quadrants or more (i.e., beyond 180 degrees) the designation would be 1.2. We then moved to the Y axis and summarized what happens with indentation into 4 major categories, 1 to 4 and 3 subcategories each to Majors 2 and 3. Major Categories are: (1) Not Opening further with Indentation, (2) Opening with Indentation in some Areas, (3) Opening with Indentation in All Areas & (4) Open without Indentation. Sub-Categories for Major categories 2 & 3 are: (#.1) Up to "1-G", (#.2) Up to "2-G" & (#.3) Beyond "2-G". Empiric Risk Assignment Number (ERAN) are given to the junctions in the table, starting with 2 for "3-G" on X-axis & "Open Without Indentation" on "Y-axis" corresponding to the widely open angle at risk of POAG alone; we then add 1 point for every cell moved up or to left & the table gets the highest ERAN of 16 at top-left for the angle completely un-relenting even with indentation. The ERAN number at the ISGEO classification's traditional PACS cut-off ranges from 6 to 12, depending on the initial view of angle opening on X-axis 2.1 position & options in final indentation view; the ERAN number is 6 if the angles are opening "beyond "2-G"" i.e., SS/CBB and 12 if "Not Opening further with Indentation". Empirical color coding has been given to the ERAN score cells with use of Microsoft Excel® Software (using the Conditional Formatting toolbar). An additional table is added to give additional risk scores because of features like Pigment Clumps, Goniosynechiae, Inflammation, Plateau Iris, Angle Recession, Iris stromal signs of PACD, etc. These scores can be added to the ERAN score to give an empirical idea of the total risk.

Results: We present the table with labels, explanations and illustrated sample cases.

Conclusion: The 2-dimensional perspective with the ERAN table adds to the detail and complexity of the traditional gonioscopic categorizations, including the ISGEO classification. The matrix reveals potential for more accurate risk assignments. The 3rd dimension added through the Risk Adding Features table supplements the risk assessment protocols, in an empirical manner.

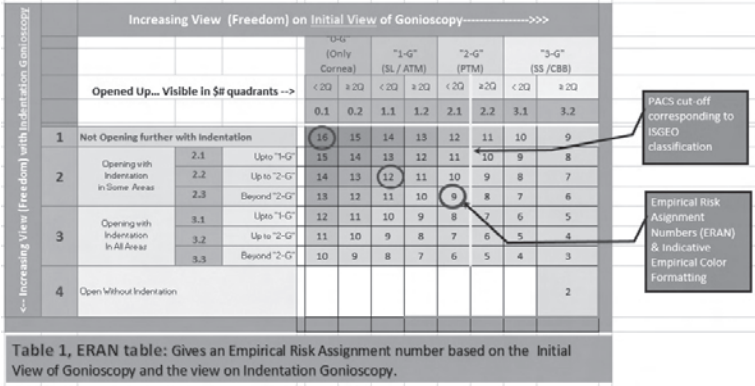

Table 1, ERAN table: Gives an Empirical Risk Assignment number based on the Initial View of Gonioscopy and the view on Indentation Gonioscopy.

Table 2, Risk Adding Features: Gives an Empirical Risk Assignment number based on probable additionalrisk to the ERAN number to selected entities

P32 Long-term outcome of initial treatment in acute primary angle closure

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Purpose: Analysis of long-term results and outcome of patients diagnosed with primary angle closure glaucoma (PACG) following acute primary angle closure (APAC) at seven years later. Re-evaluation of previously identified risk factors.

Methods: Retrospective review of patients previously diagnosed with APAC and subsequently treated in a standard protocol (period of data collection from December 2003 to June 2006). Primary care involved intensive medical therapy or laser iridoplasty followed by early laser peripheral iridotomy. Longevity analysis carried out at seven years after initial treatment.

Results: Data of 42 eyes of 41 patients were analysed with an initial mean follow-up period of 27.3 ± 16.2 months until termination of the initial study. Nine of 42 eyes (21.4%) developed an increase in intraocular pressure (IOP) within a mean of 11.9 months (median 5 months) after resolution of

APAC. Eight eyes subsequently underwent trabeculectomy or glaucoma drainage device implant at the termination of the initial study. At final follow-up, the mean IOP of attack eye was 13.3 ± 2.92 mmHg. At the point of termination of the initial study, none of the eyes required topical medication to control IOP. Duration of symptoms prior to presentation and duration taken to break the acute attack were found to be associated with development and eventual progression of PACG.

Conclusion: Early aggressive management of acute angle closure attack may contribute in preventing development of PACG after APAC and preserving visual acuity as well as lowering intraocular pressure in the long-term, may however not prevent future surgical treatment completely.

P33 Comparison of argon laser peripheral iridoplasty and medical therapy in the immediate treatment of acute primary angle closure using anterior segment optical coherence tomography

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Aim: To compare the effect of argon laser peripheral iridoplasty (ALPI) and conventional systemic medical therapy in the immediate treatment of acute primary angle closure (APAC) using anterior segment optical coherence tomography (ASOCT).

Methods: This was a prospective randomized controlled trial. 27 consecutive patients with APAC were recruited and randomized either to immediate ALPI or medical therapy. IOP was assessed and ASOCT imaging (Visante prototype, Carl Zeiss Meditec, USA) was performed immediately before and one hour after ALPI or medical therapy. Custom software was used to measure the pupil distance (PD), anterior chamber depth (ACD), anterior chamber area (ACA, anterior chamber width (ACW), iris curvature (I-Curv), iris area (IA) and the angle opening distance (AOD750), angle recess area (ARA750), trabecular iris space area (TISA750) and iris thickness (IT750) at 750mm from the scleral spur.

Results: The mean age of the patients was 60.9 ± 7.5 years and 11 patients (40.7%) were male. The mean interval between onset of APAC symptoms and presentation was 35 hours (range 2 to 144 hours). The mean IOP in the APAC eye was 54.4 ± 10.0 mmHg at presentation, and 29.6 ± 13.3 mmHg one hour after treatment ($p < 0.001$). The decrease in IOP one hour after treatment did not differ significantly between patients who underwent ALPI or medical therapy. APAC eyes which underwent ALPI had a larger increase in ACA ($p = 0.001$), AOD750 ($p = 0.002$), ARA750 ($p = 0.012$) and TISA750 ($p = 0.007$) compared to APAC eyes which received conventional systemic medical therapy.

Conclusion: ALPI and medical therapy resulted in similar IOP reduction in APAC eyes, when the duration of APAC was short. However, there was a larger increase in most anterior segment parameters measured using ASOCT in APAC eyes that underwent ALPI compared to those that received medical therapy.

P34 Short-term efficacy of selective laser trabeculoplasty in primary angle closure disease - Results of a RANDOMIZED CONTROLLED TRIAL

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Purpose: To assess the intraocular pressure (IOP) lowering efficacy of selective laser trabeculoplasty (SLT) over 6 months in eyes with primary angle closure (PAC) and primary angle closure glaucoma (PACG).

Methods: One hundred subjects diagnosed as PAC/PACG with at least 180 degrees of visible posterior trabecular meshwork on gonioscopy after laser iridotomy were enrolled in this prospective multi-centre randomized study. Subjects with a baseline IOP > 21 mmHg were randomized to either SLT or medical therapy (prostaglandin analog). Repeat SLT was performed if the IOP reduction of less than 20% from baseline was noted at month 1 or 3 visit. The primary outcome measure was the change in IOP from baseline at 6 months. Further treatment modification in the form of additional medication was administered if the IOP was > 21 mmHg (after a maximum of 2 laser sittings in the SLT group) and was considered as criteria for failure.

Results: Fifty subjects (96 eyes) were randomized to SLT and 50 subjects (99 eyes) to medical therapy. At 6 months, 49 subjects completed follow up in the SLT group and 47 subjects in the medical group. Data from one eye per subject was included in the final analysis. There were no significant differences between the groups in terms of demographic features, diagnosis, extent of peripheral anterior synechiae, and vertical cup-to-disc ratio or visual field indices at baseline. There were no differences in the mean baseline IOP between the SLT group and the medication group (23.4 ± 2.5 Vs. 22.5 ± 2.3 mmHg; p = 0.07). Median extent of angle treated by SLT was 360º (180º-360º) and 28.5% of eyes received SLT twice. At 6 months, IOP decreased by 3.9 mmHg (95% Confidence Interval [CI]: 2.7-5.1 mmHg) in the SLT group (p < 0.001) and by 4.4 mmHg (95% CI: 3.4-5.4 mmHg) in the medication group (p < 0.001). There were no differences noted either in the absolute mean reduction of IOP (3.9 Vs. 4.4 mmHg; p = 0.4) or in the percentage reduction in IOP (17.5% vs. 21.4%; p = 0.1) between the groups. A failure rate of 22.4% was noted in the SLT group compared to 6.3% in the medication group (p = 0.02). Three subjects had a post treatment IOP spike in the SLT group. No other complications were recorded in either of the groups.

Conclusions: SLT treatment is effective in eyes with PAC/PACG but the overall success rates are lower when compared to prostaglandin analogues.

P36 Comparative study of the intraocular pressure fluctuations between the 24 hr Tensional Curve, Borrone Test and Water Drinking Test in patients with primary open angle glaucoma in Mexico

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Objectives: To evaluate de results of the Water Drinking Test and Borrone Test in patients with primary open angle glaucoma, comparing it with 24 hr Tensional Curve.

Methods: To the same group of patients a 24 hr Tensional Curve was perfomed and the results were compared with the Borrone Test and the Water Drinking Test.

Results: The average of IOP fluctuation was 4.05 ± 1.57 mmHg in the 24 hr Tensional Curve, for the Water Drinking Test was 3.55 ± 1.5 mmHg and for Borrone Test was 2.55 ± 2.83 mmHg. The difference of the results between the 24 hr Tensional Curve and Borrone Test were statistically significant. The difference of the results between the 24 hr Tensional Curve and Water Drinking Test were not statistically significant. We observed just a 40% of concordance between both the Borrone Test and Water Drinking Test with the 24 hr Tensional Curve.

Conclusions: In the present study the Borrone Test and the Water Drinking Test obtained a low correlation with the 24 hr Tensional Curve which is considered the gold standard.

P37 The impact of lens vault on visual acuity and refractive error in subjects with angle closure: implications for management of angle closure

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Purpose: To investigate the relationship between lens vault (LV), visual acuity and refraction in subjects with angle closure.

Methods: This was a cross-sectional study of 2047 subjects aged ≥ 50 years recruited from a community polyclinic. All participants underwent a standardized ocular examination and anterior segment optical coherence tomography (ASOCT). Customised software was used to measure LV, defined as the perpendicular distance between the anterior pole of the crystalline lens and the horizontal line joining the 2 scleral spurs, on horizontal ASOCT scans. Visual acuity was measured using a logarithm of minimum angle of resolution chart (logMAR chart, Lighthouse Inc, Long Island, New York). Visual acuity was classified as normal (logMAR < 0.3), mild impairment (0.3 < logMAR < 0.6) and moderate/severe impairment (logMAR > 0.6). Refraction was measured with an autorefractor machine (Topcon Auto K KR7100D, Topcon Corp, Tokyo, Japan). Spherical equivalent was defined as sphere plus half cylinder. An eye was defined as having angle closure if the posterior pigmented trabecular meshwork was not visualized ≥ 180° on gonioscopy.

Results: Complete data on 1372 subjects including 295 (21.5%) with angle closure were available for analysis. Eyes with angle closure were significantly older ($p < 0.001$), with shorter axial length (AL, $p < 0.001$) and shallower anterior chamber depth (ACD, $p < 0.001$). However, although eyes with angle closure had a significantly greater LV ($p < 0.001$), there was no significant difference in visual acuity ($p = 0.12$) compared to those without angle closure. No significant trend was noted in visual acuity ($p = 0.83$) or spherical equivalent ($p = 0.64$) with increasing magnitude of LV in eyes with angle closure. After adjusting for age, gender, AL, ACD, and spherical equivalent, there was no significant association between LV and visual acuity ($p = 0.35$). Similarly, no significant association was found between LV and spherical equivalent ($p = 0.06$).

Conclusion: LV was not associated with visual acuity or spherical equivalent.

• CONGENITAL / PEDIATRIC GLAUCOMA

P38 Glaucoma after congenital cataract surgery

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Purpose: Cataract surgery in children is a difficult entity with marked variability in surgical techniques and outcomes. Glaucoma is a fairly common complication of congenital cataract surgery, and the treatment is mainly surgical, with adjunctive medical therapy frequently required. The purpose of the study was to explore the clinical characteristics of and the results of surgical intervention for glaucoma after congenital cataract surgery in a University based practice in Alexandria, Egypt, a community were childhood glaucoma is known to be particularly common and particularly severe.

Methods: The study was a retrospective chart review of 32 children that presented to the Ophthalmology department of Alexandria Main University Hospital with the diagnosis of glaucoma after congenital cataract surgery and were operated upon for glaucoma between June 2005 and November 2012. The charts were reviewed for demographic data, preoperative clinical examination data including level of intraocular pressure (IOP), corneal diameter, clarity and thickness (CCT), fundus examination for cup/disc ratio and axial length (AL) measurements, operative data including type(s) of glaucoma surgical interventions, and postoperative clinical examination data at monthly intervals in the first postoperative year, then every 3 months till the end of the third year, then every 6 months till the end of the follow up period. Medication use was reviewed preoperatively as well as at all time points postoperatively. Complications were noted. Success was studied at the end of follow-up. All glaucoma surgical procedures were performed by the same surgeon.

Results: The study included 41 (25 right, 16 left) eyes of 32 (19 males, 13 females) children with glaucoma after congenital cataract surgery that were operated upon by 57 glaucoma surgical procedures (average 1.4 procedure/eye, range 1-4) performed by the same surgeon. The study

eyes included 36 aphakic and 5 pseudophakic eyes. The mean age (±SD, range) of the study patients at the time of surgery was 15.3 (± 19.6, 3-103) months and the mean (±SD, range) follow up period was 39.1 (±25.2, 1-75) months. Preoperatively, 16 eyes were on no IOP lowering therapy, 19 eyes were on 1 agent and 6 eyes were on 2 agents. 30 (73%) eyes were subject to 1 glaucoma surgical procedure, 8 (20%) eyes were subject to 2 glaucoma surgical procedures, 1 (2%) eye were subject to 3 glaucoma surgical procedures, and 2 (5%) eyes were subject to 4 glaucoma surgical procedures. The most common primary glaucoma surgical procedure performed was combined trabeculotomy-trabeculectomy with mitomycin C (CTTM, 32 (78%) procedures). The mean (±SD, range) preoperative IOP, corneal diameter and thickness, cup/disc ratio and AL of the study eyes was 22.3 (±6.1, 10-34) mmHg, 11.4 (±0.9, 10-13) mm and 617.6 (±66.8, 538-758) μ, 0.5 (±0.3, 0-1) and 22.85 (±2.75, 18.55-29.17) mm respectively and postoperatively at last follow up was 11.0 (±7.3, 1-36) mmHg, 11.5 (±0.9, 10-13) mm and 576.8 (±83.3, 461-736) μ, 0.4 (±0.3, 0-1) and 24.62 (±2.81, 19.70-32.81) mm respectively. Success was defined by the cup/disc ratio stability in eyes with visible fundi and by IOP reduction to ≤ 15 mmHg and from preoperative IOP in eyes with invisible fundi, and was reported in 34 (82.9%) eyes at the end of follow up (8 eyes with the use of IOP lowering medications, 26 eyes without). Complications included endophthalmitis in 1 eye, hypotony disc oedema in 1 eye and retinal detachment in 1 eye.

Conclusion: Glaucoma after congenital cataract surgery is a difficult entity, often requiring more than 1 surgical procedure to control, and frequently requiring adjunctive IOP lowering therapy for control of the condition. Optic nerve stability is more accurate in defining success in view of the changes in CCT with resultant less reliability of IOP measurements. Long-term follow-up is mandatory to detect any failure of treatment at any time point and manage accordingly.

P40 Filtering surgery for OPTN E50K patient

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Purpose: The only effective treatment for glaucoma is reducing intraocular pressure (IOP). However, we do not know the effect of low IOP for normal tension glaucoma (NTG) caused by genetic mutation. We investigated the clinical features and effects of filtering surgery of subjects with glaucoma caused by E50K mutation in the optineurin (OPTN) gene.

Subjects and Methods: A 41 year old woman with the E50K mutation in the OPTN gene underwent trabeculectomy in the left eye in 2006. She is from a big glaucoma family (father, brother, son, nephew and niece). This patient's IOP and visual field was observed for 5 years before and after filtering surgery. IOP was measured by applanation tonometer and Mean Deviation (MD) of visual field was measured by Humphrey Field Analyzer (Carl Zeiss Meditec Inc, Germany) program 30-2. MD slope was calculated by HFA files (Beeline Co. Ltd Tokyo Japan).

Results: IOP was significantly reduced from 10.8 ± 0.84 mmHg to 7.38 ± 1.06 mmHg($p = 0.002$ Mann-Whitney U test) after surgery and MD slope improved from -0.63 dB/year to +0.12 dB/year in the operated eye. However, IOP did not change from 11.4 ± 0.55 mmHg to 11.6 ± 1 .51mmHg before and after surgery in the fellow eye and MD slope dropped from -0.38 dB/year to -0.73 dB/year.

Conclusion: We observed effects of filtering surgery for the patient with E50K mutation in the OPTN gene for 10 years (5 years pre operation and 5 years post operation). The visual field progression was improved after trabeculectomy in the operated eye. This result may suggest that filtering surgery have good effect for genetic NTG even when IOP is lower than 15 mmHg.

P41 Surgical outcome of 25 eyes of congenital glaucoma

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Purpose: To evaluate the outcomes of the surgical procedures for the treatment of primary congenital glaucoma (PCG).

Methods: This was a retrospective study of 25 eyes with PCG. The patients with age less than 2 year age (Group A) underwent combined trabeculotomy and trabeculectomy (CTT) and patients aged 2-5 years (Group B) underwent trabeculectomy. Since all eyes were in advanced stage with hazy cornea so no eye was subjected to primary goniotomy or trabeculotomy alone. Anti metabolite (Mitomycin C 0.2 mg % for 2 minutes) was used in all cases.

Results: Group A and B contained 17 and 8 eyes respectively. The mean duration of follow-up was 6 months. In Group A 13 (76.47%) eyes had satisfactory IOP control without any medication, 2(11.76%) eyes needed add on antiglaucoma medications and 2 (11.76%) eyes needed resurgery. In Group B 6 (75%) eyes had satisfactory IOP control without any medication, 1(12.50%) eye needed add on antiglaucoma medications and 1 (12.50%) eye needed resurgery. Eyes of Group A gained good corneal clarity. Reductions in the corneal diameter were only seen in the successful surgery group. In addition, the successful surgery group contained more patients that complied with a regular follow-up routine.

Conclusions: CTT and trabeculectomy both have satisfactory results. The patients with successful surgical results had better vision. Early presentation and compliance for regular follow-up may increase the chances of a successful surgical outcome.

P43 Management of childhood glaucoma associated with bilateral Sturge Weber Syndrome: A challenge.

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Purpose: To report surgical and visual outcome of trabeculectomy in bilateral Sturge-Weber syndrome.

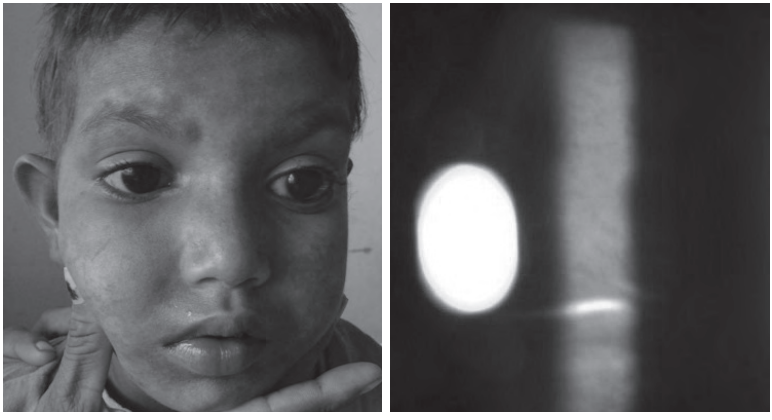
Method: Interventional case report.

Result: A 6-year-old girl was brought to the outpatient department of ophthalmology by her parents with the chief complaints of gradually increase in size of the eyes since birth, diminution of vision, photophobia and watering. There was no history of ocular trauma. There was no significant systemic history including no seizure disorder. She was normally delivered at full term. Family history was not significant. She was a second child in the family. She was treated elsewhere with eye drops 0.5% timolol b.d. and eye drops 2% dorzolamide t.i.d. in both the eyes for six months. Systemic examination was within normal limits. Erythematous well defined irregular shaped plaque was present on both the sides of the face involving right ear lobule and right side of upper trunk. Mild right sided facial hypertrophy was also noted. The findings were suggestive of bilateral Sturge-Weber syndrome. On ocular examination, best corrected visual acuity in the right eye was 2/60 and that in the left eye was perception of light with accurate projection of rays in all quadrants. The eyes were aligned. Extraocular movements were full in all positions of gaze. Both the eyes were buphthalmic. Tortous conjunctival vessels were present in both the eyes. Cornea was clear and the anterior chamber was deep on both the sides. There was loss of iris pattern in both the eyes. Pupils were round in shape and with sluggish reaction. There was no relative afferent pupillary defect. Lens was clear. Ultra-sonography B Scan of both the eyes revealed normal posterior segment. The axial length of right and left eyes was 27.13 mm and 28.12 mm respectively. The child was examined under general examination. The child was examined under general anesthesia. Intraocular pressure was 26 mmHg in the right eye and 17.3 mmHg in left under halothane and timolol and dorzolamide eye drops. The diameter of cornea was 14 x 14 mm and 14 x 14.5 mm in right and

left eyes respectively. Examination of sclera showed diffuse pigmentation and dilated tortuous episcleral vessels, which were more marked in the right eye. Examination of fundus revealed pale disc with total cupping, nasal shift of vessels and dilated tortuous vessels in both the eyes. In the left eye had choroidal hemangioma of two disc diameter was seen in the superotemporal quadrant. Foveal reflex was dull. She underwent bilateral trabeculectomy with intraoperative use of 5- FU on the right eye followed by the left eye seven days apart. In the postoperative period, she was commenced on eye drops 1% prednisolone acetate 2 hourly, eye drops 5% moxifloxacin 6 hourly and eye drops 1% tropicamide t.i.d. There was no improvement in visual acuity in both the eyes postoperatively. On 1st postoperative day, the right eye developed massive kissing choroidal effusion with shallow anterior chamber. On the third postoperative day, the anterior chamber in the right eye was reformed with ringer lactate solution. Similarly, on the 2nd postoperative day the left eye had choroidal effusion in the inferior nasal quadrant sparing the macula. She was started on oral prednisolone 1 mg/kg body weight. Within seven days, gradual spontaneous resolution of choroidal effusion was seen with well formed anterior chamber and normalization of IOP. At one month follow up, BCVA in right eye was > 3/60 and that in the left 2/60 with accurate projection of rays in all the quadrants. The anterior chamber was well formed and the IOP was 10 mmHg in both the eyes with flat retina.

Conclusion: Sturge Weber syndrome is a rare entity. Management of glaucoma associated with Sturge-Weber syndrome is challenging. While planning surgical intervention an increased risk of severe choroidal effusion should be kept in mind.

Keywords: Sturge Weber syndrome, trabeculectomy, choroidal effusion, glaucoma



P44 Association of retinal venous tortuosity and inverse glaucoma - case report

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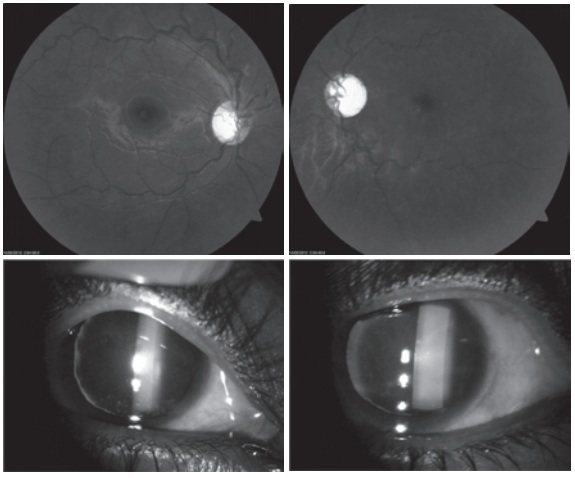
16 yr female presented with visual blurring in both eyes. Her visual acuity was 6/36 improving to 6/6 with -5.00D in right and 2/60 improving to 6/36 with -7DS/-1.5Dcyl@110^0 in left eye. The intraocular pressures (IOP) were upto 35 mmHg, with advanced glaucomatous cupping , disc collaterals and retinal venous tortuosity in both eyes. After dilatation, lens edge was readily visible in the inferior quadrants suggestive of lens subluxation in both eyes. Gonioscopy showed open angle recess with insertion upto posterior meshwork and iris processes all around. High serum homocysteine levels (19.51 umol/l, reconfirmed 3.5 mg/l), low vitamin B12 levels (165 pg/ml) with normal folate (11.01 ng/ml) were reported. Genetic testing revealed heterozygosity for MTHFR 1298C-AC-100 and 72bp. This could manifest as homocysteinaemia in patients having nutritional deficiency of vitamin B12,

as likely in our patient. She was put on methionine restricted diet alongside Tab. Pyridoxine 100 mg BD, Tab. Folic Acid 5 mg OD & Tab. Vitamin B12 OD. IOP could not be controlled medically and trabeculectomy was performed.

Conclusion: The role of retinal venous tortuosity as a marker for homocysteinaemia in the young should alert the clinician to look for other associations. The subtle finding of retinal venous tortuosity and a search for likely associations in the young may help in diagnosing this form of progressive secondary glaucoma where lens position contributed to severe visual deficit possibly due to inverse glaucoma.



P45 Ipsilateral Nevus of Ota with glaucoma: A case report with literature review

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The nevus of Ota also known as "congenital melanosis bulbi" and "oculodermal melanocytosis" is a blue-gray hyperpigmentation that occurs on the face and eyes. The sclera is involved in two-thirds of cases (causing an increased risk of glaucoma). Glaucoma is associated only 10% cases. Most cases of the nevus of Ota are unilateral (90%), although pigmentation is present bilaterally in 5%–10%. Ocular abnormalities included pigmentation of the sclera, cornea, retina, and optic disc and cavernous hemangiomas of the optic disc, elevated intraocular pressure, glaucoma, and ocular melanoma. We reported a case of 14 years girl patient with the, ipsilateral nevus of Ota with unilateral glaucoma.

Key words: Nevus of ota, Glaucoma

• GLAUCOMA MEDICATIONS

P46 Early initiation of aqueous suppressants, Timolol-Trusopt fixed combination, on Ahmed glaucoma valve implantation outcome

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Purpose: To evaluate the effect of early aqueous suppressants initiation on Ahmed glaucoma valve (AGV) implantation outcome.

Methods: In this randomized clinical trial, 94 eyes of 94 patients with refractory glaucoma were enrolled and assigned into 2 groups. After AGV implantation, group 1 (case; n = 47) received topical Timolol-Dorzolamide fixed combination twice daily when the intraocular pressure (IOP) reached 10 mmHg, and group 2 (control; n = 47) received stepwise glaucoma medications when IOP reached higher than target. Main outcome measures included IOP and success rate (defined as 6 < IOP < 15 mmHg and at least 30% IOP reduction). Other outcome measures included, best corrected visual acuity (BCVA), complications, and rate of hypertensive phase.

Results: Forty seven eyes in group 1 and 2 were followed for a mean period of 45 ± 11.6 and 47.2 ± 7.4 weeks respectively (p = 0.74). Using mixed model analysis the IOP reduction was significantly more in group 1 at all interval points (p < 0.001). Success rate was significantly higher in group 1 (63.2% versus 33.3%, p = 0.008). The rate of hypertensive phase was significantly more in control group (23.4% versus 66.0%, p < 0.001).

Conclusions: Early initiation of aqueous suppressants may improve success rate of AGV implantation, and can be considered in postoperative management of this procedure.

P47 Comparison of treated mean intra-ocular pressure in stable glaucoma with different severity

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Purpose: To compared stable glaucoma with different severity in regard to mean IOP and number of medications used.

Materials and Method: 116 eyes from 68 patients with medically treated glaucoma were prospectively enrolled at a single centre and subjected to automated perimetry every 3-months for at least 9 months. Glaucoma progression was identified according to Early Manifest Glaucoma Trial criterion using Glaucoma Progression Analysis software. Eyes in which no progression was identified were staged for glaucoma severity using field criteria (Mild MD > -6dB, Moderate MD -6 to -12 dB, Advanced MD < -12dB, End-Stage central island only). Groups were compared in terms of mean IOP and number of medications used. Statistical analysis was performed using SPSS v16.0.

Results: 109 eyes displayed no evidence of progression during the study period. Pre-treatment mean IOP for mild, moderate, severe and end-stage glaucoma was 28.2 ± 1.4, 28.8 ± 1.6, 29.1 ± 1.8 and 28.6 ± 0.8 mmHg. The mean IOP of all 109 eyes during follow-up was 16.8 ± 1.4 mmHg (95% confidence interval [CL] = 16.6 to 17.1 mmHg). Mild, moderate, advanced and end-stage glaucoma had mean IOP of 17.5 ± 1.2, 16.9 ± 1.3, 15.8 ± 0.9 and 15.5 ± 1.1 mmHg. The mean IOP of mild stage was significantly higher than advanced and end-stage (t test, p< 0.001). Also, the mean IOP of moderate glaucoma was significantly higher than advanced and end-stage glaucoma (t test, p < 0.05). Number of medications had no significant difference among these glaucoma stages (Chi-square test, p > 0.05).

Conclusion: Reached IOP lowering contributes to glaucoma stabilization especially in late stages. To maintain stable glaucoma, there was no difference in medical procedure of glaucoma stages.

P48 To evaluate the improvement in eye drop instillation after use of drop application strips in glaucoma patients on chronic topical medical therapy

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Purpose: Compliance and appropriate use of topical medication is paramount in glaucoma patients especially because chronic topical medical therapy is needed. The main challenge in these patients is to place drops in the eye accurately. Drop application strip is a cheap device which assists patient in instilling topical medication. The strip consists of a reflective coating and a central dot. It is stuck with adhesive to the eye drop bottle and the patient is instructed to look in

the centre of the dot while instilling the eye drop. This aids the patient in instilling eye drops within the palpebral aperture. These drops have recently been introduced in India and the purpose of this pilot study was to evaluate the improvement in eye drop instillation after use of drop application strips in glaucoma patients on chronic topical medical therapy.

Method: Patients with diagnosis of juvenile open angle glaucoma and primary open angle glaucoma on medical therapy attending the outpatient department of tertiary care centre with vision of 3/60 or better were included in the study. Fifty two eyes of 52 patients were assessed. Patients were instructed to instill 0.5% CMC drops in one eye. They were then instructed to instill the drops in the same eye using the drop application strips. The number of drops used until instilling one drop accurately into the eye, site of drops falling in the eye/adnexae and contact of the nozzle with the eyeball or eyelid were the parameters recorded.

Results: Mean age of the patient included in the study was 43.13 ± 14.7 years (range = 17-82 years). Out of 52 patients, 35 (67.3%) were males and 17 (32.7%) were females. Before assistance of drop application strips, 25 (48%) patients placed drop into the eye without any contact of the dropper nozzle and after application of drop application strips 48 (92.3%) patients placed drop in eye without any contact ($p = 0.0005$). Number of patients putting first drop of drug into the eye without spilling over the adenxae increased from 22 (42.3%) to 30 (57.7%) after application of the strip ($p = 0.180$). The mean number of drop instilled to get one drop into the eye decreased from 1.75 ± 0.92 (range 1-6) to 1.44 ± 0.53 (range 1-3) when the drop application strip was used ($p = 0.043$).

Conclusion: Using the drop application strips causes significant decrease in contact of eye drop bottle nozzle with the eyeball and eyelid and also decreases the number of drop instilled to get one drop into the eye.

P49 A novel Mas-receptor is expressed in the human eye tissue

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Purpose: The aim of the study was to determine a novel Mas-receptor in the human eye tissue. The Mas-receptor is a member of G-protein coupled receptors and known to act antagonistically to the angiotensin 1 receptor thus counter-regulating local fluid volume, homeostasis and participating in to antiproliferation, antifibrosis and vasodilatation.

Matherials and Methods: Enucleated human eyes were used for immunohistochemical determinations. Human kidney sample was used as a positive control. In addition enucleated rat eyes were immunohistochemically stained and compared to the rat kidney tissue.

Results: The Mas-receptor was expressed both in the human eye tissue. The expression of receptor was denser in the retina than in the ciliary body. The receptor was also expressed in the rodent eye tissues.

Conclusion: The expression of a novel Mas-receptor in the human eye tissue was described first time in this study. The Mas-receptor may be an object for further ocular medicine development studies concerning intraocular pressure and retinal disease.

P50 Sequential therapy with saratin, bevacizumab and ilomastat to prolong bleb function following glaucoma filtration surgery in a rabbit model

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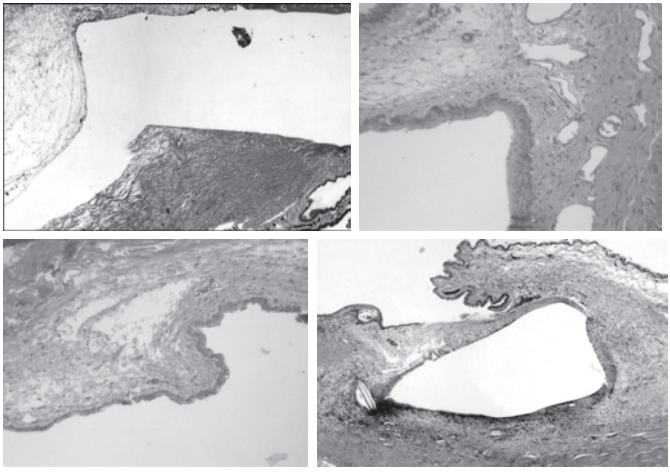
Purpose: To determine if consecutive treatment with bevacizumab (avastin), a monoclonal antibody that blocks angiogenesis, saratin, a 12 kd protein with anti-inflammatory and anti-thrombotic properties, and ilomastat, an MMP inhibitor, prolongs bleb life following glaucoma filtration surgery (GFS) in a rabbit model.

Methods: Thirty New Zealand White rabbits underwent GFS in the left eye. Group 1 received only the saratin peroperatively, and then ilomastat was injected on days 8 and 15. Group 2 received peroperative injections of saratin and avastin, and later subconjuctival injection of ilomastat on days 8 and 15. Group 3, the negative control received balanced saline solution (BSS), and group 4, the positive control, mitomycin-C (MMC) at the time of surgery. Intraocular pressures measured, blebs were then evaluated by a masked observer, and ultrasounds performed using the iScience iUltrasound every third day. Histology was obtained on two eyes in each group on post-op day twelve.

Results: Eyes group 1 that received the experimental treatment without avastin had a mean survival time of 25.5 ± 2.7 days, whereas eyes in group 2, had a mean bleb survival time of 29 ± 2.7 days. An ANOVA test showed that the saratin/ ilomastat group was not statistically different than the BSS group ($p = 0.1446$), which averaged 19.7 ± 2.7 days; however, the saratin/ilomastat/avastin group showed a significant improvement ($p = 0.0252$). In addition, group 2 eyes that received all three agents showed no significant difference from the MMC control group ($p = 0.4238$).

Conclusions: Sequential therapy with multiple agents, including avastin, successfully prolonged bleb function following GFS in the rabbit model.



P51 A prospective crossover study to compare the efficacy of latanoprost-timolol fixed dose combination (LTFC) along with add on therapy of timolol in patients of open angle glaucoma

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Objective: To evaluate the efficacy of latanoprost-timolol fixed dose combination (LTFC) along with add on therapy of timolol in patients of open angle glaucoma.

Methods: This 12 weeks randomised, crossover study included new patients of primary open angle glaucoma with baseline IOP 24 to 30 mm hg, after baseline IOP and Diurnal variation patients were randomised into two groups. One received LTFC and other LTFC+ morning dose of timolol. After 4 weeks of washout treatments were exchanged.

Outcome Measures: Post baseline IOP measurements at 9 am,12 noon, 4 pm, 7 pm, 10 pm, 4 am, 7 am at 4 weeks of both groups and same IOP measurements at 12 weeks for both groups.

Results: All therapies resulted in significant IOP reductions from baseline. But comparison with both group showed statistically insignificant results.

Conclusion: Fixed-combination latanoprost-timolol therapy is as safe and effective in lowering IOP in patients with POAG. No further benefit was observed by adding morning dose of timolol 0.5%.

• LASERS

P53 Combined laser technologies in treatment of pseudoexfoliative glaucoma (PEG)

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Purpose: To develop technology of combined application of selective laser trabeculoplasty (SLT) and YAG laser activation of trabecula (YAG-LAT) in PEG treatment as well as to evaluate its efficacy.

Methods: SLT and YAG-LAT were carried out according to standard technology in the lower half of the anterior chamber angle (ACA) (Latina M.A. et al. 1989; Magaramov D.A., Doga A.V., 2005). The treatment was performed using a combined SLT-YAG laser Tango of the Laserex Company (Australia). In this technique the laser effect was realized both on available pigment and on non-pigmented substrate which decreased permeability of trabecula. There were in the follow-up 58 patients (58 eyes) with PEG in the initial stage. The Group I included 20 patients (20 eyes) which underwent the SLT. In the Group II the YAG-LAT was performed in 17 patients (17 eyes). The Group III consisted of 21 patients (21 eyes), where the combined SLT + YAG-LAT treatment was carried out. The follow-up: up to 6 months postoperatively. The pigmentation degree of ACA structures was from a weak one (0-I) to a moderately pronounced degree (II) in all patients. Preoperatively the IOP on the hypotensive therapy background averaged 27.3 mmHg in patients of the Group I, 26.4 mmHg in the Group II, 28.3 mmHg in the Group III. Coefficient of outflow facility (C) in the Group I averaged 0.08 mm^3/min· mmHg; in the Group II – 0.10; in the Group III – 0.08. All operations were without complications.

Results: The average IOP decrease postoperatively was in the Group I by 7mmHg and C increased up to 0.13 ± 0.03. The average IOP decrease was in the Group II by 5 mmHg and C increased up to 0.10 ± 0.03. The average IOP decrease in the Group III by 10mmHg, C increased up to 0.15 ± 0.02. Totally after laser treatment a stable IOP decrease was obtained in 67% of patients in the Group I, in 61% in the Group II, in 78% in the Group III. The IOP normalization in other patients was achieved by intensity of hypotensive therapy and repeated laser procedures.

Conclusions: Thus, the laser activation of trabecula is an efficient and safe method of PEG treatment. The combination of the SLT and the YAG-LAT increases intervention efficacy.

P54 Combination of Transscleral Cyclophotocoagulation and Intravitreous Injection of Avastin in Treating Neovascular Glaucoma

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Introduction: Refractory glaucoma, especially when complicated after neovascularization, are still among most serious ophthalmological isssues. Secondary glaucoma development is predetermined by a combination of mutually interconnected genetical, biochemical, immune and morphological disorders in the eye bulb. Despite significant progress in this area, we are in continuous search of new approaches to treating obstinate glaucomas. Neovascular glaucoma is one of most "complicated" forms of glaucoma process. It mainly develops as a result of blood supply disfunction in inner parts of retina. Diabetic retinopathy and large vessels obstruction (occlusion) account

for the largest part. The mechanism of iris rubeosis development is not totally clear. Although no single view exists on it, the theory of retinal hypoxia and directly related to it vascular endothelial growth factor is the most common one. Being a polypeptide, VEGF is synthesized in retinal cells. Laser cyclocoagulation is one of the methods of treating neovascular glaucoma. The concept of laser cyclocoagulation is to impact the aqueous humor formation aiming at reducing the IOP level. This is reached via cyclocoagulation, which means destruction of ciliary body (its partial atrophy and destruction of non pigmental ciliated epithelium producing aqueous humor) and thrombosis or obstruction of certain vessels reaching the ciliary body. Avastin (Bevacizumab) is a growth factor paralyzer used in ophthalmology. Vitreous body injections of Avastin (Bevacizumab) proved highly efficient and showed good tolerance with patients running the risk of proliferative diabetic retinopathy.

Purpose: To show the effectiveness of pairing transscleral cyclocoagulation and intravitreous injection of Avastin.

Work material: There were 15 patients with neovascular glaucoma under our supervision. Average observation period was 2 (two) years. Average age of the patients was 65 years. Initial investigation involved visometry, tonometry, biomicroscopy, ophthalmoscopy, B-scan. Visometry: visual acuity for 9 patients (60%) was hand movement by the face, 6 patients (40%) could count fingers at 1 metre distance.Tonometry: initial average IOP was 45.5 mm Hg. Biomicroscopy: rubeosis was only touching the papillary edge or single vessels appeared on the iris body. There was hyphema (2-3 mm) in 2 cases (13.33%), 1 case (6.67%) of corneal opacity (paracentral). Ophthalmoscopy: preproliferative diabetic angioretinopathy in 86,67% and proliferative diabetic retinopathy in 13,33% of cases. B-scan: traction component not found. Treatment: prior to the intervention all patients received beta-blockers, m-cholinergic receptors and steroids in the form of instillations. At earlier stages of the disease 2 patients (13.33%) underwent vitrectomy with panretinal photocoagulation and C3F8 gas injection.

Methods: Prior to the transscleral cyclophotocoagulation the patients received Avastin as intravitreous injection on outpatient basis. Afterwards transscleral cyclophotocoagulation (TSCPC) was perfomed based on our parameters (power 1750-2500 mW, duration 2000 msec, with a minimum number of 25 coagulants). This was done on outpatient basis as well. After TSCPC a solution of Dexamethasone Sulphate 0.4% - 0.5 ml was injected under conjunctiva. Antibiotics and steroids instillations were prescribed.

Findings: dymanic follow-up observation in 1 month, 1 year and 2 years period.

Results: Visometry: 8 patients were able to count fingers at 1-2 m distance; 3 patients – were able to count fingers at 4 m distans; 1 patient with correction sph (+) 4.0D – 20/200; 3 patients – 20/200. Tonometry: average IOP level made 23.5 mm Hg.

Biomicroscopy: no more rubeosis and hyphema revealed. Ophthalmoscopy: no considerable changes observed, however certain positive dynamics can be noted, namly reduced edema and hemorrhage. B-scan: unchanged. After a 1 year period 1 patient underwent panretinal photocoagulation and 1 patient vitrectomy with panretinal photocoagulation. The rest of the patients from time to time received intravitreous injection of Avastin.

Conclusion: Transscleral cyclophotocoagulation with G-probe diode laser is noninvasive and atraumatic method. Transscleral cyclophotocoagulation with G-probe diode laser and intravitreous injection of Avastin allow to level the IOP and reduce neovascularization (rubeosis). As a result, the patient's visual function is improved. The advantage of using the above described method on an outpatient basis allows to decide in favor it when treating neovascular glaucoma. This technique can also be used as a pre-operational stage for surgery.

P55 Posture-induced intraocular alterations after laser peripheral iridotomy in eyes with primary angle closure

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Purpose: To determine whether laser peripheral iridotomy (LPI) affects the posture-induced changes in the intraocular pressure (IOP) in eyes with primary angle closure (PAC), primary angle closure suspect (PACS) and primary angle closure glaucoma (PACG).

Methods: Forty-one eyes of 41 patients with PAC/PACS and PACG who were scheduled for LPI were subjected. The IOP was measured in the sitting and the lateral decubitus position with an Icare rebound tonometer before, and 1, 3 months after the laser therapy.

Results: The mean age was 67.4 ± 9.1 years with a range of 43 to 81 years. There were 29 women and 12 men. Twenty-three eyes had PAC, 10 eyes had PACS, and 8 eyes had PACG. The mean extent of the peripheral anterior synechiae was 36.0 ± 58.1 degrees with a range of 0 to 255 degrees. The mean baseline IOP measured with the Icare was 16.4 ± 6.2 mmHg in the sitting position and 20.5 ± 6.2 mmHg in the lateral decubitus position ($p = 0.000$; paired *t*-test). At one month, the mean IOP was 15.5 ± 4.1 mmHg in the sitting position and 19.3 ± 4.6 mmHg in the lateral decubitus position ($p = 0.000$; paired *t*-test). At three months, the mean IOP was 15.9 ± 4.1 mmHg in the sitting position and 19.4 ± 4.2 mmHg in the lateral decubitus position ($p = 0.000$; paired *t*-test). This postural IOP difference, +4.1 mmHg, was +3.8 ± 2.6 mmHg at one month and to +3.5 ± 2.3 mmHg at 3 months after the laser surgery ($p = 0.247$; repeated-ANOVA). Conclusion: Our results indicate that LPI has no effect on posture-induced IOP changes from the sitting to the lateral decubitus position in eyes with primary angle closure.

P56 Outcomes of transscleral diode laser cyclophotocoagulation in adult patients with refractory glaucoma

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Purpose: The aim of this study was to evaluate the efficacy and safety of transscleral diode laser cyclophotocoagulation in adult patients with refractory glaucoma.

Methods: Charts of the patients who underwent transscleral diode laser cyclophotocoagulation in our clinic between January 2009 and June 2013 were reviewed retrospectively. Eyes with follow-up shorter than 6 months were excluded. Success was defined as a final intraocular pressure (IOP) between 7 and 21 mmHg.

Results: Fifty-one eyes of 47 patients were included in the study. Mean age was 52.25 ± 16.85 years, mean follow-up time was 17.22 ± 13.46 months. Glaucoma diagnosis was primary open angle glaucoma in 16 eyes (31.37%), primary congenital glaucoma in 8 eyes (15.69 %), neovascular glaucoma in 6 eyes (11.76 %), silicone oil induced glaucoma in 6 eyes (11.76%), pseudoexfoliation glaucoma in 6 eyes (11.76%), posttraumatic glaucoma in 4 eyes (7.84%), uveitic glaucoma in 4 eyes (7.84%), postkeratoplasty glaucoma in 2 eyes (3.92 %), chronic angle closure glaucoma in one eye (1.96%). Before laser treatment mean IOP was 32.18 ± 10.80 mmHg. It was found as 17.50 ± 6.22 mmHg at last follow-up visit. Decrease in IOP level after laser treatment was statistically significant ($p < 0.001$). Before laser treatment, mean topical antiglaucomatous medication was 2.57 ± 0.83. It was found as 2.43 ± 0.98 at final visit. There was no statistically significant difference between the number of topical medications ($p = 0.332$). At last follow-up visit success was achieved in 36 of 51 eyes (70.58 %). As a postoperative complication chronic ocular hypotony was developed in one eye with neovascular glaucoma.

Conclusion: Transscleral diode laser cyclophotocoagulation is an effective and safe procedure in adult patients with refractory glaucoma.

P57 Argon laser trabeculoplasty (ALT) in cases of advanced glaucoma

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Introduction: The treatment for advanced glaucoma includes multiple medications combined with laser and surgical interventions. Argon laser trabeculoplasty (ALT) in addition to topical treatment may be an effective alternative in patients with advanced glaucoma who do not want drainage surgery.

Purpose: To assess the safety and efficacy of ALT in cases of advanced glaucoma.

Methods: We retrospectively reviewed the case notes of patients who underwent ALT between August 2010 and September 2011. The following data were recorded for each case: the number of medications, visual acuity (VA), intraocular pressure (IOP), visual field (VF) before and after ALT treatment. Adverse events following treatment were recorded.

Results: A total of 40 patients, mean age of 79 years (range 56-92), were identified No change in number of medications was required in 75% patients, 12.5% required a decrease in 2-4 medications and 12.5% an increase in 1-2 medications. The difference in LogMAR visual acuity was not statistically significant (027 pre-ALT and 0.19 post-ALT) as well as the change in visual field mean deviation (-9.17 pre-ALT, -9.45 12 months post-ALT). The change in IOP was statistically significant (21.5 (SD 4.6) pre-ALT, 17.6 mmHg (SD 5.9) at 12 months post-ALT). A mean decrease in IOP of 6 mmHg was recorded in 76% patients and a final IOP < 16 mmHg in 47.5% of patients. No serious complications were observed during the study. No extra visits were required.

Conclusions: ALT appeared safe and effective in lowering the IOP in cases of advanced glaucoma not opting for filtration surgery.

P58 Evaluation of Patterned Laser Trabeculoplasty for Intraocular Pressure Lowering in Glaucoma - A Novel Treatment

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Purpose: The PASCAL Photocoagulator was introduced in 2006 for semi-automated photocoagulation of the retina. It has the advantages of short pulse durations and predetermined patterns of spots resulting in reduced thermal diffusion and associated unintended tissue damage, greater control of tissue effects, precise placement of laser spots, faster treatment and reduced patient discomfort.

Its application in glaucoma laser treatment is novel and the use of sub-visible treatment lesions associated with reduced amount of tissue damage may provide benefits similar to selective laser trabeculoplasty, including reduced scarring and possibility of re-treatment.

The purpose of this study is to evaluate the efficacy of a novel computer-guided laser therapy based on PASCAL technology called Patterned Laser Trabeculoplasty (PLT) in terms of the intraocular pressure lowering effect and the safety profile.

Methods: 13 eyes with primary open-angle glaucoma were recruited in this prospective, interventional pilot study. Patients received 532-nm laser treatment with 100um spots. Power was titrated for trabecular meshwork blanching at 10ms and subvisible treatment was applied with 5ms pulses. The arc patterns of 33 spots rotated automatically after each laser application so that the new pattern was applied at an untreated position. 180 degrees of the trabecular meshwork was treated in 16 steps, each step applied under 200 ms (i.e. within the eye fixation time) with a total of around 500 spots delivered. Inclusion criteria were: diagnosis of primary open-angle glaucoma; older than 18 years of age with two sighted eyes; ability to comply with treatment and follow-up schedule

and provide written informed consent. Exclusion criteria included pregnancy, previous glaucoma surgery, significant cataract rendering visual field testing or optic disc imaging not technically possible, participation in another therapeutic drug study within the last 30 days.

The main outcomes were the mean intraocular pressure and the number of postoperative complications. Patients were followed up at day 1, 1 week, 1 month, 3 months and 6 months after PLT treatment.

Results: The patients had a mean age of 61.5 years old. Of the 13 patients, 6 were male and 7 were female. All had a diagnosis of primary open-angle glaucoma. The mean number of pre-treatment anti-glaucoma medications was 2.85. The average IOP decreased from the pre-treatment level of 21.81 mmHg (SD 3.46, 95% CI 19.72 to 23.90) to 15.54 mmHg (SD 2.98, 95% CI 13.74 to 17.34) on Day 1, with a mean difference of -6.27 mmHg (SD 3.15, 95% CI -8.17 to -4.36). At week 1, the average IOP was 17.69 mmHg (SD 3.32, 95% CI 15.80 to 19.58), with a mean reduction of -4.12 mmHg (SD 3.32, 95% CI -6.12 to -2.11) from pre-treatment level. At 1 month, the average IOP remained stable at 17.54 mmHg (SD 2.49, 95% CI 16.04 to 19.04), with a mean reduction of -4.27 mmHg (SD 2.69, 95% CI -5.89 to -2.64) from pre-treatment level. This represents a 20% reduction of average IOP, which is statistically significant at all time points, with all *P* values less than 0.01 using the Student's *t* test.

Patients experienced mild or no discomfort during the treatment and no discomfort post-treatment. There were no IOP spikes, and only mild AC reaction detected on Day 1. No topical steroids were given post-treatment.

Conclusion: Patterned laser trabeculoplasty is a safe and efficient method for treatment of primary open-angle glaucoma. It provides rapid, precise and minimally traumatic (subvisible) coverage of the trabecular meshwork using the pattern scanning system of PASCAL with novel software, exhibiting a 20% reduction ($p<0.01$) in intraocular pressure in our study.

P59 Laser Peripheral Iridotomy and the Corneal Endothelium: A Systemic Review

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Purpose: This paper aims to systemically review the effect of laser peripheral iridotomy (LPI) on the corneal endothelium.

Methods: A literature review of databases (Pubmed, MEDLINE, Ovid, Google Scholar, The Cochrane Library, ScienceDirect) was performed using key words "laser iridotomy, corneal endothelium, endothelial cell count, endothelial cell density, corneal thickness, corneal decompensation, corneal oedema, corneal damage, bullous keratopathy". Studies that compared the corneal endothelium objectively before and after LPI, as well as those that evaluated the corneal complications that occurred after LPI were taken into consideration. We accepted studies that compared LPI with other therapeutic interventions if there were objective assessments of the corneal endothelium pre- and post-LPI. Studies that focused on complications not directly involving the cornea were excluded. We also excluded studies that were not published in English and those that did not include LPI.

Results: There were 20 eligible studies which either compared the corneal endothelial cell density, endothelial cell count, corneal thickness and morphological changes pre- and post-LPI, or evaluated the development of corneal decompensation and bullous keratopathy following LPI. Our review shows that the effect of LPI on the corneal endothelium has been investigated with varying results. Although LPI has been demonstrated to be a relatively safe procedure, there is still the potential long-term risk of corneal decompensation and bullous keratopathy, for which a corneal transplantation may be indicated eventually. The longest interval from LPI to corneal decompensation seen was 8 years. Mechanisms proposed for corneal endothelial damage include direct

focal injury, thermal damage from aqueous humour and iris, mechanical shock waves, iris pigment dispersion, transient rise in intraocular pressure, anterior chamber inflammation and alterations in aqueous dynamics with turbulent flow of aqueous during iris destruction. Also, bubbles formed during treatment may settle onto the endothelium and cause further damage. Other factors postulated were time-dependent effect of shear stress on the endothelium and chronic breakdown of blood-aqueous barrier. Inherent risk factors identified are the presence of iridotrabecular contact, eyes with current or prior episodes of acute angle closure, pigmented irides, small target tissue to endothelium distance, pre-existing corneal endothelial disease, senility and presence of diabetes. Intervention-related risk factors include the type of laser used, delivery of laser energy (number of bursts, number of pulses per burst, mode of delivery) and the quantity of energy given.

Conclusion: The significance of the risk factors and their direct association with the development of corneal decompensation remain to be determined. Understanding these risk factors may allow physicians to counsel their patients better. Additional prospective research involving larger populations is also required to ascertain how objective changes in corneal endothelium following a LPI may be used to predict future development and extent of corneal decompensation. These findings will be important as they may offer opportunities for preventive strategies, allowing us to ensure that a procedure performed to prevent disease progression and visual loss, does not cause further morbidity.

P60 Evaluation of effectiveness of SLT in different types of OAGs

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Purpose: To evaluate the effectiveness of selective laser trabeculoplasty,as well as the difference in response in the different types of open angle glaucoma.

Patients and Methods: 26 eyes of 18 patients with POAG, PXF glaucoma, LTG and pigmentary glaucoma. The target IOP was determined using the collaborative initial glaucoma treatment study formula. Patients were treated with SLT (100 application 360 degrees). 6 visits over 1 year followed the initial treatment. If the target IOP was not attained SLT, additional session was done. The IOP was measured together with the percentage of IOP reduction as well as the number of medications reduction in each case.

Results: 26 eyes have finished the data collection after 9-12 months follow-up where the mean preoperative IOP was 19.8 mmHg and the mean postoperative IOP was 13.8 mmHg with an average IOP reduction of 6 mmHg (30.3 %). The average number of medications preoperatively was 2.2 and postoperatively was 1.1. 3 eyes out of 26 required retreatment (11.5%). The cases of POAG the mean IOP preoperatively was 19.2 mmHg and postoperatively was 14.3 mmHg with an average IOP reduction of 4.9 mmHg (25.5%). The PXF group the average preoperative IOP was 20.66 mmHg and postoperatively was 12.66 mmHg with an average IOP reduction of 8 mmHg (38.7%). In cases of pigmentary glaucoma the mean IOP preoperatively 22 mmHg and postoperatively was 14 mmHg with an average reduction of 8 mmHg (36.36 %).

Conclusion: SLT is an effective way of IOP reduction in cases of OAG, but higher results are expected in cases of PXF glaucoma and pigmentary glaucoma tan cases of POAG.

P61 Quantitative assessment of changes in the anterior segment morphology after argon laser peripheral iridoplasty: an anterior segment optical coherence tomography study. The E.A.R.L. Study Group*

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Purpose: Quantitative evaluation of the anterior chamber parameters, which include anterior chamber area (ACA), anterior chamber volume (ACV), anterior chamber width (ACW), lens vault (LV), iris thickness (IT), iris area (I-area), and iris curvature (I-curv) using the anterior segment optical coherence tomography (ASOCT) allows for quantification of morphological changes following argon laser peripheral iridoplasty (ALPI). We aimed to investigate the changes in these parameters following ALPI in patients with primary angle closure.

Methods: The records of a total of 10 patients (17 eyes) who underwent ALPI were reviewed retrospectively. All eyes except 2 (of the same patient) have undergone laser peripheral iridotomy (LPI) prior to ALPI. We analyzed ASOCT images (Visante, Carl Zeiss Meditec, Dublin, CA) from all subjects using customized software before and after ALPI.

The Wilcoxon signed-rank test was used to compare changes in the anterior chamber parameters before and after ALPI.

Results: The mean age of participants was 62 ± 9.4 years. The majority of subjects were Chinese (90.5%) and women (71.4%). The mean angle opening distance (AOD500) before and after ALPI was (0.078 vs. 0.165 mm, $p < 0.0128$), trabecular iris surface area (TISA500, 0.015 vs. 0.038 mm^2, $p < 0.0151$), and angle recess area (ARA, 0.018 vs. 0.040 mm^2, $p < 0.0056$). Mean ACA (15.2 vs. 16.3 mm^2, $p < 0.0004$) and ACV (95.4 vs. 105.6 mm^3, $p < 0.0004$) increased significantly after ALPI, but there was no change in ACW, anterior chamber depth (ACD), or LV. There was no significant change in the mean I-curv, IT or I-area.

Conclusion: This study confirms that ALPI results in a significant increase in angle width in eyes with residual angle closure. The ACA and ACV increased after ALPI, but there was no change in ACD, ACW, LV, IT, or I-area.

*E.A.R.L. Study: The Effects of Argon Laser Peripheral Iridoplasty (ALPI) for Residual Angle Closure after Laser Peripheral Iridotomy (LPI): A Randomized, Controlled Trial.

• CATARACT AND GLAUCOMA SURGERY

P64 Phacotrabeculotomy from below for exfoliation glaucoma

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Purpose: Trabeculotomy ab externo combined with cataract surgery has been reported to effectively reduce the intraocular pressure (IOP) in exfoliation glaucoma (XFG) with visually significant cataract. Furthermore, trabeculotomy can be performed from below to reserve the upper half of the conjunctiva for future trabeculectomy when needed. Our aim was to determine whether phacotrabeculotomy from below is effective in exfoliation glaucoma with cataract.

Method: We retrospectively compared phacotrabeculotomy from above and below for XFG. One hundred and twenty-nine eyes with XFG were included in this retrospective study. In Nagata's modified trabeculotomy, 4 x 4mm double scleral flaps were made to identify and cut the outer wall of Schlemm's canal. Nagata's U-shaped trabeculotome without a handle facilitated gentle insertion of the probe into Schlemm's canal with a needle holder. Main outcome measures were the intraocular pressure, probability of success based on Kaplan-Meier survival curve analysis, number of anti-glaucoma medications, and complications. Surgical failure was defined as IOP ≥ 18 mmHg, or additional glaucoma surgeries.

Results: The intraocular pressure was reduced from 22.9 ± 6.1 to 14.1 ± 2.9 mmHg at 24 months in the above group, and from 20.1 ± 6.9 to 15.0 ± 1.0 mmHg at 24 months in the below group. Kaplan-Meier survival-curve analysis showed a probability of success 12 and 24 months after phacotrabeculotomy of 88.6 and 82.0% in the above group, and 82.9 and 82.9% in the below group, respectively.

Conclusion: Phacotrabeculotomy at the inferior limbus led to a sufficient reduction of IOP in XFG with visually significant cataract. As a bleb-independent surgery, phacotrabeculotomy from below may be one of the alternatives to conventional trabeculectomy as an initial surgery in XFG.

P65 Central corneal thickness and Ocular hypertension

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Purpose: To evaluate the results of central corneal thickness in ocular hypertension and compare these results with those of normal population.

Methods: Thirty patients examined at the department of ophthalmology and diagnosed to have ocular hypertension and 30 healthy volunteers were included in the study. After a thorough ophthalmologic examination, central corneal thickness were performed to both the study and control group at the initial visit. After two years compared by means of central corneal thickness test results.

Results: At the initial visit, statistically significant difference could be detected between the two groups (570 micrometers in ocular hypertension group, 528 micrometers in control group).

Conclusion: Central corneal thickness seems to be more sensitive for the follow-up of ocular hypertension. More studies are needed to decide the predictive values of the test.

P66 Early lens extraction for primary angle closure with persistently increased intraocular pressure post laser iridotomy

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Purpose: Primary Angle Closure (PAC) is a part of the spectrum of Primary Angle Closure Disease (PACD) and includes occludable angles with elevated IOP (appositional) and/or PAS (synechial) and/or iris atrophy, distortion of iris pattern, excessive pigment deposition on trabecular surface. Laser iridotomy has been the initial management for these cases. However some patients with PAC, may continue to have high IOP after PI and require long term use of ocular hypotensive medications and even progress to the stage of optic neuropathy - Primary angle closure glaucoma (PACG). In the present study we evaluated the effect of an early lens extraction in patients with PAC with a clear lens and persistently increased IOP post laser iridotomy.

Methods: Thirty four eyes of thirty four phakic patients with BCVA of 20/30 or better and a patent PI with IOP > 25 mmHg were included. A detailed work up included BCVA, slit lamp biomicroscopy, optic nerve head evaluation (90 D lens), Goldmann Applanation tonometry, Gonioscopy, and Standard Automated Perimetry. Anterior Segment Optical Coherence Tomography (AS-OCT) was done to evaluate the angle parameters which included AOD500, AOD750 (Angle Opening Distance at 500 µ and 750 µ from scleral spur), TISA500, TISA750 (Trabecular Iris Space Area at 500 µ and 750 µ from scleral spur) and Anterior Chamber Depth (ACD). All eyes underwent temporal clear corneal phacoemulsification with posterior chamber implantation of a foldable single piece hydrophobic acrylic IOL in the capsular bag. These patients were then followed up at 1 week, 1, 3, 6 and 12 months after surgery. IOP was the primary outcome measure and anterior chamber angle parameters and reduction in medications were the secondary outcome measures. Absolute Success was defined as reduction in IOP (< 18 mmHg at 1 year follow-up) post surgery without the requirement of any antiglaucoma medications. Qualified Success was defined as reduction of IOP (IOP < 18 mmHg at 1 year follow-up) post surgery under cover of any antiglaucoma medication.

Results: 34 PAC patients (20 females, 14 males) with mean age 54.2 ± 8.6 years were included. Significant IOP reduction was noted post operatively, mean IOP pre op was 26.2 ± 2.29 mmHg, at 1 month postop it reduced to 16.05 ± 1.66 mmHg, at 3 month follow-up to 13.8 ± 1.42 mmHg; to 11.3 ± 1.17 mmHg at 6 months follow-up; to 11.2 ± 1.2 mmHg at 12 months follow-up, $p < 0.0005$.

As compared to baseline, significant widening of angle was found postoperatively depicted by increase in ACD [2.4 ± 0.13 mm pre op to 3.19 ± 0.01 mm at 12 months post op; $p < 0.0005$]; increase in AOD500 at 0 degrees [0.104 ± 0.015 mm pre op vs. 0.309 ± 0.005 mm at 3 months post op vs. 0.350 ± 0.013 mm at 6 months post op vs. 0.354 ± 0.013 mm at 12 months post op; $p < 0.0005$], increase in AOD500 at 180 degrees [0.202 ± 0.008 mm vs. 0.371 ± 0.008 mm at 3 months, 0.410 ± 0.009 mm at 6 months, 0.412 ± 0.012 mm at 12 months; $p < 0.0005$]. increase in AOD750 at 0 degrees [0.172 ± 0.008 mm vs 0.490 ± 0.013 mm vs. 0.534 ± 0.012 mm vs. 0.538 ± 0.014 mm; $p < 0.0005$], increase in AOD750 at 180 degrees [0.214 ± 0.008 mm vs. 0.520 ± 0.008 mm vs. 0.544 ± 0.012 mm vs. 0.548 ± 0.01 mm; $p < 0.0005$]. increase in TISA500 at 0 degrees [0.071 ± 0.004 mm^2 vs. 0.105 ± 0.01 mm^2 vs. 0.126 ± 0.004 mm^2 vs. 0.128 ± 0.003 mm^2; $p < 0.0005$], increase in TISA500 at 180 degrees [0.075 ± 0.003 mm^2 vs. 0.113 ± 0.007 mm^2 vs. 0.141 ± 0.004 mm^2 vs. 0.148 ± 0.003 mm^2; $p < 0.0005$], increase in TISA750 at 0 degrees [0.115 ± 0.005 mm^2 vs. 0.208 ± 0.005 mm^2 vs. 0.222 ± 0.007 mm^2 vs. 0.232 ± 0.006 mm^2; $p < 0.0005$], increase in TISA750 at 180 degrees [0.093 ± 0.015 mm^2 vs. 0.191 ± 0.007 mm^2 vs. 0.211 ± 0.006 mm^2 vs. 0.216 ± 0.005 mm^2; $p < 0.0005$]. Absolute Success as defined in methodology was achieved in 91.1% patients while 8.8% (3 patients) achieved Qualified Success.

Conclusions: In eyes with PAC and persistently raised IOP post laser iridotomy, a clear lens extraction is associated with a significant reduction in IOP, widening of the anterior chamber angle and a reduced requirement of antiglaucoma medications.

P67 Phako with endoscopic cyclophotocoagulation versus phako with external cyclodiode laser: a pilot study

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Purpose: To compare the efficacy and safety of two adjunctive laser procedures: endoscopic cyclophotocoagulation (ECP); and external cyclodiode laser (ECD), both combined with standard phacoemulsification cataract surgery.

Methods: Retrospective notes review of consecutive cases completed by a single surgeon at a single centre over a 15 month period. All patients had known glaucoma with suboptimal intraocular pressure (IOP) control. Patients underwent standard small incision cataract extraction and IOL implantation immediately followed by the adjunctive laser, all performed as a single procedure. ECP involved treatment to 360 degrees of the ciliary body, whilst ECD was typically 270 degrees. The choice of which adjunctive laser procedure was performed was dependent on the availability of probes for ECP. ECD was performed when ECP was not possible due to non-availability of the probes. We recorded patient demographics including underlying diagnosis, medication history, baseline IOP and visual acuity (VA). Change in IOP, VA and number of glaucoma medications were recorded at day 1, 7, and 1, 3, 6 and 12 months post-op as well as at final follow-up. Any need for further surgery or intervention and any intra-operative or post-operative complications were noted.

Results: 44 cases were performed during the defined time period, and all case notes were obtained for analysis. 28 had phako + ECP and 16 phako + ECD. Mean age was 76.73 years (SD ± 7.86) with mean follow-up of 207.3 ± 140.79 days overall. 66% were male. 88.7% were Caucasian with the remainder of Afro-Caribbean (4.5%), Indian (4.5%) and Oriental (2.3%) descent. 62.8% had primary open angle glaucoma, 18.5% primary angle closure glaucoma, 7% normal tension glaucoma and 7% pigmentary glaucoma. 2 patients had previous trabeculectomy surgery and 2 had previous ECD. The visual field mean deviation was -14.52dB. There was no statistically significant difference in any of these baseline characteristics between patients who had ECP compared to those treated with ECD. Pre-operative mean IOP was 22.07 ± 5.43 mmHg overall (22.39 ± 5.28 in the ECP group and 21.5 ± 5.82 in the ECD group). There was a statistically significant reduction in IOP at each

postoperative appointment, and at final follow-up, the IOP was reduced by 7.66 ± 6.02 mmHg ($p < 0.0001$). There was a significant reduction of 7.14 ± 4.93 mmHg in the ECP and 8.56 ± 7.65 in the ECD groups with no difference in the two groups ($p = 0.4579$). Overall, 79.6% of patients had an IOP reduction > 20% from baseline at latest follow-up (82.1% in the ECP group and 75% in the ECD group, $p = 0.57$). Mean number of glaucoma medications was 2.66 preoperatively. Again there was no significant difference between the number of preoperative medications in the ECP (2.5) or ECD (2.93) groups. At latest follow-up, there was a significant reduction in the total number of glaucoma medications used of 0.432 drops ($p = 0.0063$) but there was no significant difference in the two groups. Pre-operatively 3 patients required oral acetazolamide to lower IOP, but this was not required in any patient post-operatively. LogMAR equivalent visual acuity showed a significant improvement from 0.5581 ± 0.531 LogMAR to 0.3976 ± 0.4969 ($p = 0.0449$). There were two intraoperative complications of minor (2 clock hours) zonular dehiscence (one with vitreous loss) in the ECP group. In the early post-operative period, one patient in each group had corneal surface toxicity and an epithelial defect. There were 4 cases of cystoid macula oedema, all in the ECP group. Three responded with drops and one required orbital floor steroid.

Conclusion: This pilot study demonstrates that a significant reduction in IOP, number of glaucoma medications and improvement of vision is possible following cataract surgery with adjunctive ciliary body laser. This preliminary data suggest a possible role for the use of ECD as an adjunctive procedure to cataract surgery. ECD could produce similar results to that of the more established ECP. ECD could also have a better safely profile than ECP, but this requires further investigation. ECD has the advantages of ease of use and requiring less instrumentation, which has resource implications internationally. Prospective, randomised trials with longer follow up are needed to clarify the role of these two modalities of treatment in patients with co-existing cataract and glaucoma.

P68 Late intraocular pressure changes in Pseudophakic patients

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Introduction: Cataract surgery is associated with alterations in IOP in the immediate and late postoperative period. The more common mid and long term IOP outcome after cataract surgery has been a significant reduction in IOP. With the change in spectrum of surgical technique from ICCE to ECCE and presently SICS and Phacoemulsification, this trend of lowering IOP has increased.

Aim: To study the changes in intraocular pressure in eyes undergoing cataract extraction with intraocular lens implantation at our hospital.

Methods: Hospital based prospective study of 199 eyes of 172 patients who underwent cataract surgery at our hospital.

Inclusion criteria: All patients undergoing uncomplicated cataract extraction with intraocular lens implantation during the given period. We also included 10 eyes with pseudoexfoliation without glaucoma.

Exclusion criteria: Already diagnosed cases of both open-angle and angle-closure glaucoma. Patients on any anti-glaucoma medications prior to undergoing cataract operations.Cases of complicated cataract. Traumatic cataract cases. Congenital cataract cases. Patients with secondary intraocular lens implantation. Patients with vitreous loss during cataract surgery or hyphema, wound leak during the immediate postoperative period. Extracapsular cataract extraction (ECCE), small incision cataract surgery (SICS) or Phacoemulsification (through clear cornea or scleral tunnel) were done based on the type of cataract, feasibility and patient's choice. In all patients intraocular lenses were implanted. Vision, anterior segment, IOP, and fundus evaluation were done at 3rd and 6th month follow-up visits. IOP was assessed using applanation tonometry.

Statistical analysis was done using paired t-test and repeated measures ANOVA.

Preoperative Patient Characteristics: Number of eyes: 199; Mean preoperative IOP: 13.90 mm Hg; Range of preoperative IOP: 8 – 21 mm Hg.

Results: No statistically significant difference in the decrease in IOP was found in between the four types of surgeries (p = 0.690) according to the repeated measures ANOVA test.There was no statistically significant decrease in mean IOP in pseudoexfoliation group both at 3 and 6 months visit postoperatively.

Conclusion: Overall, in this study, we found a trend towards lower IOP after cataract surgery that needs to be further studied to find if this lowering in IOP lasts for several years.

P69 Does anaesthesia technique have an effect on the outcome of glaucoma surgery? A world-wide survey of opinion leaders in glaucoma

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Purpose: To establish current practice in anaesthesia for glaucoma interventions, and to survey opinion amongst glaucoma surgeons as to whether they believe anaesthesia technique might influence the outcome of common glaucoma procedures.

Methods: Subjects were defined as: Corresponding author of a paper on glaucoma surgical technique, published in 2012-13 and identified through the pubmed.gov website, with an e-mail address.

Questionnaires were then sent via email in July 2013. The 5 surgical procedures were: trabeculectomy, non-penetrating surgery, cyclo-diode laser, glaucoma drainage devices and bleb needling. For each procedure, the subject was asked whether they carried out the procedure, and their preferred anaesthesic technique: general anaesthetic (GA) , retrobulbar (RBA), peribulbar (PBA) sub-Tenon's (STA), topical (TA) , sub-conjunctival (SCA), intra-cameral (ICA), or other. Subjects were also asked whether they thought the choice of anaestheic technique might influence the outcome of the surgical procedure.

Results: Questionnaires were e-mailed to 184 individuals in 15 countries. 12 e-mail addresses engendered automatic response to indicate that the address was unavailable. 42 responses were received (24% response rate). 2 responses were excluded as the attached questionnaire was not filled out. Trabeculectomy surgery was done by all 40 respondents (100%). Preferred anaesthesia technique for trabeculectomy was PBA (10, 25%), STA (7, 17.5%), GA (6, 15%), RBA (6, 15%), TA (5, 12.5%), SCA (4, 10%), ICA (1, 2.5%) and other (1, 2.5%). 26 respondents (65%) thought that the anaesthetic technique might influence the outcome of rabeculectomy surgery. Non-penetrating surgery was done by 17 respondents (42%). Preferred anaesthesia technique for non-penetrating surgery was PBA (7, 41%), GA (5, 29%), STA (2, 12%), RBA (1, 6%), ICA (1, 6%), and other (1, 6%). 10 respondents (59%) thought that the anaesthetic technique might influence the outcome of non-penetrating surgery.Cyclo-diode laser surgery was done by 32 respondents (80%). Preferred anaesthesia technique for cyclo-diode laser surgery was RBA (12, 38%), RBA (9, 28%), GA (4, 13%), STA (3, 9%), TA (2, 6%), SCA (1, 3%) and other (1, 3%). 9 respondents (28%) thought the anaesthesic technique might influence the outcome of cyclo-diode laser surgery. Glaucoma drainage devices was done by 33 respondents (83%). Preferred anaesthesia technique for Glaucoma drainage devices was GA (9, 27%), RBA (6, 18%), PBA (6, 18%), STA (5, 16%), TA (4, 12%), SCA (1, 3%), ICA (1, 3%) and other (1, 3%). 16 respondents (48%) thought that the anaesthesic technique might influence the outcome of glaucoma drainage devices surgery. Bleb needling surgery was done by 37 respondents (93%). Preferred anaesthesia technique for bleb needling surgery was TA (18, 49%), SCA (15, 40%), STA (2, 5%), GA (1, 2%), ICA (1, 2%) and PBA (1, 2%). 14 respondents (38%) thought that the anaesthesic technique might influence the outcome of bleb needling surgery. Overall, 48% of responses believed that anaesthesia technique could influence outcome for at least one of the five surgical procedures.

Conclusion: A variety of anaesthesia techniques are currently in use by glaucoma surgeons. Many glaucoma specialists believe that the anaesthesia technique may influence the outcome of glaucoma surgery. These opinions may not be representative of glaucoma surgeons in general.

P70 Combining cataract and glaucoma treatment: transcleral diode laser cyclophotocoagulation (TSCPC) and phacoemulsification and intro ulnar lens implant (IOL)

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Introduction: TSCPC is an established method for controlling intraocular pressure (IOP) in glaucoma. Many patients undergoing phacoemulsification (phaco) also have glaucoma; combining this with TSCPC may help to reduce iop long-term whilst also addressing the visual acuity issues. Although endoscopic cyclodiode laser treatment combined with phaco+iol is already performed by some surgeons, TSCPC + phaco+IOL is a viable option for those centres without endoscopic facilities.

To our knowledge there have been no previous studies on the effect of iop control following combined tscpc and phacoemulsification + IOL.

Purpose: To assess the effect of combined tscpc and phacoemulsification surgery with respect to; a) iop control; b) va; c) change in topical therapy and d) side effect profile at 6 months post surgery.

Methods: a retrospective review of 24 eyes undergoing combined tscpc and phacoemulsification was conducted at 6 months post-operatively. The procedures were performed by one surgeon (ea) under peribulbar local anaesthesia. The iris medical oculight slx laser (Iridex, Mountain view, CA, USA) was used for TSCPC, which was applied across 270 degrees using the gaasterland criteria immediately after completion of the phaco+iol procedure. Subtenons triamcinolone acetonide 40mg and subconjunctival dexamethasone and cefuroxime were administered following each case. G. Prednisolone 1% x6 daily was used post-operatively for 6 weeks with reducing frequency. The patients were reviewed at weeks 1, 4, 12 and 24 and the post-operative steroid and glaucoma drops were adjusted according to the clinical progress.

Results: 42 eyes were included in the analysis. 35 had open angle glaucoma, 6 had mixed mechanism glaucoma and 1 neovascular glaucoma (nvg). The average total energy used was 87.51w, (range: 33.75-346w). Mean pre-treatment iop was 22.08mmhg (range: 12-47mmhg) and mean iop at 6 months post treatment was 14.01mmhg (range: 0-20mmhg). This difference was statistically significant, ($p<0.05$). Mean total medication was reduced from 2.1 to 1.9, which was not statistically significant ($p=0.55$). Diamox was discontinued in all cases who were taking this pre-operatively (n=7). At 6 months, visual acuity was stable or improved in 36 eyes (86%) and worse in 6 eyes (14%). Uveitis occurred in 5 eyes following treatment, 1 patient developed optic atrophy and chronic hypotony occurred in only 1 eye which had neovascular glaucoma. The causes of worsening of visual acuity at 6 months were chronic hypotony (n=1), chronic cystoid macular oedema (n=2), worsening of glaucoma (n=3).

Conclusion: Combined tscpc and phacoemulsification is an effective method to treat cataract and control IOP. Post-operative inflammation is a potential threat to visual improvement. Vigilance needs to be exercised to ensure adequate post-operative control of inflammation, and in cases of nvg the power settings need to be reduced. Many patients undergoing tscpc already have a poor visual prognosis because of advanced disease and the chances of further deterioration must be discussed fully with them before surgery

P73 Corneal biomechanical changes after phacotrabeculectomy with 5-FU for open angle glaucoma

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Purpose: To evaluate ocular biomechanical properties in open angle glaucoma patients before and after phacoemulsification, trabeculectomy, posterior chamber lens implantation and 5-FU. Corneal biomechanical properties influence intraocular pressure measurements by Goldmann applanation tonometry.

Methods: In a prospective study, ocular response analyzer (ORA; Reichart Ophthalmic Instruments) was used to measure the following parameters: corneal hysteresis (CH), corneal resistance factor (CRF), Goldmann-correlated intraocular pressure (IOPg) and corneal compensated intraocular pressure (IOPcc) in 31 patients who underwent phacotrabeculectomy. All patients were evaluated with ORA prior to surgery and were followed-up at one day, one month and three months after surgery. The changes in CH and CRF were analyzed. Patients with surgical complications or failed surgery were excluded.

Results: Goldmann correlated IOP and corneal compensated IOP were statistically significant lower at all follow-ups ($p < 0.05$). Preoperative CH was 7.3 ± 1.8 mmHg and preoperative CRF was 11.2 ± 2.2 mmHg. Postoperatively, CH increased mainly especially in subjects with IOP drop of more than 7 mmHg ($p < 0.05$). Mean CH changes after one month were +1.88 and after three months after surgery were +1.71. Corneal resistance factor was lower at all follow-ups compared to preoperative values. The difference between IOPcc before and after phacotrabeculectomy was lower than the difference between IOPg measured before and after surgery (5.82 vs 6.34).

Conclusion: Phacotrabeculectomy with 5-FU and intraocular lens implantation led to a change in ocular biomechanical properties. Corneal hysteresis increased significantly after surgery. CH increase was proportional with the amount of decrease in IOP values.

• TRABECULECTOMY

P74 Standard trabeculectomy and Ex-Press miniature glaucoma shunt: a comparative study and literature review

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Purpose: To compare the efficacy and safety between standard trabeculectomy and the Ex-Press shunt.

Methods: A retrospective review of the records of 100 eyes of 100 patients that underwent trabeculectomy or Ex-Press shunt implantation between July 2009 and June 2012. Surgeries included 61 (61%) trabeculectomies and 39 (39%) Ex-Press shunts. Demographic information, glaucoma type, surgical details, pre-operative and post-operative data including intraocular pressure (IOP), number of medications, re-operation and occurrence of any complications were recorded.

Results: No differences in IOP reduction or number of postoperative IOP-lowering agents were demonstrated between the two procedures. Rates of complete success and qualified success were 62.3% and 24.6% for trabeculectomy and 66.6% and 17.9% for Ex-Press shunt. Rates of failure and hypotony were also not significantly different between groups. No parameter was correlated with success or failure of any procedure.

Conclusions: Standard trabeculectomy and Ex-PRESS shunt have similar efficacy and safety profiles.

P75 Clinical and epidemiological study of trabeculectomy efficacy

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Objective: To study the clinical and epidemiological characteristics of primary open angle glaucoma (POAG) development and progression in patients who underwent trabeculectomy.

Material and methods: The results of complex clinical assessment and treatment of 184 patients (73 females, 79 eyes; 111 males, 124 eyes) with different POAG stages were analyzed. Patients mean age was 67.96 ± 9.8 years (females - 67.9 ± 8.94 years; males - 67.94 ± 10.35 years), $p > 0.05$. Medical history, ocular status, IOP-lowering medication use, concomitant disease, early and long-term trabeculectomy results were assessed.

Results: Mean duration of POAG from the diagnosis to the endpoint visit was 5.39 ± 4.87 years (min.6 months, max.34 years). The duration of the disease in patients with early glaucoma-changes was 7.2 ± 3.8 years, in patients with moderate glaucoma-changes - 6.5 ± 5.95 years, in patients with advanced glaucoma-changes - 3.8 ± 3.6 years. Mean duration of POAG at the time of the surgical procedure was 2.5 ± 3.02 years (min.1 month, max.16 years). In patients with early, moderate and advanced glaucoma-changes it was 3.4±3.5 years, 3.1 ± 3.03 years and 1.5±2.4 years respectively. The follow-up period was 2.97 ± 3.93 years (min.6 months, max.33 years). In patients with early, moderate and advanced glaucoma-changes it was 3.1 ± 3.6 years, 2.9 ± 5.3 years and 1.8 ± 2.8 years respectively. Mean observation period (total, prior to and after the procedure) was not significantly different between groups of patients with early and moderate glaucoma changes ($p > 0.05$), but was longer than in patients with advanced glaucoma ($p < 0.0003$, $p < 0.0007$ and $p < 0.02$ respectively). Moderate and advanced glaucoma-changes were found in 83.3% of patients at the diagnosis; at the end of the study these changes were found in more - 87.7% of patients ($p < 0.05$). Prior to the procedure glaucoma progression was followed in 80% of patients with early glaucoma-changes, in 50.65% of patients with moderate changes and in 6.59% of patients with advanced changes. After the procedure glaucoma continued progressing in 28.58%, 27.32% and 8.89% of patients respectively. After the procedure 42.9% of patients with early glaucoma changes, 58.2% of patients with moderate glaucoma changes and 47.8% of patients with advanced glaucoma changes discontinued using IOP-lowering medications. Main indications for the procedure were: increased IOP level - 58.62%, a combination of increased IOP and glaucoma optical neuropathy (GON) progression - 22.66% and a high medication cost which was considered a limitation in 5.91% of cases. After the procedure a significant decrease of IOP level was established in all patients.

Conclusion: More than a half of operated patients (50.74%) do not need to use IOP-lowering medications in a follow-up period of 2.97 ± 3.93 years. Glaucoma surgery is an effective method of treatment that can slow down glaucoma progression.

P76 Outcome of trabeculectomy with iGenTM (biodegradable collagen matrix implant)

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Purpose: To report on the outcome of trabeculectomy with iGen™ in controlling intraocular pressures in glaucoma patients.

Methods: A prospective study of 21 eyes of 19 patients who underwent trabeculectomy alone with iGEN™ implant or phacoemulsification with trabeculectomywith iGen™implant between 1st September to 31st December 2010 was carried out. For each patient, the following data were collected: preoperative and postoperative intraocular pressure (IOP), the number of glaucoma medications used, the operation date, the surgical technique and the postoperative complications, if any. The primary outcome measure of success was defined as complete (IOP of ≤ 21 mmHg) without anti-glaucoma medications and qualified (IOP ≤ 21 mmHg) with antiglaucoma medications.A routine trabeculectomy using a fornix based conjunctival flap was performed in all cases. The sclera flap was closed with 1 to 3 loose 10-0 nylon sutures. The iGen™ implant was placed on top of the sclera flap under the conjunctiva which was then closed with 10-0 nylon sutures. In those cases combined with phacoemulsification, a two site procedure was performed.

Results: 21eyes of 19 patients who underwent trabeculectomy alone or phacoemulsification with trabeculectomy with iGEN™ were studied. The duration of follow up was 12 months. The mean age of the patients was 61.4 ± 18.54 years .The mean preoperative IOP was 20.33 ± 8.88 mmHg while the mean postoperative IOP at 6 months and 1 year was 15.67 ± 1.32 mmHg and 15.25± 4.52 mmHg respectively.The mean anti-glaucoma medications reduced from 2.76 to 0.57. There were no patients from the study with IOP more than 21mmHg at the end of 1 year follow-up.The IOP was controlled without anti-glaucoma medications in 43.7% and with medications in 56.3% (qualified success: with IOP ≤ 21 mmHg).

Conclusion: Trabeculectomy with implantation of iGen is a safe and effective surgical method in patients with glaucoma but a longer duration of follow up in a larger number of patients with a control group is needed.

Keywords: Glaucoma, iGen, Trabeculectomy

P77 A case of treating glaucoma during pregnancy for young glaucoma specialist

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Purpose: To report a surgical treatment for pregnant with high myopia.

Methods: A 34-year-old Korean female with 38 mmHg of right eye and 30 mmHg of left eye visit for our clinic, who were pregnant with 28 wks. Previously, she had used maximal anti-glaucoma medication (dorzolamide hydrochloride/timolol maleate, prostaglandin analogue and brimonidine) before pregnancy. She under took refractive corneal surgery for high myopia 10 years ago. After, she discovered she was pregnant, she used only brimonidine eye drop (FDA category B) with 20-22 mmHg of both eye during 1st and 2nd trimester. She learned punctual occlusion by out-side clinic physician. Initial examination, we found advanced visual field defect in right eye and early stage in left eye. We performed selective laser trabeculoplasty of left eye. After 1 week later, her intraocular pressure (IOP) decreased to 33 mmHg of right eye and 26 mmHg for left eye. She heard that fetus had cardiac problem (atrial septal defect). We prescribe Brinzolamide, because b-blocker would not good for cardiac problem. After that, her IOP was 28 mmHg in right eye and 20 mmHg in left eye. She wanted to avoid surgery and we recommended every 1 week follow-up. However, 2 days later, she visited emergency room (ER) with blurred vision of right eye. Her IOP was 40 mmHg in right eye with corneal edema. We could find grade 2 anterior chamber reaction. We regard that she had

uveitic component. She told us that her husband had been car-accident, who needed orthopedic surgery in ER. She had cried without sleeping overnight. That emotional stress would be one of reason of inflammation. We prescribe topical steroid eye drop four times and take a rest in peace.

Results: One week later, she had still high IOP and visual field test showed progression in right eye, compared with initial our clinic visit. Hence, we recommended surgical treatment of right eye. She underwent trabeculectomy without the application of an anti-metabolite under topical and subtenon anesthesia. After surgery, IOP was decreased to 5 mmHg in right eye with high bleb. Anterior chamber was shallow, showed grade 2 cornea-iris touch. We waited for 3 days, because overfilteration would be resolved. However, she was pregnant and nervous, we did bleb revision with air injection in anterior chamber. After surgery, that IOP was persisted 10-16 mmHg with cystic bleb. And she underwent cesarean delivery for fetal heart problem.

Conclusion: The studies showed an association with pregnancy and lower IOP, did not included pregnant women with glaucoma. In addition, large case series from Harvard medical school did not required surgical intervention. This study showed the course of glaucoma during pregnancy was various, and emotional stress can lead uveitic glaucoma. Also, gentle manipulation is needed for pregnant women, because of weak sclera rigidity in high myopia and pregnancy itself. Teratogenic effect of anti glaucoma medication of this woman with FDA class C during first 6 weeks could be controversy.

P78 Groove sclerectomy in trabeculectomy

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Purpose: In trabeculectomy it is ideal to achieve flow of aqueous into the posterior subconjunctival tissues. Several tactics can be employed to help achieve this. When using a rectangular scleral flap, tactics which may help include: (1) a shorter scleral flap (2) making the radial cuts not extend too anterior (3) scleral flap sutures which achieve closure approximation of side incisions of scleral flap than the posterior incision of flap (4) conjunctival sutures which secure and approximate conjunctiva to anterior sclera to help adhesion of conjunctiva to sclera.

Method: The standard way to use a Kelly punch is to take a perpendicular bite of deep scleral tissue. Groove sclerectomy with the Kelly punch can be achieved by angling the Kelly punch so as to make it almost parallel with the scleral surface after the initial perpendicular bite. This can be done several times until a groove is formed to almost reach the posterior limit of the scleral bed. It is important not to take a full thickness scleral bite, in which case flexible uveal tissue will obliterate the intended groove.

Results: The groove would then heal into a track when the scleral flap is closed. This helps direct the aqueous posteriorly. It also forms a space under the scleral flap which when needling bleb, may facilitate lifting of the scleral flap to increase fluid drainage.

Conclusion: Groove sclerectomy in trabeculectomy helps make a track which facilitates formation of a fistula to drain aqueous into the posterior subconjunctival tissues.

P79 Preliminary results of the trabeculectomy with suprachoroidal deviation: one year of follow-up

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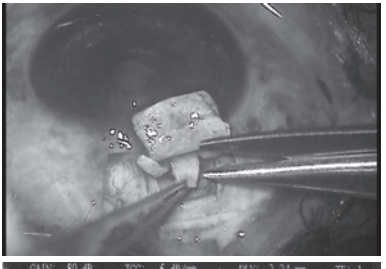
Purpose: The purpose of this study is to evaluate the effectiveness of a new technique, trabeculectomy with mitomycin C and suprachoroidal deviation.

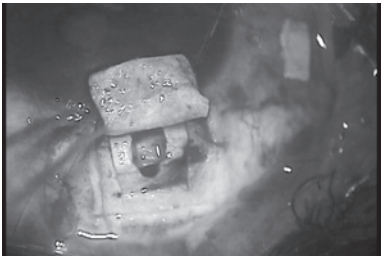
Methods: Prospective uncontrolled case series. This study included 12 eyes of 12 patients with secondary open angle glaucoma and refractory glaucoma. Patients underwent trabeculectomy with Mitomycin C and suprachoroidal derivation with 2 autologous scleral flaps. Follow-up visits

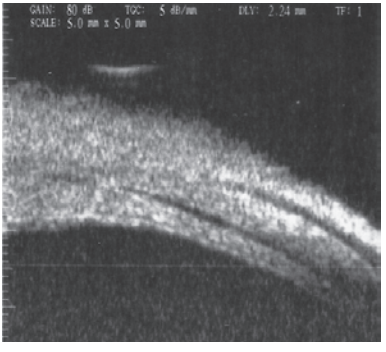
were performed on day 1, week 1, month 1, month 3, month 6, month 9 and month 12. All patients underwent slit-lamp examination, gonioscopy and ultrasound biomicroscopy (UBM) of anterior segment. Intraocular pressure, best corrected visual acuity (BCVA) and complications were registered.

Results: The study included 6 men and 6 women with a mean age of 61.17 ± 19.90 (range: 31 to 89) years old. Upon inclusion, the eyes averaged 2.17 ± 1.99 (range: 0 to 6) intraocular procedures. Six eyes were pseudophakic and 6 were phakic. The mean pre-operative IOP was 25.42 ± 6.89 mmHg (range: 17 to 42 mmHg) and the mean number of pre-operative glaucoma medications was 2.67 ± 1.23 (range: 1 to 4). One day postoperatively IOP decreased a mean of 13.92 mmHg (95% CI: 8.475-19.358) (p value = 0.00007). One week postoperatively IOP decreased a mean of 15.00 mmHg (95% CI: 9.494-20.506) (p value = 0.00004). At 1 month postoperatively IOP decreased a mean of 13.75 mmHg (95% CI: 8.761-18.739) (p value = 0.00004). At 3 months postoperatively IOP decreased a mean of 14.25 mmHg (95% CI: 8.885-19.615) (p value = 0.00005). At 6 months postoperatively IOP decreased a mean of 14.08 mmHg (95% CI: 8.548-19.619) (p value = 0.00008). At 9 months postoperatively IOP decreased a mean of 14.25 mmHg (95% CI: 8.851-19.649) (p value = 0.00005). At 12 months postoperatively IOP decreased a mean of 14.50 mmHg (95% CI: 9.051-19.949) (p value = 0.00005). The mean number of post-operative glaucoma medications was 0.08 ± 0.29. No statistically significant changes were found in the BCVA (p = 0.087). No severe complications were found.

Conclusions: Unlike classic trabeculectomy, our surgical procedure has the advantage of using 2 different drainage pathways to lower the IOP, the anterior chamber to subconjunctival space fistula and the uveoescleral drainage through the suprachoroidal space. If the filtration bleb becomes increasingly vascularized, and/or excessive capsular fibrosis appears, the uveoescleral pathway is still patent. We found both subconjunctival and suprachoroidal fluid using UBM. The use of autologous scleral tissue may have played a role in overcoming rejection and in minimizing a fibrotic reaction secondary to foreign body. In this small prospective case series, our novel surgical procedure has shown to be an effective and safe technique, achieving a statistically significant reduction of the IOP after 12 months of follow-up. No severe complications were found. However, a bigger sample of patients, with a control group and longer follow-up is needed to confirm our initial findings.







P80 Trabeculectomy augmented with healaflow subconunctival spacer: 6-month outcomes

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Objective: To compare outcomes of trabeculectomy with mitomycin-C (MMC) versus trabeculectomy with mitomycin-C augmented with subconjunctival Healaflow (Anteis, Geneva), a highly-retentive viscoelastic spacer.

Methods: This was a retrospective comparative longitudinal analysis of consecutive phacotrabeculectomies in a single surgeon practice. 38 eyes with uncontrolled primary glaucoma were analyzed. 18 eyes underwent fornix-based phacotrabeculectomy with MMC (0.04 mg/ml; 3 minutes), and 20 eyes underwent fornix-based MMC-phacotrabeculectomy with Healaflow spacer. Primary outcome was intraocular pressure (IOP) at 1, 3, and 6 months. Secondary outcomes were number of antiglaucoma medications, qualified and complete IOP success (i.e. with and without medications) using ≤ 14, ≤ 17, and ≤ 21 mmHg criteria, complications and interventions.

Results: The mean age was 70.4 ± 12.1 years. No differences in age, gender, race, glaucoma subtype were observed between the 2 groups. IOP in the control group decreased from 17.1 ± 4.9 mmHg on 1.5 ± 0.7 medications to 14.5 ± 4.6 mmHg on 0.1 ± 0.3 medications at 6 months ($p = 0.14$, $p < 0.001$, respectively). In the Healaflow group, IOP improved from 16.8 ± 3.4 mmHg on 2.0 ± 1.0 medications to 15.3 ± 6.1 mmHg on 0.2 ± 0.6 medications at 6 months ($p = 0.409$, $p < 0.001$, respectively). Mean IOP was lower for Healaflow trabeculectomies at 1 month (13.4 ± 4.8 vs. 10.5 ± 3.6 mmHg, $p = 0.04$), but not 3 or 6 months ($p > 0.05$). Complete and qualified IOP success < 15 and < 18 was higher in the Healaflow group (95% vs. 66%, $p = 0.007$; 100% vs. 83.3%, $p = 0.04$) at 1 month, but not at 3 or 6 months ($p > 0.05$).

Conclusions: Healaflow provides an initial but unsustained IOP-lowering benefit in MMC-trabeculectomy, which may reflect its subconjunctival spacer effect. Further strategies to modulate later scarring processes are indicated.

P81 Outcomes of combined subconjunctival with subscleral Ologen implant in glaucoma filtering surgery

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Purpose: Evaluation of combined subconjunctival with subscleral Ologen implant in glaucoma filtering surgery.

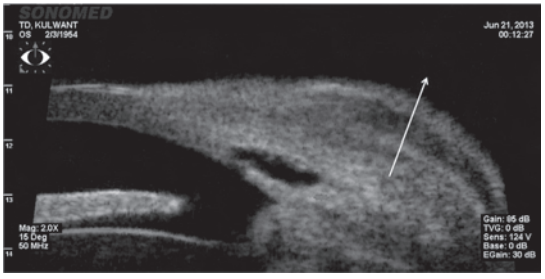
Method: A prospective clinical trial consisting of 15 patients (15 eyes), underwent a standard fornix based trabeculectomy with insertion of ologen both subsclerally and subconjunctivally. Mitomycin-C was not applied. Patients were reviewed at 1 week, 1 month, 3 months, 6months postoperatively & thereafter every 6 mths for BCVA, applanation tonometry, bleb morphology & leaks, lens status, antiglaucoma medications, perimetry & any complications.

Results: The average age of patients was 50.86 ± 14.76 yrs (range 18-68 years). The male: female ratio was 10:5. The diagnosis were varied with 3 patients having Juvenile open angle glaucoma, 4 patients with Primary open angle glaucoma, 7 patients with Primary angle closure glaucoma and 1 patient with Mixed mechanism glaucoma. The mean preoperative IOP was 40.67 ± 7.88 mmHg. The average follow-up was 13.5 ± 4.7 mths, with a minimum of at least 6 mths. Postoperatively, the IOP at 3 mths was 11.13 ± 2.74 mmHg ($n = 15$); 6mths was 12.11 ± 2.14 mmHg ($n = 10$) and at 12 mths was 13.33 ± 2.69 mmHg ($n = 4$). Mean postoperative IOP readings at all follow-up visits were significantly lower than those at preoperative levels ($p < 0.001$). Absolute success was noted in 14 patients with IOP ≤ 18 mmHg with no additional antiglaucoma medications. Qualified success was noted in 1 patient with IOP ≤ 18 mmHg, using one antiglaucoma medication. The preoperative & postoperative BCVA in LogMAR was 0.25 ± 0.21 and 0.28 ± 0.22, no significant change noted (p

= 0.239). Majority of the eyes had a diffuse elevated well-formed bleb, with the subconjunctival ologen implant being visible for 6 to 9 months. Ultrasound biomicroscopy (UBM) was done to look for the subscleral implant which was visible for 4 to 5 months. 2 patients had shallow anterior chamber in the initial postoperative day, which was reformed and subsequently patients did well. One patient had choroidal detachment, managed medically and one patient required resuturing of conjunctiva in initial postoperative days.

Conclusion: Trabeculectomy with implantation of both subconjunctival with subscleral Ologen implant appears to offer encouraging short-term results for IOP control in eyes with glaucoma with the advantage of avoiding the usage of antifibrotic agents like Mitomycin-C and thereby avoiding their associated complications.

UBM showing subscleral ologen (red star) and subconjunctival ologen (yellow arrow) in situ.



P82 Trabeculectomy as a primary modality of treating "pseudoexfoliation glaucoma"?

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A study of 200 cases of Exfoliation Glaucoma who underwent Trabeculectomy as a primary modality of treatment will be presented in this paper with emphasis on high incidence of the Pseudoexfoliation in Kashmir Valley almost as much as that seen in Scandinavia. To the authors' knowledge there is no other place in India having such a high incidence of pseudoexfoliation syndrome and associated glaucoma. PXE glaucoma constitutes the majority of glaucoma patients in the Kashmir valley accounting for 40% of the Glaucoma seen in the Glaucoma Clinic in our hospital. The extreme nature of PXE Glaucoma with high levels of IOP and the rapid damage to Optic Nerve Head as compared to POAG will be highlighted in the paper. That the Medical Management of the condition remains unsatisfactory due to high IOP levels and extensive damage to ONH when the patients presented to us, the only recourse was GFS in order to achieve good and lasting pressure control. Our experience with Trabeculectomy without any wound modulation as a modality for Primary management of PXE Glaucoma will be highlighted with its inherent advantages in our setup.

Key words: Pseudoexfoliation Glaucoma(P.X.E Gl.), High Intraocular Pressure, Extensive Optic Nerve damage, Medical treatment only to reduce I.O.P , Early or Primary Trabeculectomy.

P83 The iridenflip trabeculectomy technique

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Purpose: We describe a technique in which the iris of the iridectomy is used as a spacer to prevent fibrosis of the scleral flap.

Methods: In this preliminary study eleven consecutive patients with medically uncontrolled open angle glaucoma underwent trabeculectomy under retrobulbar anaesthesia. After a fornix based conjunctival flap, a classical trabeculectomy with releasable sutures (Peng Khaw technique) was performed. Instead of performing a classical iridectomy and discharging the iris, the iris was used as a spacer underneath the scleral flap. A video of the technique will be show. Postoperative therapy and management was similar as in classical trabeculectomy, with suture removal and needling if necessary. Five of the patients underwent a simultaneous facoemulcification through a separate temporal corneal incision. Patients should have at least one year follow-up.

Results: Ten patients with COAG were included. One patient was lost to follow-up after 5 months, although the IOP was 10 mmHg, she was excluded. Of the ten patients two had a previous failed trabeculectomy, two had a LTP and one had a corneal transplantation. In 3 patients MMC 0,1 was used because of a scarred conjunctiva or a low target pressure. In one patient one needling revision was performed after 7 weeks with application of MMC for the second time. 5FU was never needed. In the early postoperative period there was one wound leak, one choroidal effusion and one small hyphema. After one year mean IOP was 13,1 mmHg, nine of them ranging from 10 to 16 mmHg, and one patient with 19 mmHg. He had a combined procedure and topical medication was started. A pressure of 16 or lower was reached in 90% of patients without any pressure lowering medication. In 70 % IOP was 14 or lower. No major complications were seen, no abnormal inflammatory reaction, no deformation or dislocation of the pupil.

Conclusion: By using the iris from the iridectomy as a spacer under the scleral flap, fibrosis of the scleral flap is no longer possible. This iridenflip technique increased the success rate of our trabeculectomies (IOP ≤ 16 mmHg) without pressure lowering medication to 90%. A larger study with longer follow-up is currently been done and preliminary data confirm the results of this smaller study.

P86 360° Trabeculotomy using an illuminated catheter

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Purpose: Evaluation of 360° trabeculotomy using an illuminated catheter for opening Schlemm's canal.

Methods: Schlemm's canal is unroofed using a two-layered scleral flap approach. After identifying the ostia of Schlemm's canal, the illuminated catheter is introduced similar to canaloplasty. After 360° intubation, the catheter is used to rip the trabecular meshwork. The descemeto-trabeceular membrane was either opened and combined with an iridectomy or preserved without performing an iridectomy. The deep scleral flap was not excised but repositioned. The deep and the superficial flaps where secured with single stitch 10/0-Nylon sutures.

Results: In all 11 eyes Schlemm's canal was successfully probed and opened. Mean preoperative intraocular pressure was 28,6 mmHg. Mean postoperative intraocular pressure was 12,5 mmHg, with two eyes under medication and nine eyes without medication.

Conclusions: 360° probing of Schlemm's canal with an illuminated catheter to perform circular trabeculotomy was possible in all cases and has proven to result in adequate pressure control in this pilot study.

P87 Surgical technique: trans-conjunctival scleral flap resuturing for hypotensive maculopathy

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Purpose: Over-filtration following trabeculectomy, causing hypotony, may lead to reduced vision due to choroidal effusion, optic disc swelling or maculopathy. Strategies that reduce the rate of filtration with resulting elevation in intraocular pressure (IOP) may reverse these causes of visual impairment. One such strategy is the placement of trans-conjunctival scleral flap sutures which aim to increase resistance of the scleral flap and reduce aqueous egress from beneath it. A case series has reported successful outcomes with this technique (Maruyama and Shirato, 2008). To re-emphasise its utility, we describe the surgical steps and clinical outcome of a case of hypotony maculopathy treated with trans-conjunctival scleral flap resuturing.

Methods: Case report of a 56 year old female with bilateral open angle glaucoma with 10-month follow-up period after initial right eye trabeculectomy, and 5-months after right eye trans-conjunctival sutures. Two months post trans-conjunctival sutures, a right phacoemulsification with insertion of intraocular lens and injection of 5-fluorouracil (5-FU) was performed. The trans-conjunctival scleral flap suture technique comprised the following steps: i) sub-tenons local anaesthetic block, ii) placement of a limbal corneal 7-0 silk stay suture, iii) paracentesis and intracameral injection of vision blue to observe the area of subconjunctival filtration, iv) placement of tight 10-0 nylon interrupted sutures across full thickness conjunctiva and partial thickness scleral flap in the area of filtration, and v) subconjunctival injection of cephalothin.

Results: The patient had a pre-operative best corrected visual acuity (BCVA) of 6/5 in both eyes and her mean pre-operative IOP was 15 mmHg in both eyes, on three topical pressure-lowering medications. In the 5-month period following trabeculectomy with mitomycin C (0.2 mg/ml 3 mins), the patient's mean IOP was 2.8 mmHg, (range 1 to 5 mmHg). A large, diffuse over-filtering bleb (Indiana Bleb Grading Scale: H2, E3, V2, S0) was present, with no evidence of aqueous leak. During this period the anterior chamber was relatively deep and the lowest recorded BCVA was 6/36, with evidence of macula folds on fundus examination and optical coherence tomography (OCT), but no choroidal effusion or haemorrhage. Within 1 week of the resuturing, IOP improved to 6mmHg and visual acuity improved to 6/18. At month 1, IOP remained at this level. Visual acuity improved to 6/12, but further improvement was limited by cataract. The macula folds were completely resolved. At 5-months, IOP was still 5mmHg, despite intervening cataract extraction with 5-FU subconjunctival injection. The patient's BCVA was 6/9. The bleb was shallow anteriorly and diffuse posteriorly with sutures buried beneath the conjunctiva and no evidence of aqueous leak. Macula folds were absent on fundus examination and macula OCT. There was no bleb dysesthesia.

Conclusion: Trans-conjunctival scleral flap resuturing can be safe and successful for the treatment of hypotony maculopathy after trabeculectomy with mitomycin C. Interestingly, the IOP in this case, following treatment, still meets the clinical definition for hypotony however the small elevation in IOP induced by resuturing was sufficient to induce reversal of associated maculopathy and improve vision.

References: Maruyama K, Shirato S, Graefes 2008; 246: 1751-1756.

P90 Trabeculectomy with or without anterior chamber maintainer: A comparative study on intraocular pressure, endothelial cells and central corneal thickness.

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Purpose: To compare the impact of trabeculectomy and trabeculectomy with anterior chamber (AC) maintainer on intraocular pressure (IOP), endothelial cell density (ECD), and central corneal thickness (CCT) in patients with primary open angle

glaucoma (POAG).

Methods: The two groups consisted of 36 (trabeculectomy, Group A) and 42 (trabeculectomy with AC maintainer, Group B) patients with POAG. IOP and CCT were measured 1 day prior to surgery, 1 day, 1 week and 1 month postoperatively. Moreover, ECD was measured prior to surgery and 1 month postoperatively.

Results: No complications were observed. The mean decrease of mean IOP from baseline to 1 month was statistically significant for both groups (all $p<0.0001$), but the difference of the decrease between the two groups was not significant ($p=0.26$). ECD decrease was significant in Group A ($p<0.0001$), but not in Group B ($p=0.086$). The difference of the ECD decrease between the two groups was significant ($p=0.0035$). CCT changes between the two groups was not significant ($p=0.96$). The surgical procedure's duration was significantly longer in Group B than in Group A ($p<0.0001$).

Conclusion: Both techniques seem to be effective and safe options for patients with POAG. Using an AC maintainer might add some safety for the ECD, however the classic technique, which is less complicated and faster, will guarantee excellent results provided it is performed by an experienced surgeon.

• WOUND HEALING MODULATION

P91 Influx of subconjunctival 5FU into the anterior chamber

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Purpose: During needling of filtration bleb and injection of subconjunctival 5FU (Fluorouracil); influx of 5FU into the anterior chamber may potentially damage the corneal endothelium. Toxicity of 5FU may be due to its alkaline pH of 8.9 and/or direct toxic effect or inhibition of cell replication. Aqueous humour has a pH of about 7.1. It is more likely that toxicity is related to its alkaline pH or direct toxic effect rather than inhibition of cell replication as the corneal endothelium does not replicate in adult human corneas.

Method: This is a retrospective study. Two cases of influx of subconjunctival 5FU are presented with corneal specular microscopy images of the corneal endothelium. Presence of an air bubble in the anterior chamber, pain and rise of IOP with hazy cornea indicates influx. In case 1, a contingency plan has not yet been developed, and frequent topical Maxidex was given. With case 2, the contingency plan developed was carried out. Anterior chamber paracentesis with 30 G needle was done to remove sufficient aqueous without collapsing the anterior chamber totally, then air was injected. The patient was positioned supine, looking up so that air displaced the 5FU contaminated aqueous from the corneal endothelium.

Results: Influx of subconjunctival 5FU may be more likely in patients with small orbits and tight ptotic upper lid tissue and small palpebral fissures. Both the patients described have these features. This is because there is limited subconjunctival area for injection due to limited exposure of posterior conjunctiva; and after injection, the eyelid and periorbital tissues compress the elevated conjunctival tissue which pushes the subconjunctival injected fluid into the anterior chamber especially if intraocular pressures is low. Corneal specular microscopy of case 1 showed a drop in endothelial cell count with enlargement of individual cells. Case 2 showed no significant change of endothelial cell count or morphology.

Conclusion: The contingency plan developed worked in preventing damage to corneal endothelial cells. A personal protocol to prevent 5FU influx is suggested.

Appendix: Protocol when needling filtration bleb and injecting subconjunctival 5FU

Exercise caution in the patient with tight ptotic eyelid and periorbital tissue, small palpebral fissures and small orbit. It is usually the oriental patient

Be aware that in such patients with tight eyelids and orbital tissues, the eye speculum can raise IOP which encourages outflow of fluid through the fistula, and this lowers IOP and with sudden removal of the speculum after subconjunctival 5FU injection, if the bleb pressure exceeds IOP, influx of 5FU may occur.

Some patients are more sensitive to discomfort from the eye speculum which exacerbates blepharospasm and limits exposure of conjunctiva.

It is preferable not to do bleb needling and injection of subconjunctival 5FU in same puncture site. Do needling first with 27G needle, then withdraw needle. Check IOP, and then inject 5FU with 30G needle via different puncture site.

Do no inject if IOP is less than 5 mm Hg. It is preferably if IOP is more than 10 mm Hg before injecting 5FU. May consider 5FU injection on a different day, either before or after. Air bubble in the anterior chamber, pain and rise of IOP with hazy cornea indicates influx. Contingency plan is to do anterior chamber paracentesis with 30 G needle to remove enough aqueous without collapsing anterior chamber totally, then inject air. Lie the patient looking up so that air displaces 5FU contaminated aqueous from corneal endothelium. Reassess after an hour. If IOP and cornea satisfactory, Maxidex 1-2 hourly for a few days. Frequent reviews.

P92 Trabeculectomy revision with Ologen implant

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Purpose: To investigate the safety and efficacy of Ologen (OLO) implant (Kestrel Medical Ltd, Broadstone, Dorset) for trabeculectomy revision surgery

Methods: This non-comparative study was prospective with 6-months follow-up. 30 glaucoma patients underwent trabeculectomy revision with OLO. Primary outcome measures included postoperative target intraocular pressure (IOP), with or without medications. Secondary outcome measures included bleb evaluation with OCT imaging, number of medications, number of postoperative interventions and adverse events. All patients were reviewed postoperatively at day 1, 7, week 3, 7, 12 and 24.

Results: The mean pre-operative IOP was 22.3 (±4.1 mmHg), mean postoperative IOP was 14 (±5.8 mmHg). IOP reduction from baseline was statistically significant ($p<0.05$). The bleb remained well formed and functioning in all patients at all postoperative reviews. OCT imaging allowed monitoring of the position of OLO implant and showed a progressive decrease in thickness from week 1 to week 7. No serious events were observed.

Conclusions: The study demonstrated that trabeculectomy revision with OLO implant was safe and achieved a success rate similar to trabeculectomy revision with MMC at 6 months.

P93 Keys to success when using Ologen in glaucoma surgery: trabeculectomy and non penetrating deep sclerectomy

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Purpose: Show simple tools that enhance and extend the success of Ologen results in glaucoma filtration surgery, trabeculectomy and non penetrating deep sclerectomy (NPDS). Literature review on ologen placement.

Material and Methods: A series of 25 eyes received trabeculectomy glaucoma surgery: 21 eyes, fornix based and 4 eyes NPDS. A 6 mm by 2 mm Aeon Astron Europe BV Ologen collagen matrix was used intraoperatively. The Ologen was placed far from the scleral flap (4-5 mm) and viscoleastic substance (Healon) was placed around the Collagen matrix. In one case of NPDS a piece of Ologen was placed below de scleral flap also. In the postoperative period the following was: prednisolone acetate drops at a rate of 4 per day and Nepafenac, 3 drops per day during four months.

Results: In no case appeared, cystic bleb or any complications. Injectable 5- Fu adjuvants were used in 2 cases, with severe bleb vascularity. The IOP target was achieved in all patients.

Conclusions: The Ologen has little secrets to be better used. Taking these secrets into account will improve surgical success.

Keywords: trabeculectomy, non penetrating deep sclerectomy, mitomycin-C, Ologen, adjuvants in trabeculectomy.

• NON-PENETRATING SURGERY

P95 Viscocanalostomy versus trabeculotomy in buphthalmos

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Objectives: Is to compare the efficacy of viscocanalostomy to that of trabeculotomy in patients with primary congenital glaucoma.

Methods: 20 patients, 12 males and 8 females are subdivided into 2 groups. The first group (group A) include 10 patients with bilateral primary congenital glaucoma (20 eyes) underwent trabeculotomy operation. The second group (group B) include 10 patients with bilateral primary congenital glaucoma (20 eyes) underwent canalostomy operation. The patients were examined after 1 and 3 months by Intraocular pressure (IOP) and corneal diameter measurements.

Statistical Analysis: Done by the paired-sample's Student's t test and ANOVA F test were applied.

Results: Preoperative IOP mean and standard deviation (SD) of eyes undergoing trabeculotomy (30.40 (5.36) mm Hg) and that of eyes undergoing canalostomy (29.90 [4.72] mm Hg) with no significant difference difference between the two groups (p value = 0.7) with highly significant drop in IOP was noted in both groups after 1and 3 months (p = 0.001). Similarly, a decrease in the postoperative vertical and horizontal corneal diameters was noted in the two study groups.

Conclusion: Viscocanalostomy proved to be as effective as trabeculotomy in lowering IOP. Moreover, it is likely to be a good surgical alternative with a higher long-term success rate in eyes with more aggressive disease.

P96 Surgical efficacy of trabectome and trabeculotomy combined with sclerectomy in open-angle glaucoma and exfoliation glaucoma

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Purpose: To assess short-term intraocular pressure-lowering efficacy of trabectome versus trabeculotomy ab externo combined with deep sclerectomy without mitomycin C (LOTD).

Methods: Outcomes included intraocular pressure (IOP), medications, complications, visual acuity, and success rate, defined as IOP less than 21 mmHg with medications (baseline IOP 21 ≤), or less than 16 mmHg with medications (baseline IOP 16-20 mmHg). In the trabectome group, a 1.7 mm near limbal temporal incision was made. Under gonioscopic view, the trabectome handpiece was advanced nasally and inserted through the trabecular meshwork. Selective electrosurgical ablation was activated to remove a 60- to 120-degree arc of trabecular meshwork and inner wall of

Schlemm's canal. Irrigation of the anterior chamber with BSS was routine to remove as much blood as possible. In the LOTD group, a fornix-based conjunctival flap was dissected lower site. A 4 × 4 mm scleral flap was dissected anteriorly into clear cornea. A deep scleral flap was then dissected to identify Schlemm's canal. Trabeculotomy was performed first. Anteriorly, the dissection was made down to remove Schlemm's canal and jaxtacanalicular trabecular. Excision of the corneal stroma was performed more anteriorly down to Descemet's membrane. The scleral flap and conjunctiva were closed.

Results: 56 eyes of 56 patients and 43 eyes of 43 patients were recruited for trabectome and LOTD, respectively. The mean (SD) baseline IOP was 24.3 (7.3) mmHg and 23.0 (5.8) for trabectome and LOTD, respectively (p = 0.33). The means postoperative IOPs were 15.1 (3.3) and 14.8 (3.7) at 6 months (p = 0.66), 15.8 (3.6) and 15.2 (3.6) at 12 months (p = 0.51), 16.4 (5.8) and 14.3 (3.5) at 18 months (p = 0.19) for Trabectome and LOTD, respectively. The cumulative success rate for trabectome and LOTD at 20 months after surgery was 53% and 56% (p = 0.86), respectively. The number of medications did not decreased from 2.8 (0.7) to 2.9 (0.7), (p = 0.42) in trabectome and from 2.3 (0.9) to 2.3 (1.1), (p = 0.79) in LOTD at last visit. Visions within 2 lines of preoperative levels and remained stable in all patients for trabectome and 38 patients (88%) for LOTD (p = 0.009). There were no cases of sustained hypotony, choroidal effusion, or hemorrhage, and infection in these tow groups.

Conclusions: Trabectome and LOTD were equally effective in lowering IOP in Japanese patients with POAG and EX. However, the LOTD is associated with a high incidence of visual acuity loss.

P97 Application of viscoelastic medicines in complicated course of non-penetrating glaucoma surgeries

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One of the basic courses of hypotensive effect decrease in non-penetrating operations is a blocade of trabecular-descemet's membrane with iris root and formation of adhesions in the anterior chamber angle. This pathology is up to 28% among the reasons of IOP elevation after non-penetrating deep sclerectomy in the follow-up up to 6 months.

Purpose: To evaluate an efficiency of viscoelastics use in the course of micro-invasive non-penetrating deep sclerectomy (MNPDS) to prevent a contact of the iris with the surgical zone.

Material and Methods: The study was performed in 35 patients (35 eyes) with primary open-angle glaucoma of stage I, II and III, where during the MNPDS intra-operatively there were noted: excessive filtration - 30 eyes and micro-perforation of trabecular-descemet's membrane - 5 eyes, with a reduction of the anterior chamber depth by 0.5-1.0 mm. The mean age was 69 ± 5.5 years, the medication decreased the IOP preoperatively up to 26.5 ± 3.5 mmHg. In the revealed reduction of anterior chamber depth The Viscot (Alcon) 0.1-0.2 ml was injected under the scleral flap, and through the paracentesis the anterior chamber was filled using a cannula with a viscoelastics combination: Viscot 0.1ml and Provisc 0.2-0.3 ml. The postoperative follow-up was from 3 to 18 months (12 ± 2.5 months).

Results: There were noted a uncomplicated course of postoperative period with a restoration of the anterior chamber depth and a normalization of the ophthalmotonus during the whole follow-up. According to the OCT data (Visante) a displacement and a contact of the iris root with the trabecular-descement's membrane (TDM) was not found, the anterior chamber angle remained open. The TDM had a smooth contour, without a prominence into the intrascleral cavity.

Conclusion: The suggested technique of anterior chamber restoration during the MNPDS in case of excessive filtration of aqueous humor promotes an uncomplicated course of the surgery and creates optimum conditions for aqueous humor filtration, prevents a displacement of iris root and the TDM block.

P98 urgical outcome of hybrid surgery (non-filtering and filtering surgery). Effects of fenestration between lake and supra-ciliary space

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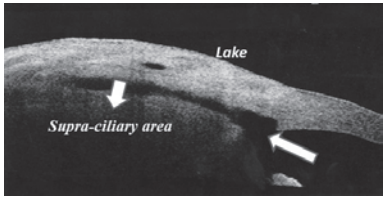
Purpose: To evaluate effects of fenestration between intrascleral lake and supra-ciliary area on surgical outcome of deep sclerectomy.

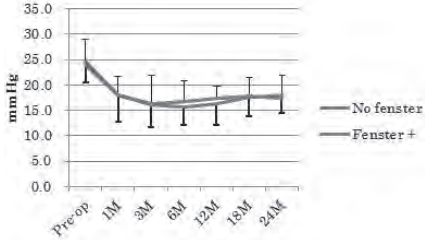
Introduction: There are 3 main routes to drain the aqueous out of the eye; via Schlemm's canal, filtration to subconjunctival space and drainage via uveo-scleral outflow. To activate uveo-scleral outflow, previous trials utilizing Cypass and gold micro-shunt may not be successful. To enhance the uveo-scleral outflow, we modified deep sclerectomy creating a fenestration between intra-scleral lake and supra-ciliary area (Fig 1).

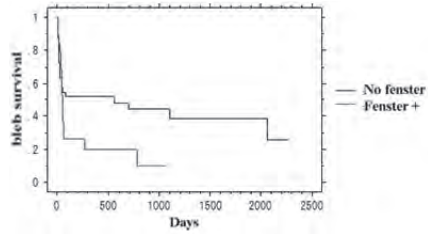
Methods: We retrospectively reviewed 397 records of eyes treated by deep sclerectomy (150 eyes without fenestration and 247 eyes with fenestration) at Sensho-kai Eye Institute between 2006 and 2012. Among them, 162 eyes with angle closure glaucoma, secondary glaucoma and developmental glaucoma, and 164 eyes with combined cataract surgery were excluded. In the residual 71 deep sclerectomy alone cases with primary open angle glaucoma (POAG) or ocular hypertension (OH), 2 eyes with incomplete data and left eye data of 17 subjects with bilateral surgical intervention were excluded. Finally 52 eyes of 52 subjects were analyzed. As a control, 77 eyes of 77 POAG subjects treated by trabeculectomy with adjunctive mitomycin C (MMC) were selected by the same procedure from 326 trabeculectomy MMC treated cases during the same period. Among the 52 deep sclerectomy cases, 33 were not fenestrated and 19 were fenestrated.

Results: In the deep sclerectomy cases, there was no statistically significant difference in post-operative intraocular pressure (IOP) between fenestrated and non-fenestrated eyes (Fig 2: P=0.327 to 0.892). However there was marginally significant difference in the rate of filtering bleb formation (P=0.0869: Mantel Cox log rank test Fig.3). When we compared trabeculectomy and deep sclerectomy cases, there was no statistically significant difference in the successful IOP control below 21mmHg between trabeculectomy MMC and deep sclerectomy (P=0.577, Mantel Cox log rank test) however, there was a significant difference in the probability of bleb survival between trabeculectomy MMC and deep sclerectomy cases (P=0.0004, Mantel Cox log rank test), (Fig 3) This finding suggest that uveo-scleral outflow works to reduce IOP after modified deep sclerectomy. On the other hand, small number of deep sclerectomy subjects developed a filtering bleb after creating fenestration, which means bidirectional outflow to supra-ciliary area and also to subconjunctival space. Thus this procedure is considered as a hybrid of filtering and non-filtering surgery.



Conclusion: Fenestration between the intra-scleral lake and supra-ciliary area leads to decrease in probability of bleb formation despite similar lowering of the IOP. This finding suggests that the fenestration facilitated aqueous outflow to the uveo-scleral pathway, and decreases in a rate of filtering bleb formation.





P102 Nonpenetrating deep sclerectomy in the treatment pseudoexfoliation open-angle glaucoma

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To evaluate the control of intraocular pressure and safety of deep sclerectomy with implantation Sk-gel in the combined surgery with cataract in patients with pseudoexfoliation open-angle glaucoma.

Materials and Methods: Prospective case series study comprised 24 patients and 26 eyes. Pseudoexfoliation open-angle glaucoma without satisfying intraocular pressure (IOP) control (≥ 21 mmHg) despite maximally tolerated medications or with progression of visual field and cataract was the indication for surgery. IOP, number of medications and best corrected visual acuity (BCVA) were examined. On the basis of the assessment of the anterior and posterior segments of the eye, the character and also the degree of intensification of postoperative complications were established. The complete success rate was defined as IOP ≤ 18 mmHg without antiglaucoma medications, and the qualified success rate as IOP ≤ 18 mmHg with and without antiglaucoma medications.

Results: The mean follow-up was 44.8 ± 12.8 months. Mean IOP decreased from 22.6 ± 7.5 to 11.4 ± 2.3 mmHg ($p < 0.001$). The mean number of medications was reduced from 2.3 ± 0.5 to 0.1 ± 0.4 ($p < 0.001$). Qualified and complete success rates were 100% and 80.95% after 12 months, 94.7% and 52.63% after 24 months. Mean BCVA changed from 0.3 ± 0.27 do 0.7 ± 0.3 ($p < 0.001$). Subconjunctival 5-FU injections together with suturolysis was performed in 7 eyes. The most frequent complications were punctuate keratopathy in 19.2% of the operated eyes. Hypotony and choroid detachment were observed in 7.7% of eyes.

Conclusions: Phacoemulsification-deep sclerectomy with implantation Sk-gel allows to reduce intraocular pressure in patients with pseudoexfoliation open-angle glaucoma in the medium-term follow-up.

P103 Deep sclerectomy with insertion of a prolene 5/0 suture segment inside Schlemm's Canal. A pilot study

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Purpose: To describe an additional step during deep sclerectomy in eyes with primary open angle glaucoma (POAG).

Methods: A prospective interventional pilot study. Classic deep sclerectomy is performed, a 10-mm length segment of 5/0 polypropylene suture is passed through the cut end of Schlemm's Canal (SC), then the other end of the suture is threaded through the other cut end of SC; in this way the polypropylene suture is centered on the exposed Trabeculo-Descemet's membrane and extending inside both ends of SC.

Results: This pilot study is conducted on 5 eyes of three patients with. the mean pre-operative intra-ocular pressure (IOP) was 26 mmHg under a mean of 2.2 anti-glaucoma eye drops. The mean follow up was 8 months, and the mean IOP at the end of the follow up period was 12 mmHg without anti-glaucoma medications. No serious complications were reported.

Conclusion: The described step is a promising add and obtained a low IOP after deep sclerectomy. Additional studies are required.

P104 Trabeculotomy with deep sclerectomy for primary open-angle glaucoma°Outcomes of 360

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Objective: We had performed 120° trabeculotomy with deep sclerectomy until 2010, after which we performed 360° trabeculotomy with deep sclerectomy. In this study, we compared the therapeutic outcomes between the two procedures retrospectively.

Subjects and Methods: Fifty-one eyes of 35 consecutive patients with primary open-angle glaucoma (POAG) who underwent 360° trabeculotomy with deep sclerectomy simultaneously with cataract surgery (360°LOT+DS group) at the Sato Ophthalmological Clinic between April 2011 and February 2013 were compared retrospectively with 35 eyes of 24 patients with POAG who underwent 120° trabeculotomy with deep sclerectomy (120°LOT+DS group). The mean follow-up period was 12.5 ± 7.2 and 21.9 ± 5.0 months, respectively.

Surgical Procedures: 360° trabeculotomy with deep sclerectomy: To preserve the upper conjunctiva, surgery was performed at the temporal position in all patients. Conjunctival incision was performed at the base of the fornix, a 4x4-mm first scleral flap, and a 3x3-mm second scleral flap was prepared in the first flap. After exposing the internal wall of Schlemm's canal, a viscoelastic material was injected into Schlemm's canal, a 5-0 nylon thread with the tip rounded by applying heat was inserted into Schlemm's canal, advanced circumferentially, and pulled out from the opposite side. The anterior chamber was filled with viscoelastic material, a small incision was made at the angle between the trabecula and internal wall of Schlemm's canal (window) using a 30G needle, the thread was advanced from this site through the anterior chamber, and pulled out from a corneal side port prepared on the opposite side of the window, and 360° trabeculotomy was performed by slowly withdrawing the threads on both sides. Then, phacoemulsification and intraocular lens insertion (PEA+IOL) were performed through the first incision, the second scleral flap was removed, and the first scleral flap and the conjunctiva was closed by continuous suture with a 10-0 nylon thread by preventing the leakage of aqueous fluid, and surgery was completed. 120° trabeculotomy with deep sclerectomy using a trabeculotome: The procedure was the same as above except that, after exposing Schlemm's canal, a trabeculotome was inserted bilaterally into the canal, and the internal wall of the canal was incised over a total of 120°. The evaluation items were: (1) serial changes in the intraocular pressure, (2) serial changes in the medication score, and (3) frequency of postoperative transient ocular hypertension.

Results: No significant difference was observed in the patients' background between the two groups. 1. Intraocular pressure: In the 360°LOT+DS group, the intraocular pressure was 18.6 ± 0.4 mmHg before surgery but was 11.7 ± 0.3, 12.4 ± 0.4, 12.7 ± 0.4, 13.1 ± 0.5, 13.0 ± 0.4, 12.0 ± 0.5, 12.3 ± 0.6, and 11.8 ± 0.5 mmHg 3, 6, 9, 12, 15, 18, 21, and 24 months after surgery. In the 120° LOT+DS group, the intraocular pressure was 19.3 ± 0.5 mmHg before surgery but was 13.7 ± 0.6, 13.9 ± 0.5, 14.4 ± 0.5, 14.2 ± 0.5, 14.4 ± 0.5, 14.9 ± 0.6, 14.8 ± 0.5, and 15.0 ± 0.6 mmHg 3, 6, 9, 12, 15, 18, 21, and 24 months after surgery. The intraocular pressure was significantly lower in the 360° than 120° LOT+DS group 3, 6, 18, 21, and 24 months after surgery ($p = 0.001$, 0.023, 0.012, 0.003, 0.007, and 0.007, respectively; unpaired t-test). The success rate calculated with failure being defined as an intraocular pressure exceeding 16 mmHg 24 months after surgery by the Kaplan-Meier method was 98.0 and 75.9% in the 360° and 120° LOT+DS groups, respectively, being significantly higher in the 360° group ($p = 0.0013$, log-rank test). The success rate with failure being defined as an intraocular pressure exceeding 14 mmHg 24 months after surgery was 84.9 and 45.9% in the 360° and 120°LOT+DS groups, respectively, also being significantly higher in the 360° group ($p = 0.0003$, log-rank test). 2. Medication score: In both group, it was significantly reduced compared with the preoperative score until 9 months after surgery ($p < 0.05$ for each, Dunnet's multiple comparison test). No significant difference was noted between the surgical procedures at any point of evaluation. 3. Postoperative transient ocular hypertension: Postoperative transient ocular hypertension was observed in 13 eyes (25.5%) in the 360°LOT+DS group and 3 eyes (8.6%) in the 120°LOT+DS group, but the difference was not significant ($p = 0.0541$, Fisher's exact test).

Conclusion: 360° LOT+DS is considered to be effective in lowering IOP and safe for adults with POAG.

P105 Ab-Interno Peripheral Iridectomy for the Management of Iris Incarceration Following Deep Sclerectomy

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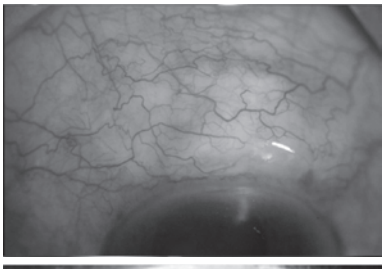
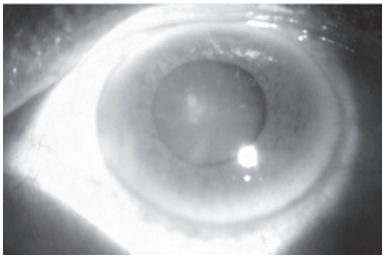
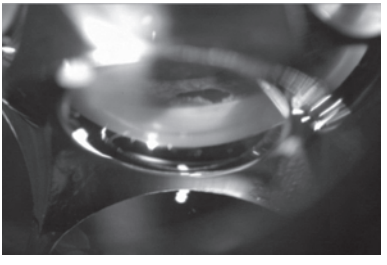
Purpose: Deep sclerectomy (DS) and viscocanalostomy (VC) are surgical techniques that aim to lower intraocular pressure (IOP) by increasing aqueous humour outflow via Schlemm's canal, the suprachoroidal space, intra-scleral pathways and/or the sub-conjunctiva. A defining feature of DS and VC is preservation of the inner wall of Schlemm's canal. The lack of full-thickness incision into the anterior chamber (AC) avoids: i) sudden intra-operative and/or post-operative decompression of the eye, and ii) the need for surgical iridectomy. Micro-perforation into the AC may occur but in the absence of iris incarceration, post-operative topical pilocarpine is sufficient to manage this. Uncommonly iris incarceration may occur post-operatively, [1-2] leading to elevated IOP and surgery failure, necessitating revision of surgery with surgical iridectomy to correct. We describe, for the first time, an ab-interno peripheral iridectomy technique using a 23-gauge vitrectomy cutter to re-establish aqueous flow and avoid the need for surgical revision following iris incarceration complicating DS and VC.

Methods: Case report.

Results: A 64 year-old male with primary open angle glaucoma underwent DS with mitomycin C (0.2 mg/ml for 30 seconds). Micro-perforation without iris incarceration occurred when de-roofing Schlemm's canal. Pilocarpine 2% was instilled at the end of surgery. At the post-operative review next day, the intra-ocular pressure (IOP) was 2 mmHg with a diffuse subconjunctival bleb, formed anterior chamber (AC), no aqueous leak and no choroidal effusions. The patient was discharged home on g. maxidex QID, g. chlorsig QID and g. pilocarpine 2% TDS to the left eye. The patient presented 5 days after surgery with left ocular pain, headache and reduced vision in the context of stopping pilocarpine soon after discharge. On examination, left visual acuity was hand movements, IOP 50 mmHg, corneal oedema was present, superior corectopia was noted and gonioscopy revealed peripheral iris incarcertion into the trabecular meshwork. Despite attempts to reverse the iris plugging and re-establish aqueous flow across the trabecular window using topical pilocarpine, superior argon laser peripheral iridoplasty and an iris sweep performed in theatre, iris incarceration with raised IOP persisted. To avoid complete surgical revision and preserve the trabecular meshwork, an ab-interno peripheral iridectomy using a 23-gauge vitreous-cutter (Accurus, Alcon, Fort Worth, Texas, USA) was performed via two 1 mm clear cornea side ports at 3 and 9 o'clock with a rate of 100 cuts/min and 300 mmHg of suction. At the last follow-up, 2 months after the ab-interno iridectomy, IOP was 14 on no medications and no signs of iris plugging of the trabecular meshwork.







Conclusion: This case shows that ab-interno peripheral iridectomy may be performed safely and effectively for management of iris incarceration complicating DS. In this case, iris incarceration that did not respond to topical

cholinergics, laser iridoplasty and iris sweep was corrected using the ab-interno peripheral iridectomy using a 23-G vitreous cutter. The trabecular window remained free of iris incarceration and IOP is well controlled without the need to manipulate the conjunctiva or scleral flap.

P106 Early visual impact of deep sclerectomy

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Introduction: Patients undergoing glaucoma surgery may experience visual loss in the early post-operative period. The magnitude and temporal pattern of visual changes have been studied, and patients undergoing trabeculectomy, glaucoma drainage device surgery and cyclodiode laser can be properly counselled regarding the likely early visual impact of their procedure. There is currently no such information for patients undergoing non-penetrating glaucoma surgery (NPGS, deep sclerectomy). Patients undergoing NPGS have no comparative information for their pre-operative counsel.

Objectives: To assess the early visual impact of non-penetrating glaucoma surgery. To determine the magnitude and duration of any early visual loss. If visual loss is transient, to determine the timing of visual recovery.

Methods: 30 consecutive patients who were listed for NPGS at HUG were followed up over a 6 month period. Visual acuity was recorded at recorded at 1 day, 1 week, 1 month, 3 months and 6 months. Visual loss was categorised into mild (0-3 snellen lines of acuity), moderate (3-5 lines) or severe (more than 5 lines). Vision not recovered at 6 months was considered permanently lost.

Results: The median patient lost 1 line of acuity at 1 day, and this recovered to pre-operative visual acuity by 1 week. 83% of patients retained pre-operative visual acuity at 1 week post-op. 6% off patients suffered mild but permanent visual loss. Of those 5 (17%) patients whose vision was still reduced at 1 week, 3 (60%) recovered pre-operative visual acuity by 1 month. The 2 patients whose vision was still reduced at 1 month continued to have reduced vision at 6 months.

Conclusions: Patients undergoing NPGS can now be counselled as to the risks of early visual loss and in the case of visual loss, the likely time course of recovery. Patients undergoing NPGS are less likely to suffer early visual loss when compared to published data for trabeculectomy, GDDS and cyclodiode laser. Of those who do suffer transient loss of acuity, visual recovery is faster than for other surgical procedures, and fewer patients suffer permanent visual loss.

P108 Partial canaloplasty

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Canaloplasty is a non-penetrating glaucoma surgery that includes deep sclerectomy, viscocanalostomy, circular catheterization of Schlemm's canal, placement of a tensioning suture within the Schlemm's canal and watertight closure of the superficial scleral flap. In some eyes a complete circular catherization is not possible. This could be caused by a atypical anatomy, a collapsed and scarred Schlemm's canal or after previous antiglaucomatous surgery like trabeculectomy or Schlemm's canal bypass or laser surgery. In this case most surgeons only perform a deep sclerectomy/viscocanalostomy or modify the procedure to a penetrating glaucoma surgery. We developed a modified technique to place a tensioning suture within the Schlemm's canal in case of incomplete catheterization - partial canaloplasty.

After deep sclerectomy is performed the microcatheter (Glaucolight, DORC, The Netherlands or iTrack, iScience Interventional, USA) is introduced and catherization is performed to the maximal distance. There the conjunctiva is opened and a second deep sclerectomy is performed. This is usually easier as the illuminated tip of the microcatheter is indicating Schlemm's canal location. The tip is externalized and the polypropylane suture is fixated to the microcatheter and then withdrawn. We leave the needle attached to the suture and create a loop while fixating the suture to

the microcatheter. Now the suture is detached from the microcatheter and the loop is fixated with a second polypropylene suture to the sclera within the deep sclerectomy bed. At the second deep sclerectomy the attached needle of the polypropylene suture is used to fix the tensioning suture to the scleral wall within the deep sclerectomy bed and knot to the free end of the suture. Tensioning the polypropylene suture in that way creates a detachment of the inner wall of Schlemm's canal and a partial canaloplasty. Surgical technique and results will be presented.

• TUBE SHUNTS

P109 Application of combination of Ex-press glaucoma filtration device and hydro-gel drainage in case of secondary glaucoma induced by silicone oil emulsification in patients after vitrectomy

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A long presence of silicone oil in vitreous cavity can lead to an emulsification with a subsequent development of secondary glaucoma, that difficult resists to traditional methods of medicamentous and surgical treatment. Elevation of intraocular pressure (IOP) manifested without symptoms in postoperative period, is observed in 5.9-48% of cases and can lead to the optic atrophy minimizing results of a difficult and high technological surgical treatment.

Purpose: To study efficiency of combination of the Ex-press glaucoma filtration device Model P 50 and the hydro-gel drainage in secondary glaucoma induced by silicone oil emulsification in patients after vitrectomy.

Methods: There were included in the study the patients after retinal detachment surgery with silicone oil tamponade (1300 and 1000 centistrokes). Periods of tamponade varied from 1 to 6 months. The silicone oil was removed from the vitreous cavity in all patients. There were operated 23 eyes (23 patients) with secondary glaucoma induced by silicone oil emulsification. The preoperative IOP was from 32 to 39mmHg using maximum hypotensive mode.

Patients were divided into 2 groups. Group I - 9 patients with implantation of Ex-press glaucoma filtration device. Group II - 14 patients with performed glaucoma surgery using the combination of Ex-press glaucoma filtration device and hydro-gel drainage. There were performed 5-7 fluoruracil injections in the dosage of 10-15 mg/ml in all patients. All patients were examined in follow-up of 1, 7, 15 days and 1, 3, 6 and 12 months postoperatively.

Results: An IOP compensation without drops was achieved 12 months later in the Group I in 5 patients (55%), the compensation with hypotensive regimen - in 3 patients (33%), the IOP compensation was not achieved in 1 patient. In the Group II the IOP compensation was achieved without drops in 12 patients (85.7%), the compensation with hypotensive regimen - in 2 patients (14.3%). A local retinal detachment appeared in 1 patient of the Group II 2 months postoperatively, pneumoretinopexy was performed in combination with demarcated laser coagulation of retina as a result a total anatomic retinal attachment was achieved. According to ultrasound bio-microscopy data the intrascleral cavity had a linear profile, with unclear borders, visualized multiple inclusions (emulsified silicone) in all patients of the Group I. Patients of the Group II had the intrascleral cavity with unclear borders (height from 0.53 to 0.75mm), there were determined parietal inclusions (emulsified silicone) a thin hydro-gel drainage was visualized in the cavity, along which the aqueous humor outflow occurred together with emulsified silicone.

Conclusions: Application of the combination of the Ex-press glaucoma filtration device and the hydro-gel drainage in secondary glaucoma, induced silicone emulsification in patients with operated retinal detachment compared with the use of the Ex-press glaucoma filtration device allows to achieve a more stable and pronounced hypotensive effect, promotes a maintenance of visual functions, minimizes a risk of postoperative hypotension.

P110 The effect of intravitreal bevacizumab injection before Ahmed valve implantation in patients with neovascular glaucoma

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Purpose: To evaluate the effect of intravitreal bevacizumab (IVB) before Ahmed valve implantation for treatment of neovascular glaucoma (NVG).

Methods: This study is a retrospective, comparative, consecutive case series. The study group consisted of 27 eyes of 26 patients with NVG who underwent an Ahmed valve implantation. Thirteen eyes were treated with Ahmed valve implantation alone (control group), and 14 eyes were treated with a combination of preoperative intravitreal bevacizumab injection and Ahmed valve implantation (IVB group). Visual acuity, intraocular pressure (IOP), number of anti-glaucoma medications, surgical complications, and success rate were compared between the two groups.

Results: There were no significant differences in preoperative characteristics between the two groups. Visual acuity at one week, two weeks, and one month after operation were significantly better in the IVB Group ($p = 0.038$, 0.034, and 0.032, respectively). Hyphema associated with Ahmed valve implantation occurred significantly less often in the IVB group ($p = 0.016$). On the other hand, the mean IOP and number of anti-glaucoma medications at all follow-up periods were similar between the two groups. Kaplan-Meier survival analysis showed the probability of success six months after operation as 71.4% in the IVB group and 84.6% in the control group. No significant difference in success rate was found between the groups ($p = 0.422$).

Conclusions: IVB before Ahmed valve implantation for treatment of NVG reduces hyphema. IVB provided better visual outcomes at early postoperative periods but did not significantly improve mean IOP, number of anti-glaucoma medications, or success rate.

P111 Three types of draining devices for surgical treatments of glaucoma

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The main purpose of this study was to evaluate the efficacy and indication of different glaucoma devices for different stages and types of glaucoma. For this purpose we examined 90 patients with initial and developing non compensated, advance and refractory open angle glaucomas who had devices implantation done in S.V. Malayan's Eye Center, Yerevan, Armenia during 2011-2012yy: 30 cases with Glaukos™ G1 trabecular bypass stents, 30 cases with Alcon Ex-Press shunts, and 30 cases with Ahmed Glaucoma Valve, World Medical. All the patients had anatomically opened angle with or without synechia, primary or secondary, intraocular pressure (IOP) was from 24 to 32 mmHg with medications, ages 25-66 y.o. For the first group with G1 stents - open angle glaucoma with or without pigmentation, pseudoexfoliative and pigmentary, no goniosynechia, initial or developing stages and with two antyglaucoma medications before the implantation. Surgery was perform under anesthetic drops 10 and 5 min before implantation. Through paracenthesis in anterior chamber Hialone was injected to keep the eye and under goniolens view 2 trabecular bypass stents were inserted into trabacular meshwork. Surgery performed during 1-2 min. Patients were under control next day, one week, one month, 3,6,12 months after intervention taking antibiotics one week and Dexametasone for 2-4 weeks. The main goal was to decrease IOP and keep the vision. Most important point was to properly insert both stent exactly in trabecular meshwork and that way to recover nonworking portion of trabeculas. Second group included 30 patients with different stages and types of open angle glaucoma, who had Ex-Press shunt device implanted as a first surgery. The anatomical structures same as for the first group, but we included also advance graucomas. Patients were under 2 meds and not fully compensated. Surgery was perform with subtennon anesthesia, with limbus- based conjuctiaval flap without antimetabolites, and took about 30 min. Patients were taking Antibiotics one week and Dexamethasone one month period. Under our control mostly were IOP and the vision. Third group had 30 patients with

primary, secondary, refractory glaucomas with very big structural cases in the angle, when any other intervention would fail. Ahmed Glaucoma Valve (AGV) was implanted under retrobulbar or subtennon anesthesia. The devise was fixed at superotemporal quadrant behind equator and the tube inserted into anterior chamber angle projection. Tube was covered by homosclera and fornix-based conjunctiva was replaced. Surgery takes about 40 min and postop medications are the same. We had 4 cases with juvenile uveal glaucoma, 18 cases as first surgery for neovascular glaucoma and 8 cases for refractory glaucoma. IOP and vision were under control. The results showed for first group IOP lowering and stabilizing for one year period. The mean IOP for this group was 23 mmHg with two meds, and 28-29 mmHg after washout the meds one week prior to intervention. The mean IOP for first week was 12, and 17 mmHg at one year after the surgery. Only 6 patients had IOP elevation found at three months to ~21 mmHg and Prostaglandine was added to normalize the IOP. No complications or adverse events were found. The only «negative» for these patients was IOP elevation. All patients kept their vision and visual fields as from first visit. The second group patients had very significant IOP lowering from 28 mmHg with medications. Postoperatively IOP was 11-12 mmHg first days and 13-14 mmHg at the 3 moths period and stays to the one year period. Postop complications included one case of Hypotony maculopathy treated with triamcinolone injection, 2 cases of choroidal detachment treated by medications, hyphema first week 2 patients resolved spontaneously, and only one case with IOP elevation at 6 mo from surgery. Prostagrandin was added to keep the IOP and normal level. 3 cases with cataract formation. No nonreversible complications. The third group had the hardest cases involved. IOP was normalized for all cases and dropped from 30 mmHg in average to 14-15 postoperatively. The complications included Hyphema (6 cases), choroidal detachment - one case, cataract formation - 3 cases, retinal detachment - one case - surgical intervention was performed to restore the vision. 2 cases with IOP elevation had Prostaglandin added to normalize IOP.

Conclusion: Glaucoma draining devices are safe, effective and modern shunts or stents, improving fluid outflow and treating glaucoma. For Glaukos G1 trabecular bypass stent the best result found for safe eyes with working peripheral draining system, for Alcon Express shunts indications are the same as for Trabeculectomies, but surgery much easier and faster to perform and complications are less. AGVs are very useful and helpful for hard and refractory cases, when all other interventions are not effective. But all these types of implants are highly effective for surgical treatment of glaucoma.

P112 Aqueous shunt surgery using the EX-PRESS® glaucoma filtration device for glaucoma secondary to iridocorneal endothelial syndrome

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Purpose: Eyes with iridocorneal endothelial (ICE) syndrome that undergo glaucoma filtration surgery have a high risk of failure due to endothelialization of the fistula by the abnormal corneal endothelium. The purpose of this study was to report the surgical outcome of two patients with ICE syndrome who underwent aqueous shunt surgery using the Ex-Press® glaucoma filtration device (Alcon Laboratories, Fort Worth, TX, USA) for uncontrolled glaucoma.

Methods: The study design was a non-comparative, retrospective case series. Two cases of glaucoma with ICE syndrome who underwent aqueous shunt surgery at our institution between January 2012 and March 2013 were reviewed.

Results: Case 1 involved a 34-year-old female with blurred vision who was referred to our clinic. Upon examination, abnormal corneal endothelial cells causing corneal edema, with secondary spreading of the cells over the trabecular meshwork causing high intraocular pressure (IOP) (41 mmHg), and across the surface of the iris responsible for the pupillary distortion and iris nodules led to the diagnosis of Cogan-Reese syndrome. Initial trabeculotomy *ab interno* failed at 1 year after the surgery due to the endothelialization of the fistula by the abnormal corneal endothelium. Aqueous shunt surgery using the Ex-Press® glaucoma filtration device was then performed, and

IOP was controlled at under 15 mmHg for 1 year postoperative. Case 2 involved a 54-year-old female with bullous keratopathy due to ICE syndrome. High IOP (31 mmHg) was observed while the patient was under full medication following corneal endothelial transplantation (Descemet's Stripping Automated Endothelial Keratoplasty; DSAEK). Aqueous shunt surgery using the Ex-Press® glaucoma filtration device controlled the IOP at under 20 mmHg and without any medications post surgery with a well-formed filtering bleb.

Conclusion: Glaucoma associated with ICE syndrome can be successfully managed by aqueous shunt surgery using the Ex-Press® glaucoma filtration device, as the device is made of stainless steel which prevents proliferative endothelialization of the fistula.

P113 Surgical results and effect to corneal endothelium after Baerveldt Glaucoma Implant in Japanese patients

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Introduction: Baerveldt Glaucoma Implant (BGI) was brought to the Japanese Market in 2012. Although, cases with Japanese intractable glaucoma were treated with BGI since 2012, information of surgical result in Japanese patients is lacking. In this prospective study, surgical result of BGI is reported.

Patients: Twenty-two eyes of 22 Japanese patients with intractable glaucoma were treated with BGI (21 had BGI-101 and 1 case had BGI-103). Mean age was 57.8 years. Fifty percent (11 eyes) was neovascular glaucoma, and other cases were diagnosed to have developmental glaucoma, congenital glaucoma, iridocorneal syndrome, uveitic glaucoma, secondary glaucoma associated with scleral buckling, or primary open angle glaucoma. Past history of surgery was 2.6 on average.

Method: Tube was inserted into anterior chamber in all cases. Intraocular pressure (IOP), number of medications, complications, and cell count of corneal endothelium (CE) were measured before and after surgery (1, 3, 6, and 12 month).

Results: Mean IOP was 32.7 before surgery and 20.8, 15.8, 14.2, and 14.5 mmHg at 1, 3, 6, 12 month after surgery ($p < 0.05$). Mean number of glaucoma medications reduced from 3.2 to 0.6 after surgery ($p < 0.05$). There was no significant difference in average CE before and after surgery (2113 /mm^2 vs. 2009 /mm^2). One case lost light perception and 1 had extrusion of plate. Surgical success defined with 5< IOP < 21 mmHg without reoperation and without loss of more than 2 lines of visual acuity was 90 % (20/22).

Conclusion: Anterior chamber insertion of BGI was effective treatment in eyes with Japanese intractable glaucoma.

P114 Priming pressure and over-priming of the Ahmed glaucoma valve device

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Purpose: To determine the pressure required to prime an Ahmed Glaucoma Valve (AGV) and determine if the valve can be damaged by "over-priming pressure".

Methods: Six AGVs, a syringe pump and a manometer were used to assess priming pressure. A 20 ml syringe pump was filled with balanced salt solution (BSS) and attached to an AGV and manometer via a 3-way stop cock. BSS was pumped through the AGV tube at increasing pressures until a jet of fluid was seen to eject from the AGV, as per manufacturer instructions. This was repeated 3 times for 3 different virgin AGVs giving the "priming pressure". A second experiment used the same experimental set up to determine the "over-priming pressure" on 3 other AGV's. Fluid was pumped

through the AGV at increasing pressures until evidence of damage was seen. The valve function was assessed before and after the "over priming" stress test. Valve function was determined by the closing pressure, which is the pressure at which the valve closes and fluid was no longer seen passing through the valve.

Results: The priming pressure in the 3 AGV's was 2844 mmHg, 3154 mmHg and 3051 mmHg (mean 3017 ± 158 mmHg). The maximum pressure generated using the syringe pump was 10860 mmHg, 10343 mmHg and 10860 mmHg (mean 10688 ± 299 mmHg). The experiment was aborted at this pressure level due to buckling of the 20 ml syringe. No damage was observed in the valve mechanism. AGV closing pressure before the "over-priming" stress test was 8, 6 and 13 mmHg and after the stress test was 6, 7 and 13 mmHg.

Conclusion: This study demonstrates that the priming pressure is consistent at around 3000 mmHg. Also, over-priming is not likely to damage or disturb the closing pressure.

P115 Ahmed Glaucoma valve in refractory glaucoma. My experience

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Purpose: To evaluate the intraocular pressure control and complications with Ahmed Glaucoma valve (AGV) in eyes with refractory glaucoma.

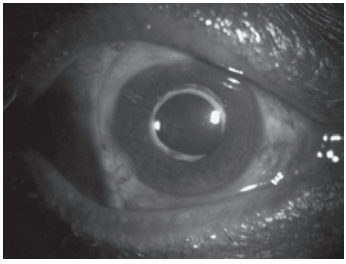
Methods: A total of 15 eyes were recruited for the study. The age of the patients ranged from 12 to 80 years. Four had primary open angle glaucoma with two failed trabeculectomy surgeries, two had buphthalmos with two failed trabeculotomy with trabeculectomy surgeries, and the rest nine eyes had secondary glaucoma which included two cases of glaucoma following penetrating keratoplasty. All eyes except the eye with neovascular glaucoma had intraocular lens at the time of surgery. The mean number of antiglaucoma medications used preoperatively was 2.4 ± 1.12. Ahmed glaucoma valve (FP-7) 184 mm^2 was used in all the eyes. The outcome measures assessed following Ahmed glaucoma valve implantation were the intraocular pressure (IOP), visual acuity and the incidence of complications. The success of surgery was based on IOP control and was defined as IOP between 9 and 21 mmHg without medications, qualified success was defined as IOP between 14 and 21 mmHg with one or more medications. Failure was defined as IOP more than 21 mmHg even with medications for more than a month. The preoperative and postoperative intraocular pressures were compared using ANOVA. The pre and postoperative visual acuities (in logMAR) were analyzed by paired 't' test.

Results: The mean age of the 15 patients was 50.9 ± 21.08 years. Primary AGV implantation (no previous filtering surgeries) was done in seven patients. The tube was placed in the anterior chamber in 14 eyes and in the pars plana in one eye. The mean follow-up was 12 months (range from 3 to 36 months). Intraoperatively difficulty in inserting the tube was noted in two eyes and minimal hyphema was noted in one eye. In the immediate postoperative period, 5 eyes had high IOP probably due to retained viscoelastic (Healon). By 1st week, the IOP was normal without any medications in all but one eye. One patient developed shallow chamber with peripheral iridocorneal contact and hypotony on day 3 for whom AC reformation was done with Sodium hyaluronate 1.4% viscoelastic substance at a slit lamp. The mean preoperative IOP which was 29.47 ± 12.39 mmHg with or without maximum medications decreased to 19.33 ± 7.05 mmHg at 3 months following surgery (p value 0.01) and 13.86 ± 5.87 mmHg at 6 months (p value 0.001) (figure 2). At 3 months after surgery, four patients developed IOP between 25-30 mmHg (hypertensive phase) for which aqueous suppressants were started. By 6 months, the IOP returned to normal without medication in two of them.

At six months, complete success was achieved in 12 patients and qualified success in one patient. This patient maintained an IOP of 15 mmHg on timolol eye drops. The two patients with buphthalmos had encysted blebs and required two medications for the control of IOP. The mean

visual acuity (logMAR) before surgery was +0.71 ± 0.43 and that at 6 months after surgery was +0.63 ± 0.41. Though there was an improvement in vision after surgery, this was not significant (p value of 0.76). One patient with penetrating keratoplasty developed tube erosion at 6 months for which a scleral patch graft was placed. She further suffered blunt trauma at 8 months post operatively following which the chamber shallowed. The IOP became low, the graft started failing and later the AGV extruded. There was no case of motility restriction or endophthalmitis. Encapsulated blebs were seen in the two patients with buphthalmos. One patient of neovascular glaucoma from ischemic central retinal vein occlusion developed cataract an year after AGV implantation with anterior migration of the tube.

Conclusion: AGV is a safe and effective procedure to treat refractory primary or secondary glaucoma regardless of age.



P116 Clinical outcomes and Risk factors of Ahmed glaucoma valve implantation twice in the same eye

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Purpose: To evaluate outcomes and factors after Ahmed glaucoma valve (AGV) implantation twice.

Design: Retrospective cohort study.

Methods: This study is a retrospective review of the records from 15 adult patients (15 eyes) that underwent silicone AGV implant surgery twice in the same eye. Data regarding age, gender, eye laterality, specific glaucoma diagnosis, number of medications, IOP, surgical complications, and follow-up interval were collected from all visits and were analyzed. Surgical success was defined as IOP maintained below 21 mmHg regardless of the number of IOP medications used during the final follow-up observation. The following observations made during follow-up were regarded as surgical failures: an IOP greater than 22 mmHg at 2 or more consecutive follow-up visits, an IOP less than 5 mmHg at 2 or more consecutive follow-up visits, additional glaucoma surgery was required, and loss of light perception. Fifteen eyes were followed six, 12, 24, 36, and 48 months after Surgery.

Results: The cumulative probability of success was 84% and 42% at one and 3 years, respectively. Diabetes mellitus and preoperative high IOP (> 35) were found to be associated with a worse outcome after exposure repair.

Conclusion: Approximately 45% of Ahmed glaucoma valve implantation twice in the same eye were considered successful after three years of follow-up. Preoperative high IOP and diabetes mellitus were statistically significant risk factors for failure.

P117 Intermediate term safety and efficacy of Ahmed glaucoma valve implant in refractory glaucoma in Indian eyes

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Purpose: The study was done to investigate the intermediate term clinical outcomes of Ahmed glaucoma valve implant in refractory glaucoma in Indian eyes.

Material and methods: Retrospective records of 55 eyes of 55 patients with refractory glaucoma who underwent Ahmed valve implantation at Dr. Shroff's Charity Eye Hospital, New Delhi, India from January 2003 to December 2011 were reviewed. The patients included had a minimum follow up of one year. Surgical success was defined as intraocular pressure less than 22 mm Hg and greater than 5 mmHg without additional glaucoma surgery and without loss of light perception. Data regarding age at the time of surgery, gender, eye laterality, diagnosis, pre-operative IOP on medical treatment and number of anti-glaucoma medications used, interval between AGV implantation and any other surgical procedure, post operative IOP (at 1 month, 2 month, 3 month, 6 month and yearly thereafter) and number of anti-glaucoma medications used, intra or post-operative complications, and additional surgical interventions were analysed.

Results: The mean IOP decreased from 39.71 ± 8.99 to 17.58 ± 4.37 mmHg ($p < 0.001$) at 1 year and to 18.9 ± 3.57 mmHg at 3 years ($p < 0.001$). Minimum follow-up period was one year and maximum was 8 years. The number of medications reduced from 3.43 ± 1.19 in pre-operative period to 1.0 ± 1.0 at 1 year and to 1.71 ± 1.11 at 3 years. The cumulative probability of success (Kaplan-Meier life-table analysis) was 86.5% at 1 year and 64.9% at 3 years. The incidence of post-operative complications was 14.54%. The most common post-operative complication noted was hypotony (4.54%).

Conclusion: Ahmed glaucoma valve implantation has proved to be safe and effective in controlling intraocular pressure in refractory glaucoma in Indian eyes.

P118 Tube shunts preventing blindness in management of complicated glaucoma patients - Oman experience

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Purpose: The article demonstrates effectively, tube shunt surgery as the sight saving procedure in complicated glaucoma. Also our experience of management of such complicated Omani patients.

Methods: This study was conducted in 2012 of the patients of sight threatening, complicated glaucoma, operated in Oman. Details of medical and surgical treatment were recorded. Ophthalmologists examined eyes and performed glaucoma surgeries using Ahmed Glaucoma Valve. The best corrected distant vision, IOP, and glaucoma medications were prospectively reviewed on 1st day, 1st, 6th, 12th week postoperatively, 1year post operatively and at the last follow-up.

Results: Glaucoma specialists examined and treated 40 eyes with refractory glaucoma of 39 patients (20 males + 19 females). Neo-vascular glaucoma was present in 23 eyes. Vision before surgery was < 3/60 in 21 eyes. At 12 weeks, one eye had vision better than 6/12, seven eyes had vision 6/18 to 6/60, and eight eyes had vision 6/60 to 3/60. Mean IOP was reduced from 42.9 (SD 16) to 14.2 (SD 8) and 19.1 (SD 7.8) mmHg at one and 12 weeks after surgery, respectively. At 12 weeks, five (12.5%) eyes had IOP controlled without medication. In 33 (77.5%) eyes, pressure was controlled by using one or two eye drops. The mean number of preoperative anti-glaucoma medications (2.38; SD 1.1) was reduced compared to the mean number of postoperative medications (1.92; SD 0.9) at 12 weeks. At the end of 1 year 90 % of patients had vision despite having complicated, refractory glaucoma problem.

Conclusion: Tube shunt surgery is effective in reducing visual disabilities, preventing blindness in patients with potentially refractory glaucoma. Also the increasing role of tube shunt surgery in Omani patients with complicated glaucoma.

P119 Pericardial membrane patch as flow restrictor in glaucoma drainage devices: intermediate results

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Objectives: To observe the intraocular pressure (IOP) in the early and intermediate post-operative period of cases with pericardial patch placed over the plate of glaucoma drainage devices (GDD). To determine whether pericardial patch as flow restrictor is safe and affects hypertensive phase of GDD surgery.

Methods: A piece of Tutopatch® (Tutogen Medical GmbH, Germany), bovine pericardial membrane patch, was placed over GDD plate to restrict aqueous drainage flow into the subconjunctival space. The patch was cut to a rectangular shape of 10-13 mm in width and 5-7 mm in length, placed in the posterior part of the plate, 2 mm behind the tube opening. The rest of the succeeding steps of the surgery were carried out as per usual.

Results: Twenty patients underwent GDD surgery using Ahmed™ glaucoma valve (New World Medical, CA, USA). The two groups did not differ significantly in age ($p > 0.40$) and gender ($p = 1.00$, Fisher's Exact test). There were 10 eyes with tutopatch (TP) over the plate and 10 without patch (non-TP), served as control. The distribution of glaucoma diagnoses were comparable with 6 POAG & 4 PACG in each group ($p = 1.00$, Fisher's Exact test). Baseline mean IOP was 18.9 ± 5.7 mmHg for TP and 19.7 ± 5.7 mmHg for control ($p = 0.70$ Wilcoxon Rank Sum Test). Post-operatively, mean IOP decreased to 15.2 ± 2.78 mmHg for TP and 19.3 ± 6.43 mmHg for non-TP after 3 months of follow-up ($p = 0.27$, Wilcox Rank Sum Test). At 6 months, mean IOP was 16.4 ± 3.4 for TP and 17.4 ± 5.1 for non-TP ($p = 0.66$). Anti-glaucoma medicines decreased significantly in both groups (TP: pre-op 2.7 ± 0.9 to 0.5 ± 0.7 post-op ($p < 0.00$); non-TP: pre-op 2.10 ± 1.5 to 0.9 ± 0.9 post ($p = 0.01$, Student's t-test) at 6 months follow-up. Three out of 10 TP eyes (30%) had hypertensive phase with 22-34 mmHg IOP at 1-3 months after surgery. Five eyes out of 10 non-TP (50%) had 25-43 mmHg during the hypertensive phase noted at 1-3 months after surgery. No hypotony, prolonged uveitis, and visual acuity decline were noted.

Conclusion: Pericardial membrane patch is safe and may be used as a flow restrictor in GDD surgery. Its application has the potential of decreasing the rate of hypertensive phase.

P120 The effect of mitomycin-c in ahmed valve surgery for refractory glaucoma: an east asian perspective

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Purpose: To describe the efficacy and safety of adjuvant Mitomycin C (MMC) with glaucoma drainage device surgery in refractory glaucoma in East Asian patients.

Methods: Retrospective case control study. A total of 74 eyes that underwent Ahmed valve glaucoma (AGV) surgery implantation in Tan Tock Seng Hospital, Singapore, from 1st January 2001 to 31st December 2009 for refractory glaucoma were included in the study. Consecutive cases of AGV surgery performed during the study period were included. Surgery with or without adjuvant MMC was surgeon practice dependent. Patients' records were reviewed for clinical and demographic factors, treatments, intraocular pressure (IOP), visual acuity and any complications. Failure was defined as IOP >21 mmHg or less than 20% reduction from baseline on two consecutive follow up visits after 3 months, IOP ≤ 5 mmHg on 2 consecutive follow up visits after 3 months or reoperation for glaucoma.

Results: We found a statistically significant difference in success rates between patients receiving MMC and those without ($p=0.011$), with the MMC treated group being 4.86 times more likely to have success as compared to the non-MMC group (95% C.I: 1.45 - 16.34). There was no significant difference in complication rates between treatment groups.

Conclusion: The use of adjuvant MMC in AGV implantation is effective in improving overall surgical success in East Asian patients with refractory glaucoma.

P121 Systematic occlusion of shunts: control of early postoperative IOP and hypotonyrelated complications following glaucoma shunt surgery.

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Purpose: Evaluation of a novel protocol of intraluminal occlusion of Baerveldt shunts and its effects on early postoperative IOP control and hypotony related complications.

Methods: This is a non-comparative, prospective, interventional study. Glaucoma patients were recruited to undergo Baerveldt shunt surgery. A total of 116 eyes of 112 patients were enrolled. During shunt implantation, aqueous outflow was restricted using an intraluminal occluding stent inserted through the entire tube length, with and without external ligation, to halt aqueous flow. Postoperatively, eyes underwent ligature laser suture lysis and partial or complete stent removals, at predetermined time intervals.

Main outcome measure: Loss of postoperative IOP control, categorized as transient or persistent hypotony (IOP≤5 mmHg) or hypertony (IOP>21 mmHg). Patients were

followed up for one year.

Results: Preoperatively median IOP was 23 mmHg (mean 26 mmHg, SD 12 mmHg), median number of glaucoma medications was 3 (mean 3.0, SD 1.2). During year one, laser suture lysis was performed in 30 eyes (26%) and stent removal in 93 eyes (80%), (23 partial; 70 complete). There was 1 case of transient hypotony, no cases of persistent hypotony, 10 of transient hypertony and 3 of persistent hypertony. Nine eyes had IOP ≤5 mmHg at one or more time points and hypotony related complications occurred in 8 eyes (7%). At 1 year, median IOP was 12 mmHg (mean 13 mmHg, SD 4 mmHg) with a median of 1 glaucoma medications (mean 1.1, SD 1.3). The cumulative probability of failure during the first 12 months follow-up was 6% (n=6). Overall postoperative complications occurred in 11 eyes (9%).

Conclusion: The surgical and postoperative protocol resulted in controlled, step-wise reductions of IOP with low rates of hypotony and related complications.

P122 Efficacy of Additional Glaucoma Drainage Device Insertion in Refractory Glaucoma

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Purpose: To report the efficacy of additional glaucoma drainage device insertion in eyes with refractory glaucoma that has a failed primary glaucoma drainage device.

Methods: Non-comparative, retrospective study was conducted with 8 eyes of 8 patients who had a failed primary glaucoma drainage device and received an additional glaucoma drainage device in the same eye. Intraocular pressure, visual acuity, the number of anti-glaucomatous medications, and complications were analyzed during the most recent office visit. Success was defined as an intraocular pressure of between 6 and 21 mmHg and a 20% decrease in intraocular pressure after additional glaucoma drainage device insertion, with or without anti-glaucomatous medication.

Results: The mean drop in intraocular pressure at final follow-up was 19.3 mmHg (56.1 %). The mean number of anti-glaucomatous medications used at the last follow-up visit (2.38) was significantly less than the preoperative mean (3.50). Seven patients achieved the criteria for success, but one patient did not have a successful outcome because of corneal graft failure after additional glaucoma drainage device insertion.

Conclusion: Our result showed that after the failure of primary glaucoma drainage device, additional glaucoma drainage device offered favorable intraocular pressure control and stable visual acuity. And as a review of previous literature, glaucoma drainage device insertion is the best option for treating refractory glaucoma, even in patients with a failed primary glaucoma drainage device.

P123 Fibrinous uveitis following stent suture removal in patients with Baerveldt tube implant

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Purpose: The development of fibrinous uveitis is a known complication following intraocular surgery. We aimed to determine the prevalence and discuss the risk factors for fibrinous anterior uveitis after removal of the stent suture used to prevent postoperative hypotony in patients with non-valved glaucoma drainage devices.

Methods: All patients with uncontrolled glaucoma that had a Baerveldt tube implanted between June 2006 and May 2011 with a 3-0 Supramid suture were included in this retrospective study. The suture was placed subconjunctivally with the end buried under the plate. Stent suture was removed through a small conjunctival incision under topical anaesthesia in the operating room under sterile conditions. Topical antibiotics and intensive therapy with topical steroids was initiated immediately after surgery. Data regarding age, intraocular pressure pre and post suture removal, number of medications, type of glaucoma, time to removal of Supramid suture, previous ocular surgery and concomitant eye disease was collected.

Results: 127 patients were included in the study. Only one eye per patient was included. The Supramid was removed in 110 eyes (86%) 74 ± 59 days (mean ± SD; range 27-483 days) after the implantation of the tube. Fibrinous anterior uveitis occurred in 6 of the eyes (5.4%) immediately after stent suture removal. Of these, 3 had Primary open angle glaucoma, one had pseudoexfoliative glaucoma and one had neovascular glaucoma secondary to diabethic retinopathy. All patients had previous glaucoma surgery and were pseudophakic. All except one eye that required recombinant tissue plasminogen activator (tPA) responded well to topical steroids. Statistical analysis was not possible due to the small number of eyes with fibrinous uveitis.

Conclusion: Fibrinous anterior uveitis occurred in 5% of the eyes with non-valved glaucoma drainage device following stent suture removal. Risk factors for postoperative fibrin exudation after cataract surgery include diabetis, uveitis, manipulation of the iris, pseudoexfoliation. Fibrinous uveitis has also been reported following laser in situ keratomileusis (LASIK). We hypothesize uveal trauma due to sudden eye decompression, similar to what would happen during LASIK surgery after releasing the suction ring, could trigger an inflammatory response. Although inflammation responded to intensive steroid therapy, tPA, might be used. However, care should be taken to exclude endophthalmitis.

• NEW GLAUCOMA DRAINAGE DEVICES

P125 In vivo testing of a novel adjustable glaucoma drainage device

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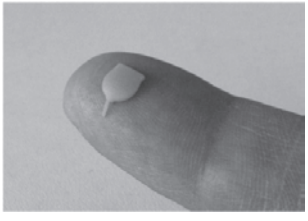
Purpose: This work reports on the in vivo testing of a novel non-invasively adjustable glaucoma drainage device (AGDD). The AGDD features an adjustable outflow resistance, thereby allowing the physician to regulate the intraocular pressure (IOP) on a per patient basis.

Methods: The in vivo study was carried on 10 white New-Zealand rabbits for duration of 6 months. Under general anesthesia, the AGDD was implanted in a way analogous to the Ex-Press® device. In short, a scleral flap of 7x7 mm was dissected and the nozzle was inserted in the anterior chamber between the cornea and the anterior surface of the iris. The AGDD was implanted in an operationally closed position and left in that position during the initial postoperative period. During the first postoperative week, IOP was measured daily on both the operated and the control eyes using a rebound tonometer. In the following weeks, such measurement was performed once a week. Results were reported and compared for statistics. Once a week, the AGDD was adjusted non-invasively from its fully closed position to its fully open position and the resulting pressure drop was measured. Hypotony was defined as an IOP equal or lower than 6 mmHg (IOP ≤ 6 mmHg). In 7 out of 10 rabbits the contralateral eye was not operated and served as control (group 1). In 3 of the 10 rabbits, an Ex-Press® P-50 was implanted in the contralateral eye following the same surgical procedure as for the AGDD (group 2). In this group IOP measurements were performed on both eyes using the same tonometry method as for group 1 and the results were processed for statistical analysis. At the end of the study the animals were sacrificed and the eyes were enucleated to perform histology in order to assess the biocompatibility of the AGDD.

Results: The mean preoperative IOP was 11.1 ± 2.4 mmHg. In the 7 rabbits from group 1 hypotony was present in the operated eyes during the first 3 days after implantation (mean IOP was 6 ± 1.4 mmHg) and the difference with the control (non-operated) eyes was significant ($p < 0.05$). Eight days after surgery the difference in IOP between control and operated eyes was no longer significant ($p = 0.12$). In the 3 rabbits from group 2 a difference in IOP in the early postoperative period between the AGDD (closed position) and the Ex-Press® was present but did not reached a statistical significance ($p = 0.1$). Hypotony was present for a longer period in the eyes implanted with an Ex-Press® as compared to eyes with AGDD (6 days vs. 3 days). For both groups the IOP dropped significantly from 11.2 ± 2.9 mmHg down to 4.8 ± 0.9 mmHg ($p < 0.05$) when the AGDD was opened from its fully closed (maximum outflow resistance) to fully opened (minimum outflow resistance) position using the external control unit. In group 1 two failures were reported due to iris being incarcerated in the AGDD nozzle. This problem was related to the geometry of the eyes having a small irido-cornea angle and a shallow anterior chamber.

Conclusion: Critical aspects such as safety and efficiency of the AGDD were assessed in this first *in vivo* study. The rate of aqueous humor outflow was easily adjustable during the entire postoperative period based on the outflow resistance control of the AGDD between the fully closed and open positions. Technically, the surgical procedure to insert the AGDD does not differ significantly from the Ex-Press® implantation, demonstrating the simplicity and relative easy use of the implant. These first *in vivo* results provided encouraging data on the safety and performance of the device.



A human clinical trial will follow to demonstrate all aspects of safety, performance and efficacy of the AGDD. This will provide an effective means of controlling IOP during both the early and late post-op period on a per patient basis, in the aim of possibly minimizing the risk of hypotony in the early postoperative stages, particularly when the AGDD is being used in conjunction with a seton tube. Furthermore, the very small diameter and anatomical localization of the nozzle could help avoiding one of the most feared complications encountered when using seton tubes, in preventing a corneal failure resulting from endothelial cell loss.

P126 The effectiveness of drainage EX-PRESS® implantation for the treatment patients with neovascular glaucoma

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Purpose: To study the effectiveness of drainage Ex-Press® implantation for the treatment patients with neovascular glaucoma.

Methods: We observed 57 patients (62 eyes) with neovascular glaucoma aged from 46 to 63 years, 36 patients were men, 21 women. To study the effectiveness of drainage Ex-Press® implantation for the treatment patients with neovascular glaucoma, all patients were divided into two representative groups randomized by sex and age. The main group consisted of 30 patients (30 eyes) who were implanted drainage Ex-Press®. The second group consisted of 27 patients (32 eyes) who was performed traditional sinus trabeculectomy. All patients in both groups pre-10 days prior to surgery were introduced 0,1 ml of anti-VEGF drug (ranibizumab) into the anterior chamber. All the patients underwent traditional ophthalmologic examination. The criteria of the treatment effectiveness ware: intraocular pressure (IOP), fixed photographically the degree of the iris neovascularization, perimetry data. The visualization of the optic nerve structures (optic disk) to determine the degree of the nerve fibers atrophy was conducted by examining the amount of neuroretinal rim volume by optical coherence tomography Stratus-OCT (Carl Zeiss, Germany).

Results: Before surgery in the study group IOP was 32.4 ± 1.4 mm ($p < 0.01$), total field of vision - 457 ± 0.8 ($p < 0.05$), neuroretinal rim volume decreased to 0.19 ± 0.06 mm 3 ($p < 0.01$). The control group patients the IOP was 29.6 ± 2.2 mm ($p < 0.05$), the total field of vision - 469 of 1.3 ($p < 0.05$), the rim volume was 0.17 ± 0.06 mm^3 ($p < 0.01$). The surgery was performed according to the standard protocol. There were no any intra- and postoperative complications in both groups. In 1 month after the surgery it was marked the positive trend in both groups by the level of IOP, and recorded reduction of the iris neovascularization degree. There was stability index of the total visual field and the rim volume. The IOP in the study group was – 19.1 ± 1.8 mm ($p < 0.05$), in the control group patients – 21.3 ± 2.5 mm ($p < 0.01$). The dynamic observation in 6 months after operation it was found that in the study group IOP compensation was achieved in 24 patients - (89%) and only in 17 patients - (63%) in the control group. In 6 months of IOP in the study group was 21.3 ± 1.7 mm ($p < 0.05$), the total visual field - 449 ± 0.8 ($p < 0.05$), neuroretinal rim volume remained at 0.18 ± 0.04 mm^3 ($p < 0.05$). In the control group patients IOP was 26.1 ± 1.9 mm ($p < 0.05$), the total visual field decreased 421 ± 2.4 ($p < 0.05$), neuroretinal rim volume decreased to 0.14 ± 0.08 mm^3 ($p < 0.01$). The control group patients who have recorded IOP increased was appointed additional antihypertensive therapy, and for its inefficiency reoperation was performed.

Conclusion:

1. The drainage Ex-Press® implantation has persistent hypotensive effect in neovascular glaucoma patients. 2. Implantation of micro-draining device has an advantage over conventional antihypertensive fistulizing operations in terms of stabilizing the level of IOP and preserve visual function. 3. The data obtained allow us to recommend micro-draining devices for neovascular glaucoma patients into broad ophthalmic practice.

P127 Evaluation of the efficacy and safety of a novel glaucoma shunt implant 'Suprajet' in an animal study

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Purpose: Suprajet (VSY Biotechnology, Istanbul, Turkey) is a new implant developed for supraciliary and suprachoroidal drainage of aqueous humour. In this study we aimed to evaluate the efficacy and safety of this new implant in rabbits.

Methods: Five rabbits were included in the study. One Suprajet Shunt was implanted in one eye of each rabbit. Implantation was performed by a superior clear corneal incision through the anterior chamber into the suprachoroidal space. Proximal end of the implant was placed in the iris root resting against the scleral spur, distal end was placed in the suprachoroidal space. Rabbits were

followed for 4 weeks. Preoperative and postoperative intraocular pressure levels were measured with Tono-Pen Avia. At last follow-up visit animals were sacrificed and eyes were enucleated. Macroscopic and histopathologic evaluation of the eyes were made. The study was approved by the Ethics Committee of the Research of Laboratory Animals, Dokuz Eylul University, School of Medicine.

Results: Mean preoperative IOP was 18.6 ± 6.1 mmHg. Mean postoperative IOP was 8.4 ± 1.1 mmHg at one week. At the 2. week of the follow-up period one rabbit died. Thereafter, only 4 rabbits were followed. Mean postoperative IOP was 11.0 ± 2.8 mmHg at the 2nd week, 9.50 ± 3.1 mmHg at the 3rd week and 11.3 ±3.3 mmHg at 4th week after the operation. When mean preoperative IOP was compared with the postoperative IOP values, only the IOP at the first week was found significantly lower ($p = 0.042$). There was no statistically significant difference between mean preoperative IOP level and mean IOP level at 2 weeks, 3 weeks and 4 weeks postoperatively ($p = 0.66$, $p = 0.66$ and $p = 0.102$, respectively). As an intraoperative complication, minimal hyphema was noted in three eyes during the surgery. However, the next day hyphema cleared completely. Macroscopic evaluation of the enucleated material showed that in one eye the distal end of the implant was in the vitreous instead of suprachoroidal space, in the other 3 eyes the distal end of the implant was noted in the suprachoroidal space. In all eyes, proximal end of the implant was localised in the anterior chamber angle. Histopathologic evaluation of the enucleated eyes showed deposition of irregular collagen bundles and fibroplasia including numerous fibroblastic and histiocytic cells around the implant.

Conclusion: This preliminary animal study showed that implantation of "Suprajet" as a suprachoroidal shunt is a promising procedure in glaucoma. Further studies are needed to evaluate its efficacy and safety profile.

P129 Analysis of therapeutic effect of Express glaucoma drainage shunt implantation for refractory glaucoma

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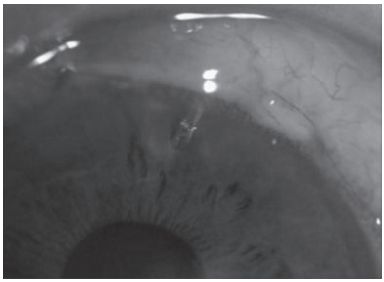
Objective: To observe the clinical curative effect of the new Express™ glaucoma drainage shunt implantation for the refractory glaucoma.

Methods: 28 eyes in 21 cases of patients with refractory glaucoma caused by various reasons with uncontrolled intraocular pressure by drugs or operation were studied in three months after operations. There're 8 eyes of neovascular glaucoma, 12 eyes of latest stage glaucoma, 1 eye of traumatic glaucoma, 3 eyes secondary glaucoma after silicone oil removal, 2 eyes of glaucoma secondary to chronic uveitis, 2 eyes of ICE syndrome. The new Express™ glaucoma drainage shunt were implanted into the anterior chamber on these above patients. In the operation, the conjunctival and scleral flaps, 0.2 mg/ml mitomycin infiltration were made just like those in the trabeculectomy, the Express™ drainage shunts were implanted into the anterior chamber through the corneoscleral transitional zone puncture. Those patients were followed up in three months, with the visual acuity, intraocular pressure, filtering blebs, anterior chamber depth, the cornea and iris, and the operation complications, and so on.

Results: There were 25 eyes whose intraocular pressure were successfully controlled (89.3%) to 10.37 ± 1.45 mmHg ($p < 0.01$) with type I filtering blebs and good drainage in the end of three months after operation. Within 1 week after operation, the anterior chambers were relatively shallow, but were well formed after three months. There's no shift or rejection of shunt, no infection, no choroidal hemorrhage or detachment, or the other complications.

Conclusion: Express™ glaucoma drainage shunt implantation is a safe and effective operation for the treatment of refractory glaucoma.

Keyword: Express™ glaucoma drainage shunt; refractory glaucoma; intraocular pressure, filtering bleb, anterior chamber.



P130 STARflo gluacoma implants, 6 months clinical results of 7 patients

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Purpose: STARfloTM Glaucoma Implant is made entirely with silicone STAR® Biomaterial, a flexible tissue-friendly, micro-porous structure designed to reduce fibrotic response and maximize long-term performance. It is a novel CE- marked implant.

Methods: Five patients with refractory advanced open angle glaucoma, one patient with uncontrollable OHT and one with neovascular glaucoma underwent implantation. Under anesthesia, a conjunctival flap and a superficial scleral flap were created. An incision in the second layer of sclera until choroid was performed to insert the implant body in the suprachoroidal space while the STARflo head was inserted into the anterior chamber. The scleral flap was sutured tight.

Results: Patient ages were 65.3 years. Mean pre-operative IOP was 32.9 mmHg and mean pre-operative glaucoma medication was 3.25 intake/day. At 6 months, mean IOP was 18.9 mmHg and mean glaucoma medication was 1.5 intake/day. No adverse events were reported during or immediately after the surgical procedure and no device-related adverse events were reported during follow-up. Early post-operative complications included transient hypotony.

Conclusion: Clinical results for STARflo have shown encouraging results in the control of the IOP with a reduction of glaucoma medications. Although long-term success still has to be demonstrated, this newly-CE marked device is promising as a novel, suprachoroidal implant for bleb-free, IOP reduction for patient suffering from refractory open angle glaucoma.

P131 Mini-Express - Comparison of two different models

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Background: The Mini-Express glaucoma device has been implanted in the last decade in 60,000 eyes around the world. At the beginning the 50 microns model (R50/P50) was used. Lately the 200 microns (P200) model is available. It has been proved in-vitro that the P200 model is superior to the R50/P50 models concerning filtration rates and resistance to filtration.

Purpose: Comparison of the results of implantation of R50/P50 models to the P200 model, concerning intra ocular pressure (IOP) and complications.

Material and Methods: A retrospective study. The files of 21 patients (25 eyes) who were operated at the Kaplan medical center by one surgeon between 2007and 2013, were reviewed. Most of the patients suffered from POAG and had previous glaucoma or other type of ocular surgery. Patients were divided in 2 groups according to the type of Mini-Express implanted, R50/P50 or P200.

Results: A decrease in IOP was recorded in most of the eyes treated. In the R50/P50 group the mean IOP prior to surgery was 23.5 mmHg. One week post surgery: 8.7 mmHg and 16.2 one month post surgery. In the P200 group the mean IOP prior to surgery was 26.5 mmHg, 12.1 and 12.2 mmHg respectively. In the R50/P50 group 2 eyes had hypotony following surgery. In the P200 group one eye had high IOP and one eye presented with shallow anterior chamber and hypotony.

Conclusions: The present study shows that P200 Mini-Express model has a relative superiority to the R50/P50 model in IOP decrease.

P132 New SLX84 Gold Micro Shunt implantation in Refractory Glaucoma

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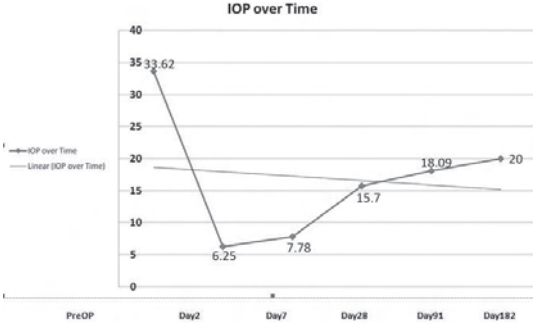
Introduction: We describe the results of a novel approach which enhances uveoscleral outflow to reduce IOP in patients with glaucoma. This concept involves implantation of an ultrathin 24-karat gold micro shunt (GMS) which allows passage of aqueous between the AC and the supraciliary/ suprachoroidal space without the creation of a bleb. Following our experience with the 2nd generation gold micro shunt implantation in refractory glaucoma, the new design of SLX84 type GMS will be described. Gold Shunt Design: The SLX84 GMS is a non valved drainage device with a distal end placed in the suprachoroidal space and a proximal end which provides the ingress for aqueous humor from the anterior chamber (AC) into the suprachoroidal space. The main modifications of the new GMS are: concave head to allow deep angle positioning and larger windows with posts replacing tubes to facilitate aqueous flow.

Purpose: To reduce in intraocular pressure (IOP) in refractory rlaucoma using the of SLX84 GMS.

Material and Methods: 16 patients were included in the study. Inclusion criteria were the diagnosis of primary open-angle glaucoma, uncontrolled IOP of 22 mmHg or more while on maximally tolerated medical treatment. All patients had at least one previous filtration surgery. SLX84 GMS was introduced to the AC under scleral flap with application of 0.4 mg/cc Mitomycin C for 1 minute in all cases. Patients were examined pre-operatively and after 1 day, 1 week, 4 weeks, 3 months, 6&12 months postoperatively. Mean follow-up time was 6 months.

Results: Mean IOP pre-operatively was 33.62 mmHg. At last follow-up visit the mean IOP was reduced to 20mmHg (a 40% reduction) (Graph 1). Mean number of medications pre-operatively was 3.1.At last follow-up visit the mean number of medication was decreased to 1.5.

Conclusions: The new SLX84 GMS implantation with adjunctive use of Mitomycin C provides a safe and effective way to control IOP in Refractory Glaucoma cases. Graph1 , IOP Over time.



• NEW TECHNOLOGY

P135 GlauTrak - An alternative surgical procedure for non responsive glaucoma

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Purpose: Due to limited success of surgical procedures and advances in developments of powerful anti-glaucoma drugs, medical management is currently the preferred choice in glaucoma care. The problem is how to handle situations where IOP is not controlled even with the maximum tolerable medications. Of course we now have excellent Glaucoma Drainage Devices. But they are associated with a steep learning curve and multiple post-operative complications. Hence these procedures are reserved usually as a last resort in glaucoma management by the average ophthalmologist. GlauTrak is a new technology that has been developed specifically to overcome these drawbacks. It provides a relatively safe and reliable method by which IOP can be controlled in problematic and intractable glaucomas.

Methods: Classical trabeculectomy has stood the test of time and even now is the most commonly performed anti glaucoma surgery. As such our first attempt was to uncover reasons of its failure, study these situations in detail, so as to pinpoint where it failed and why. For developing this technique the following factors were carefully examined the routes by which aqueous drains after a standard filtration procedure

what causes an obstruction to this pathway → Specifically with reference to the sites and the surgical or physiological reasons for the block the causes of overdrainage and why there is break-down in the physiological barriers to the outflow. This new technique takes into consideration all these reasons and incorporates solutions which bypass each of these causes of failure in classical filtration surgery. "GlauTrak" is a calibrated track to guide aqueous from the anterior chamber so that it drains freely into a wide area extending from the edge of the filtration flap to the intra-conal space while offering enough hydrostatic (back) pressure to prevent hypotony. The GlauTrak" procedure has provisions by which any obstructions in aqueous outflow that develop in the post-operative phase can be managed safely and successfully. Similarly any situations wherein there is excessive drainage and hypotony can also be handled by safe and simple procedures. The "Trak" is created by non-absorbable material embedded sub conjunctivally and intra sclerally, extending from the drainage fistula in the angle of the anterior chamber to the intra conal space of the extra ocular muscles.The surgical technique of implanting the material is explained (along with a short video). The procedure though involves extensive dissection is easy to master and has a smooth learning curve.

Results: Performed in 73 problematic eyes which included cases of Absolute glaucoma → 8; NV glaucoma → 4; Traumatic glaucoma →2; Uveitic glaucoma → 1; Failed trabs → 8; ICE syndromes → 2; Post silicon oil induced glaucoma (where surgery site was in the inferior quadrant) → 1; Microphthalmos with shallow AC → 2;

Medically uncontrolled glaucoma → 45; The follow-up period extended from 4 months to 5 years. Success rate where no further treatment was required was 89 % (65 eyes). Partial success where one or more medications could control the disease was 4% (3 eyes). Pressure could not be controlled in 7% (5 eyes) where cyclodestructive procedures had to be performed.

Conclusions: "GlauTrak" is a new technique that helps in the management of intractable glaucoma. It can induce reliable IOP reduction in cases having very high initial IOP, shallow AC, neovascular glaucoma, ICE syndromes and other similar situations where currently accepted anti glaucoma solutions are difficult to succeed. Management of post-operative complications is easier and safer. The procedure can be mastered by any glaucoma surgeon with relative ease. The main drawback is the time needed for the extensive dissection required and the care to be employed during resuturing these tissues back.

P137 Structure function correlation in open angle glaucoma

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Purpose: With an increasing prevalance of glaucoma in developing nations because of the existence of better patient education and subspeciality training facilities there is a quest for the gold standard diagnostic modality for glaucoma which remains elusive, the follow-up to which is monitoring progression. With newer non invasive diagnostic techniques available in the glaucomatologist armamentarium, a prospective cross sectional was perfomed to establish the structure function correlation between retinal nerve fiber loss and visual field damage in patients with primary open angle glaucoma.

Methods: Forty six eyes with glaucoma and 18 eyes as controls were analysed. Patients who met the specified inclusion criteria were subjected to SD-OCT optic disc cube scan and Humphrey visual field analysis using SITA STANDARAD 24'2' strategy. All patients underwent refraction, slit lamp evaluation , applanation tonometry, gonioscopy with Sussmann four mirror lens, and dialated fundus examination with stereoscopic +78D lens. Structure function analysis was done by comparing the mean sensitivity data expressed in the logarithimic scale and retinal nerve fiber layer thickness, expressed in microns. Superior, inferior and global mean sensitivity were determined, so were the superior, inferior, and global nerve fiber thicknesses.

Results: ROC curves for superior ,inferior and global mean sensitivity and nerve fiber layer thickness were determined. The mean global nerve fiber layer thickness in control and glaucomatous eyes was 73.03 ± 1.77 microns and 108.50 ± 1.25 microns ($p < 0.001$) respectively. Superior nerve fiber thickness in microns were 76.35 ± 1.80 and 108.93 ± 1.22 ($p < 0.001$), inferior 70.07 ± 1.93 and 108.10 ± 1.30 ($p < 0.001$) microns respectively. Global , superior and inferior MS values in glaucomatous and normal eyes were 20.77, 32.21 ($p < 0.001$); 19.96, 31.98 ($p < 0.001$); 21.98, 32.45 ($p < 0.001$). The area under the reciever operator characteristic curve for global nerve fiber layer thickness and global mean sensitivity was 0.971 ($p < 0.0001$) and Pearsons correlation coefficient being 0.895 (strong correlation). The AUC and correlation coefficient for superior RNFL thickness and inferior MS were 0.973 ($p < 0.001$) and 0.892. Inferior RNFL thickness and Superior MS had AUC correlation coefficient of 0.951 ($p < 0.001$) and 0.871.

Conclusions: Global nerve fiber layer thickness as measured by SD-OCT was found to have a strong correlation with the Global mean sensitivity measured using Humphrey's automated perimetry. The Pearsons correlation coefficient showed a strong correlation amongst these indices. The superior nerve fiber layer showed the strongest correlation with its corresponding inferior mean sensitivity. It would be premature to substitute SD-OCT for visual field examination in Glaucoma patients, but a strong structure -function correlation definately reinstates our faith in newer imaging.

P138 Comparative study of combined trabeculoctomy and cyclo-cryo therapy versus trabeculectomy and cyclo-cryo therapy with intravitreal and anterior chamber injection of bevacizumab (IVB) (Avastin) in treatment of patients with neovascular glaucoma (NG)

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Purpose: To compare and evaluate the efficacy and safety of combined trabeculectomy and cyclo-cryo therapy (TCC) versus our own method of surgical treatment with combined trabeculectomy and cyclo-cryo therapy with intravitreal and anterior chamber injection of bevacizumab (IVB) (Avastin) in treatment of patients with neovascular glaucoma (NG).

Methods: This was a prospective study involving two groups of neovascular glaucoma patients. 36 eyes of 36 patients aged from 61 to 72 years were included in the study. First group (17 patients) underwent TCC and cyclo-cryo therapy. Second group (19 patients) underwent TCC and cyclo-

cryo therapy with intravitreal and anterior chamber injection of bevacizumab (IVB) (Avastin) in treatment of patients with neovascular glaucoma (NG). Intravitreal injection of Avastin 1.25 mg (0.05 ml) and anterior chamber injection of Avastin 1.25 mg (0.05 ml) - all procedures perform in one surgery case. The effects on iris neovascularization by slit lamp examination, intraocular pressure, vusual acuity and other clinical effects were evaluated. Visual acuity in all patients was equal to light-perception. Order of the procedure: Cyclo-cryo therapy; IVB (Avastin); Trabeculectomy; Anterior chamber injection of Avastin

Results: In two groups IOP decreased down to 20% in early postoperative period. But regression of iris neovascularization was recorded only in group two. After the mean follow-up period of 6 month, IOP was increased in first group 8 patients (50%) and in second group 4 patients (25%). In early postoperative period 6 cases of hiphema and 4 cases of choroidal detachment were observed in first goup; in second group 3 cases of hiphema and 1 case of choroidal detachment were recorded.

Conclusion: Both surgical strategies resulted in statistically significant reduction in IOP. However, regression of iris neovascularization was observed only in second group. Also statistically it was seen that in second group patients with hypotensive effect lasted longer. With no recorded significant complications followed using Avastin.

P139 Patient acceptance to smartphone technology to monitor and improve glaucoma healthcare outcomes

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Purpose: It is well recognised that non-compliance with glaucoma eye drop medication can result in unnecessary changes to medication or the need for invasive surgical procedures. This increases a patient's risk of visual loss and cost of treatment. Non-compliance to ocular hypotensive treatment has been reported as varying between 5-80% with four major factors affecting compliance identified – medication factors, patient factors, provider factors and environmental factors. As smartphone usage has increased, we believe the potential for a glaucoma monitoring mobile application (app) can improve compliance by addressing these factors. We therefore surveyed a cohort of our patients to assess their smartphone usage and willingness to use such an application.

Methods: We undertook a prospective survey of patients attending their glaucoma follow-up appointment across two sites (Moorfields South at St. Georges Hospital and Princess Royal University Hospital) during the first six months of 2013. The survey was successfully piloted before data collection. We assessed estimated compliance with eye drop medication, reasons for not taking medication, smartphone usage and whether they would use a medication compliance app.

Results: 50 patients completed the questionnaire. Mean age of respondents was 65.2 years (range 34-92 years) with a male: female ratio of 0.93:1. 8/50 (16%) patients admitted to missing eye drops. Patients reported reasons such as difficulty remembering drops, being unsure which drops to take and running out of drops. 41/50 (82%) patients had access to computer technology of which 18 patients (44%) had access to a smartphone. Of those that responded, 26/43 (60%) said that they would use a medication compliance app.

Conclusion: Our reported non-compliance rate is similar to other previous reports. Although it is often perceived that elderly patients have limited access to technology, we have demonstrated a significant proportion of our patients did have access to a smartphone and would be willing to use it to monitor their visual health. A glaucoma monitoring app may also encourage patients to invest in smartphone technology to improve their health outcomes.

P140 Comparison of rebound tonometery with Goldmann applanation tonometery

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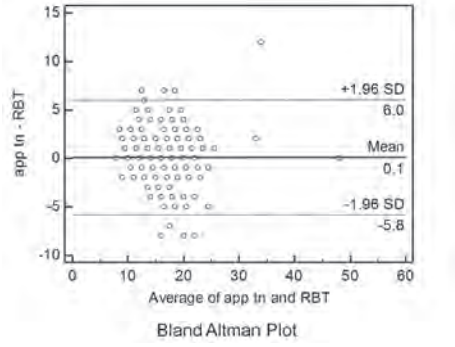
Purpose: To analyze correlation of intraocular pressure measurement between the new rebound tonometer (RBT) I-Care TA01 and the Goldmann applanation tonometer (GAT).

Methods: One hundred eighty five eyes of 185 subjects presenting with glaucoma or cataract were enrolled in the study. In all patients, Intraocular pressure (IOP) was obtained by an ophthalmologist using I-Care TA01 and subsequently measured with GAT by another single masked ophthalmologist. IOP between the two tonometers were compared at each IOP range, i.e., between 8-15, 16-21 and > 22 mmHg and difference was considered as significant at $p < 0.05$ (paired t test).

Results: Of 185 patients, 86 had glaucoma of which 24 had Primary open angle glaucoma, 60 had Primary angle closure glaucoma, and 2 had normal tension glaucoma; 99 patients had cataract. Mean age of the patients was 55.77 ± 14.46 years. There was no significant difference in the IOP levels between the two tonometers at IOP between 8-15 mmHg ($p = 0.097$) and 16-21 mmHg ($p = 0.51$). However a significant difference was observed between the two tonometers at IOP level > 22 mmHg ($p = 0.023$) with the mean GAT value (24.8 mmHg) being higher than the mean RBT value (23.16 mmHg). Overall at any IOP, there was no difference between the two tonometers ($p = 0.59$) and th e two had a high correlation (Pearson correlation $r = 0.815$; $p = 0.01$). The mean difference between the two was 0.1 mmHg (agreement limits: UL $+6_{(1.96SD)}$, LL $-5.8_{(-1.96SD)}$). Intra-individual difference between the two methods varied from 0-12 mmHg.

Conclusion: RBT I Care TA01 can be used for screening and in patients who are unable to cooperate on slit lamp for GAT; however RBT ICare may underestimate IOP at higher ranges and at high IOP, GAT values should be considered.



Bland Altman Plot

P141 Comparision of central corneal thickness measurement between noncontact pachymetry and ultrasound pachymetry

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Purpose: To evaluate the measurement of central corneal thickness obtained by Non-contact pachymetry (NCP) and to examine its agreement with Ultrasound pachymetry (USP).

Methods: One hundred eyes of fifty consecutive patients attending the outpatient department of a tertiary care centre underwent a routine ophthalmological examination. Patients with history of recent corneal disease and history of contact lens wear were excluded from this prospective non-interventional study. CCT was measured by Noncontact pachymetry (NIDEK NT 530-P, NIDEK, Gamagori, Japan) and ultrasound pachymetry(iPAC PACHYMETER, Reichert Technologies, New

York, USA)after a voluntary, informed consent. CCT measurements were compared using paired t test.Pearson correlation coefficient and Intraclass correlation coefficient was done to see the reliability of USP and agreements between NCP and USP.

Results: The mean age of the patients enrolled in this study was 43.3±43.3 years (Range 18-71years) and there were 10 females and 40 males. The mean CCT was 532.3 ± 35.1 (Range 458 to 654 µm) and 532.8 ± 34.9 (Range 462 to 652µm) microns for NCP and USP respectively. Mean difference between NCP and USP was not significant(P=0.277,Paired t-Test).There was strong positive correlation between NCT and USP, r=0.988, (P<0.0005) and good Intraclass Correlation Coefficient, alpha = 0.994.Mean difference between NCP and USP was 0.6±1.96 µm with limits of agreement as calculated by Bland Altman Plots was from +10.0 to -11.2 microns.

Conclusion: Noncontact pachymetry measurements showed excellent agreements with ultrasound pachymetry.

P142 Comparing Glaucomatous Disc Change Using Stereo Disc Viewing and the Computerized MatchedFlicker® Software Program

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Purpose: To compare the accuracy of the computerized MatchedFlicker® software program to manual viewing of the same stereoscopic disc photos to detect glaucoma progression among ophthalmologists at different levels of training.

Methods: Two resident ophthalmologists and one glaucoma fellow at the University of Florida independently evaluated stereoscopic pairs of disc photographs of 100 eyes taken at two time points: 50 eyes showed glaucoma progression as determined by the OHTS Optic Disc Reading Group of the Bascom Palmer Eye Institute and the OHTS end-point committee and 50 eyes showed no progression since the photos were taken within a few minutes of each other. Twenty eyes that progressed and 20 eyes with no progression were randomly selected to assess intra- and inter-observer variability in detecting progression. Thus, a total of 140 image pairs (280 photos) were examined by each observer. Two different methods were used to judge glaucomatous disc progression; a handheld stereo-viewer and the computerized MatchedFlicker® program which rapidly alternates the two different timed images on a computer screen to simulate a sensation of movement if there is a structural alteration. The method of examining the disc pairs was divided into alternating blocks of 70 paired images and the order of starting randomized between the MatchedFlicker® and stereo-viewing. The ONH photos were assessed for disc progression and the total evaluation time for each method for each participant was measured.

Results: Using the handheld stereo-viewer, the observers correctly identified 76.0% of the slides. Using the MatchedFlicker® software 87.6% was correctly identified. Evaluator viewing time of the 140 images averaged 79.4±11.4 minutes with conventional ONH photo viewing verses 58.1±13.2 minutes with MatchedFlicker® program. Intra-observer agreement with the stereo viewer was 84.2% and 85.8% with the MatchedFlicker® software. All three observers had a higher percentage of agreement with the MatchedFlicker® program.

Conclusion: The MatchedFlicker® software had a greater agreement and was quicker with the interpretation of optic disc photographs than clinician assessment of photographs when using a handheld stereoscopic viewer.

P144 A new angle viewing system

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Microinvasive glaucoma surgery (MIGS) is an evolving group of new techniques and devices for lowering intraocular pressure. Almost all of these devices are used ab interno and require observation of the anterior chamber angle. Typically a handheld gonioprism is used to perform gonioscopy during MIGS. But this requires a learning curve and even for experienced surgeons it could be difficult to preserve a good view throughout the surgery. In vitreoretinal surgery initially contact lenses were used for intraoperative fundusobservation. This required an assistant to center this lens and view to the retinal periphery was limited. Today microscope mounted systems like BIOM are popular because the view is much more stable and the is no need for an assistant to center a contact lens. We developed a new microscope mounted angle viewing system (AVS) to improve intraoperative observation of the anterior chamber angle during MIGS. X-Y-Z motor of the microscope is used to keep the gonioprism well centred and to change focus. As this system is indendent from the surgeons hand bimanual manipulation within the anterior chamber become possible.

Surgical videos will illustrate the use of AVS during MIGS and other procedures.

We believe that the microscope mounted angle viewing system will increase acceptance of MIGS, reduce learning curve of intraoperative anterior chamber angle observation and as bimanual manipulations become possible has the potential for new techniques for angle surgery.

P145 Titrated ligature for glaucoma implants

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Objective: To describe and present results of an original technique for non-valved glaucoma implants.

Patients and Methods: Thirty-five eyes of 34 patients with aggressive and/or advanced glaucomas of different causes were included. A Baerveldt implant was used in all cases, using an absorbable ligature that had been titrated to allow flow from day 1, but avoiding hypotony. Intraocular pressure (IOP) during the first 8 weeks, final IOP, visual acuity and complications were analyzed.

Results: Mean preoperative IOP was 42.8 mmHg (range 24 to 64 mmHg). IOP was 14.4, 17.2, 18.6, 19, and 16.4 mmHg during the first, second, fourth, sixth and eight postoperative weeks. Mean final IOP was 13.8 ± 4.25 mmHg, a 67.8% reduction, after a mean follow-up time of 13 months (range 8 to 29 months). Twenty-nine eyes (82.9%) had complete success, 2 had qualified success (5.7%) and 4 were failures (11.4%). Choroidal detachments and transient tube obstructions were the most frequent complications.

Conclusions: Titrated ligature of Baerveldt tubes was effective for controlling IOP during both the early and late postoperative phases in eyes with severe glaucomas.

Keywords: Glaucoma implant, titrated ligature

• GLAUCOMA SURGICAL COMPLICATIONS

P146 Management of nano silicon and nano silver masoud balloon for treatment and prevent open angle glaucoma with optic nerve pathology and postoperative complications after vitreoretinal surgery

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Purpose: To treatment and prevent Glaucoma and postoperative complications with intraocular Nano silicon balloon anti virus. Antibacterial anti Fungous after vitrectomy in aphakic and pseudophakic eyes with optic nerve pathology in retinal detachment.

Methods: After vitrectomy the syringe with silicon oil, with fixed nano silicon bubble anti virus antibacterial with treats drugs on it V. 4-6 mm Injected through ora serrate into vitreous cavity. Then we filled the bubble with oil or N-saline BSS up to normal pressure, and fixed on sclera upon total retina. Attachment to choroidea silicon oil or N-saline with bubble should be simultaneously removed in 1-3 month after surgery·

Result: Injection of nano silicon bubble in addition nano silver v.4-6mm with silicon oil in vitreous cavity creates. Conditions where oil dose not penetrated anywhere A-Does not get to anterior chamber and contact with corneal epithelial. Layer B-to vessels D-oil does not get through valves, and holes behind the retina. E-interferes to penetration of oil into the ciliary body and prevents closing of a space for coming of liquid regulating IOP and prevents closing canal schema. Avoid Glaucoma and Antimicrobial system Nano silver avoids postoperative complication and optimized IOP on optic disc nerve and capillaries.

Conclusion: This method help to provides total retinal attachment to choroidea and treatment and prevent Glaucoma and post operative complication.

P147 Surgical management of uveitic glaucoma: 5-year experience in a reference centre

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Purpose: Uveitic glaucoma has a challenging and complex management involving multiple specialists and therapies. Our purpose is to describe and analyse the surgical approach to uveitic glaucoma in our centre.

Methods: Patients diagnosed of uveitis with medically uncontrolled glaucoma scheduled for surgery between January 2008 and March 2013 were recorded. Filtering surgical options included trabeculectomy (TBC), non-penetrating deep sclerectomy (NPDS), derivative procedures such as Ahmed valve (AV) and Baerveldt tube shunt (BT), and diode cyclophotocoagulation (CP). Preoperative and postoperative outcomes included: type of uveitis, intraocular pressure (IOP), topical and systemic medication, previous glaucoma surgery and follow-up management.

Results: 41 glaucoma surgical procedures in 25 eyes from 21 uveitic patients were included (9 anterior uveitis, 1 intermediate uveitis, 3 posterior uveitis and 8 panuveitis). Mean postoperative follow-up was 30 months (ranged 1-61 months). Mean preoperative IOP was 32.5 ± 9.7 mmHg. Preoperative medical treatment included a mean of 2.7 topical agents and 500mg of oral agents (acetazolamide). We performed a total of 3 TBC (as first glaucoma surgery), 11 NPDS (10 as first glaucoma surgery), 11 AV (6 as first glaucoma surgery), 4 BT (1 as first glaucoma surgery) and 12 CP (5 as first glaucoma surgery). First choice indication was based on anterior chamber and camerular angle considerations, vitreous state and visual prognosis, among others. Successful primary control of IOP with one sole surgery was found in 1/3 TBC, 5/10 NPDS, 4/6 AV, 1/1 BT and 5/5 CP. 15 eyes (60%) reached target IOP with a single surgical procedure, 4 eyes (16%) required 2 different glaucoma surgeries, 3 eyes (12%) required 3 procedures and 2 eyes (8%) needed 4

surgeries to control IOP. Mean number of interventions per eye to control IOP was 1.6, with no differences regarding uveitis type. Only 1 eye (4%) failed to control IOP, presenting with anterior uveitis, congenital coloboma and uveitic glaucoma non-responding to CP and was eviscerated. Total postoperative success, understood as IOP < 20 mmHg with no use of any hypotensive treatment was found in 7 out of 25 (28%) operated eyes. Partial postoperative success, meaning IOP < 20 mmHg needing topical hypotensive treatment reached 12 of 25 eyes (48%) aiming for IOP < 20 mmHg, a result that increased to 14 of 25 eyes (56%) if considering a target IOP of < 25mmHg. Overall success rate was 76% considering cases with a controlled IOP < 20mmHg (84% if considering 25 mmHg). On the other hand, 3 eyes were controlled with IOP < 30mmHg and only 1 eye failed to control its glaucoma. Mean final postoperative IOP per eye was 18.1 ± 11.2 mmHg with a mean use of 1.2 ± 1.2 topical agents and 1/3 of a 250mg oral acetazolamide tablet. Statistically significant differences were found comparing preoperative and postoperative IOP ($p < 0.0001$), topical agents ($p = 0.0238$) and oral acetazolamide use ($p < 0.001$).

Conclusion: The management of uveitic glaucoma is challenging and complex. In our experience, surgical intervention is effective in lowering IOP and discontinuing the use of topical and systemic medication, although an exhaustive preoperative assessment and careful follow-up is demanded. Repeated surgeries are commonly expected in this type of pathology. Close collaboration with the uveitis specialist is crucial to minimize relapsing inflammation, which seams to be the main reason for glaucoma surgery failure.

P148 Ahmed glaucoma valve in refractory glaucoma. Outcome, complications & management of complications - A single surgeons experience

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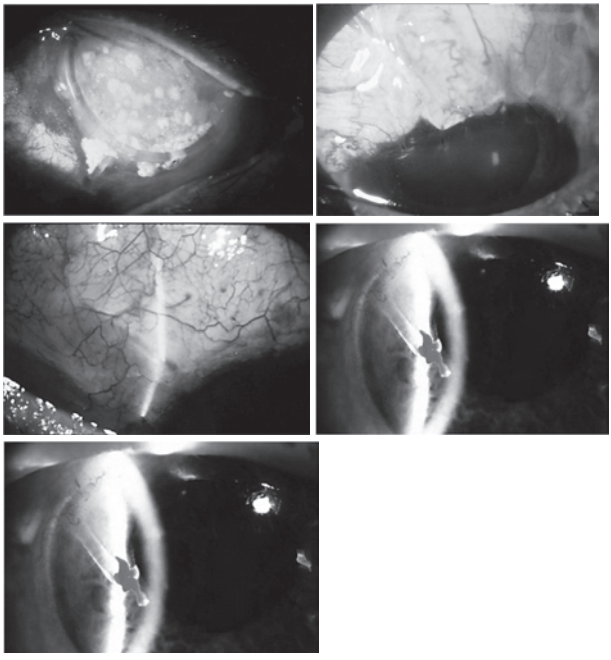
Purpose: To study the outcome of Ahmed glaucoma valve (AGV) in cases of refractory glaucoma. This study describes our clinical experience with the Ahmed Glaucoma Valve (AGV) implant in Indian eyes with glaucoma that was refractory to conventional medical/ laser and surgical treatment.

Methods: Patients with refractory Glaucoma who underwent AGV implantation were included in the study. A total of 26 patients (26 eyes) were included. Patients with < 6 months of follow-up were excluded from the analysis. After informed written consent was obtained, AGV was implanted in all cases by a single surgeon. Documentation of the following information was done: age, gender, detailed clinical history along with general physical and systemic examination, a comprehensive ocular examination including quantitative recording of BCVA,anterior and posterior segment examination, IOP measurement with GAT, gonioscopy and recording of fields using Humphrey field analyser. The primary outcome variable was considered to be successful control of the elevated IOPs after surgery. Absolute success was defined as an IOP ≤ 18 mm of Hg and ≥ 5 mm of Hg with no additional glaucoma surgeries or visually devastating complications postoperatively. Qualified success was defined as IOP ≤ 18 mm of Hg and ≥ 5 mm of Hg with the use of antiglaucoma medications. Till the IOP was controlled by a maximum of 2 topical and/or 1 systemic antiglaucoma medication the surgery was not considered to be a failure. The last follow-up was noted as the last time the patient was seen or the time at which the surgery failed by our success criteria. The data were statistically evaluated using student's t test and paired t-test for quantitative data and Pearson's c^2 test for qualitative data as indicated and the cumulative probability of success was examined by Kaplan-Meier life-table analysis.

Results: A total of 26 eyes of 26 patients were included. 19 (73.08%) males and 7 (26.92%) females. The mean age of the patients was 62.3 ± 17.5 years. The PACG group comprised the highest number of patients at 8 (30.77%) closely followed by the POAG group at 7 (26.92%). This was followed by NVG group 5 (19.23%), ICE syndrome 4 (15.38%) and Traumatic glaucoma 2 (7.69%). A large number of patients 19 (73.07%) had undergone a single Glaucoma surgical intervention

previously while 3 (11.54%) had undergone 2 and 2 (7.69%) had undergone 3 interventions. 19 (73.08%) were pseudophakic while 7 (26.92%) were phakic at the time of intervention. The mean IOP at baseline was 32.37 ± 7.86 mm of Hg and post-operatively it was 12.57 ± 8.86 mm of Hg at 1 week post surgery,17.44 ± 5.88 mm of Hg at 6 months and 17.42 ± 3.57 mm of Hg at 12 months post surgery. Pre- and postoperative IOP differences were statistically significant at all examination periods ($p < 0.001$). The cumulative probability of success was 84.75% at 6 months and 79.83% at 12 months of follow-up (Kaplan Mayer life-table analysis). The visual acuity improved/remained the same to within 1 Snellens line in 23 (88.46%) patients. The primary complications included hyphaema 2 (7.69%), shallow anterior chamber 2 (7.69%), Tube exposure 2 (7.69%), Scleral patch graft exposure 1 (3.85%), Plate exposure with leak 1 (3.85%) and 1 case (3.85%) of tube block with vitreous. Hyphaema and shallow anterior chamber were managed conservatively. Tube exposure was managed with repositioning and reinforcement with sclera patch graft. Scleral patch graft exposure was managed with regrafting with anchoring sutures. Tube exposure was managed with repositioning and reinforcement with scleral patch graft. There was a statistically significant reduction in the number of medications between the preoperative and postoperative period. The mean number of medications in the preoperative phase was 2.74 ± 0.14 compared to 0.66 ± 0.11 at 1 month after surgery and 1.10 ± 0.13 at 12 months. A variety of drainage implants have been developed to treat refractory glaucomas. In our study successful outcome was achieved in majority of the eyes at last follow-up examination, although most eyes required approximately one antiglaucoma medication postoperatively. The overall success rate in this study compares favorably with the success rates of other glaucoma drainage devices. In our study, the peak mean IOP2 months postoperatively was significantly higher than the intraocular pressure at 6m&1year after surgery. This "hypertensive phase" may be due to the intermediate-sized plate of the AGV implant and has been reported in other studies also. In our Kaplan-Meier life-table analysis, the cumulative probability of success following AGV implantion was 84.75% at 6 months and 79.83% at 12months. We found certain complications in some patients. Most were treated conservatively, however certain complications required an additional surgical procedure. 5 cases (19.3%) required another surgical



intervention. This number may seem high considering the few cases included in the study but it must be kept in mind that almost all the cases selected in this study had a history of a single or more filtering surgeries done previously which had failed over time. Thus the conjunctiva and the eye per se were already in a compromised state at the point of being selected for the study.

Conclusion: To conclude it can be said that AGV was found to be quite effective in the management of refractory glaucomas of various etiologies. There may however be certain complications in cases where AGV was not being done as a primary procedure but the complications can be managed effectively and the success outcomes are favorable in case of these refractory glaucomas.

P149 Is chronic hypotony following glaucoma filtration surgery an accurate definition of treatment failure?

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Purpose: Hypotony may be defined as an intraocular pressure (IOP) less than 6 mmHg. It is associated with sight threatening complications such as choroidal effusion and hypotensive maculopathy. Because of this, hypotony is included in the definition of treatment failure in clinical trials of glaucoma filtration surgery. However, some eyes maintain an IOP < 6 mmHg following filtration surgery without sequelae and with no significant change to vision. This is therefore at odds with the concept that hypotony is always a bad treatment outcome and raises the possibility that such a definition over-estimates treatment failure. To study this further, we measured the frequency of complications from hypotony following glaucoma filtration surgery.

Method: This retrospective case-control study compared 19 eyes with chronic hypotony (IOP < 6 mmHg) to 19 matched eyes without hypotony (IOP > 5 mmHg) 3 or more months post glaucoma filtration surgery. Cases were identified from a database of 2 surgeons (CC, BC) from 2010 to 2013. Outcomes included visual acuity, visual field indices (mean deviation, pattern deviation), refractive change, presence of choroidal effusion, hypotensive maculopathy, optic nerve swelling and cataract progression.

Results: The baseline characteristics of hypotony and control eyes were similar with the exception of mean IOP. Reduced visual acuity (> 2 Snellen lines from baseline) occurred in 8 hypotony eyes and 3 control eyes ($p = 0.074$). Hypotony was associated with a higher incidence of choroidal effusion ($p = 0.15$), maculopathy ($p = 0.07$) and cataract progression ($p = 0.21$) but statistical significance was not reached. Corneal decompensation and optic nerve swelling were not identified in either hypotony or control eyes. Seven of 19 hypotony eyes (36.8%) had no complications.

Conclusions: Sight threatening complications including choroidal effusion, maculopathy and cataract progression occur more frequently in eyes with chronic hypotony following glaucoma surgery, although in this small series the difference was not statistically significant. Approximately a third of eyes with chronic hypotony did not develop complications. These findings suggest hypotony as a definition of glaucoma surgery failure may over estimate failure rates.

P150 Fungal scleritis following bleb-associated endophthalmitis caused by Paecilomyces lilacinus

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Paecilomyces lilacinus infections have recently described from patients with compromised immune systems or intraocular lens implants. We experienced a case of this fungal scleritis complicated with bleb-associated endophthalmitis.

An 85-year-old woman underwent trabeculectomy in the left eye for advanced open-angle glaucoma. Two months postoperatively, dellen occurred at the periphery of the cornea due to the limbal elevation of the filtering bleb. Her corrected visual acuity was 20/60 and intraocular pressure

(IOP) was 11 mmHg in her left eye. Dellen persisted despite medical treatment including hyaluronate sodium eye drops and ofloxacin ointment and the discontinuation of dexamethasone eye drops. Ten months following surgery, dellen progressed to an infectious corneal ulcer, which led to blebitis. The bleb was Seidel negative. Anterior segment inflammation didn't improve even after a bleb excision and conjunctival advancement in combination with systematic and topical antibiotic therapy with topical cefmenoxime, topical gatifloxacin, and intravenous instillation of meropenem. Eight days after the occurrence of blebitis, the inflammation expanded to the vitreous body and bleb-associated endophthalmitis was diagnosed. The intraocular inflammation resolved after she underwent pars plana vitrectomy with intraocular perfusion of vancomycin and ceftazidime. Swabs taken from the conjunctiva and the cornea specimen of her left eye when she had infectious corneal ulcer showed growth of Paecilomyces lilacinus one month later. Three month after the resolution of bleb-associated endophthalmitis, she had scleritis with subconjuntival abscesses and corneal infiltrate. The conjunctiva was hyperemic and the sclera at the superotemporal part of her left eye was swollen. An excision of the affected sclera was carried out and antifungal therapy including topical pimaricin, topical fluconazole, and oral itraconazole was started. Six months later, she discontinued antifungal therapy since the inflammation of the sclera at the temporal part of her eye had resolved. A few weeks following discontinuation of antifungal therapy, however, there was a recurrence of the scleritis at the nasal part of her left eye. T2-weighted MR images showed thickness and high intensity in the affected area of the sclera. A scleral biopsy was carried out and the culture showed growth of Paecilomyces lilacinus. Therapy with topical miconazole was started together with topical pimaricin and oral itraconazol. After antifungal therapy continued over seven months, her left eye showed no residual infection. Her corrected visual acuity was 20/50 and IOP was 9 mmHg in her left eye.

An excision of the affected sclera in combination with antifungal therapy is effective to treat Paecilomyces lilacinus scleritis. Nevertheless, there is a possibility of a recurrence of fungal scleritis at other parts of the eyeball.

P151 CHLAMYDIA AND BACTEROID INFECTION AND THE POSTOPERATIVE RECURRENCE DEVELOPMENT OF GLAUCOMA PATIENTS

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One of the factors significantly reducing antiglaucoma surgery effect is scarring of the newly created outflow tract which leads to decrease the hypotensive effect and requires repeated not always successful reoperations. It is important and necessary to study infection factor role in the process of scarring stimulation .

The purpose of research: To explore the relationship between chlamydial and bacteroid infection of the organ of vision with excessive scarring of filtration pillows after fistulasing of glaucoma surgery.

Materials and methods: There were 50 patients (50 eyes) with the operative glaucoma aged 55 to 83 years, who were under our supervision during 1 year. The key criterion for inclusion in the study was affected by the method of sinustrabeculaectomia (STES), the primary otkratougolnaya glaucoma (POAG).

Laboratory research: After the fist surgery every patient was taken fence scrapings from the conjunctiva, oropharynx, taken from urethra, cervical canal (in the case with women) for performing the reaction of direct immunofluorescence (DIF), polymerase chain reaction (PCR) and culture. We also performed fence venous blood for conducting linked immunosorbent assay (ELISA) the content of antibodies of IgG and IgA to C.trachomatis. To determine B. fragilis the sowing on blood agar was conducted. To determinethe presence of systemic inflammatory process and indicators activation of the patients' immune systems we conducted a quantitative definition of the cytokines IL 1-b and IL-8 in lacrimal fluid (LF) and serum by the method of solid-phase ELISA. During the first

and the second intervention the patientswere taken samples of structures of the sclera, the angle of the anterior chamber of the eye for pathomorphological research. Structural changes in biopsy material, their localization and severity, presence and localization of pathogens was investigated by light microscopy laboratory microscope Leica MT 2500 and luminescent microscopy using the additional section of a mercury lamp.

Results: Statistically significant differences by age distribution, sex, refraction index MD and level of IOP in the operated eye to the traction was not revealed.

According to the results of PCR and UIF, in scrapes with the conjunctiva in the studying group, the frequency of detection of pathogens C.trachomatis and B.fragilis was statistically significantly higher relative to a comparison group. In 14 cases, 12 of them in the group of relapse pathogens were found in the urogenital system (generalized form of infection). According to the IFA titer of antibody IgA and IgG antibodies to the pathogen C.trachomatis was raised, in 7 cases ratio titles testified to the active form of infection, in 4 cases of reactivation of chronic infection was found. In patients with known pathogens in the comparison group antibody titers testified chronic infectious-inflammatory process. In addition, in patients' tears and blood serum with relapses the levels of cytokines IL-1β and IL-8 was significantly higher than in the comparison group ($p<0.001$). The level of IL-1β tear in the group of patients relapse more than in 2 times exceeded its content in blood serum, differing from the ratio of IL-1β in the comparison group, and the levels of IL-8 in the group. Analysis of the content of the cytokines IL-1β and IL-8 in the following releases of the band also revealed no reliable differences in the patients taking different kinds of drugs. In general the cytokines level fully met the presence of pathogens C.trachomatis and B.fragilis, and also activity of infection based on the ratio of the levels of antibodies to the pathogen. During the study of the filtration pillows biopsies taken during the repeated interference in the group with relapse after 1 year, the changes in the structure of sclera fabric fibers in the form of seals and homogenization of acellular walls pillows, individual microcyst. In the deep layers of filtration pillows, as well as in the conjunctiva, it submucosal layer we observed a large number of lymphocytes, macrophages, mast cells, and fibroblasts. When immuno-histochemistry examination of patients' biopsies with laboratory-confirmed chlamydial infection it was revealed located intra - and extracellular chlamydial inclusion in the conjunctiva and sclera tissues , including those deep layers of the iris, in the structures of the eye anterior chamber angle, as well as in the endothelial lining of the blood vessels root of the iris.

Discussion: The patients group taken part in our research was rather homogeneous and the values of these parameters from the group with a relapse of ophthalmic hypertension and comparison group did not differ significantly. At the same time, the levels of cytokines IL-1β and IL-8 was significantly higher in the group with a relapse of ophthalmic hypertension-related scarring of filtration pillows, which is consistent with findings of previous immunological and pathomorphological investigations. Cumulatively, high levels of cytokines in tear indicates the presence of inflammatory process and confirmed by the results of postmortem studies identifying the cells of inflammation in the biopsy as for traction, and when re-intervention in 1 year.

However, the wound and the nature of conservative therapy cannot explain the distribution of the results of this study due to the lack of significant differences between the groups. The only factor in the study, which relates with the level of inflammatory reactions and production of cytokines, and, as a consequence, also with the development of recurrence due to excessive scarring, was infection by C.trachomatis and B.fragilis pathogens.

Our results allow to speak about the importance of the chronic inflammatory process caused by chlamydia and bacterial infection, in the development of excessive scarring filtration pillows during fistulizing glaucoma surgery.

P152 A progressive ocular hypertension post cataract surgery

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Purpose: To describe the clinical case of ocular hypertension (OHT) for Secondary Angle Closure and detail resolution in pseudophakic cases.

Material and Methods: Female patient 80 years old, Glaucoma operated Both Eyes (OU) 4 years previous (Non-Penetrating Deep Sclerectomy with MMC) without complications, IOP 14mmHg (OU) without medication. Phacoemulsification was performed with acrylic IOL placement.

They had Open Angle Glaucoma and pseudoexfoliation and Asteroid hyalosis in RE.

Subject: The Visual Acuity after Phacoemulsification of RE decreases in (20/40) and elevated IOP 18mmHg. AC narrows with discoria. IOP up to 30mmHg without regulation. Angle Closure and synechiaes at the Gonioscopy observed, except for XII, NPDS site. Pilocarpine and acetazolamide indicated.

Results: The IOP regulates in 20mmHg.The UBM show the IOL in the Sulcus IOL, haptic contact and angle closure.The NPDS site with permeable. Iridotomy is performed. The VA get back 20 / 25 and the IOP in 12mmHg with timolol and brimonidine.

Conclusion: The OHT and Angle closure despite Glaucoma surgery can occur after phacoemulsification. Place BAG IOL in these all the cases and confirm position. The UBM is very useful for accurate diagnosis.

P154 Ahmed glaucoma valve bi-plate failure in refractory glaucoma: a case report

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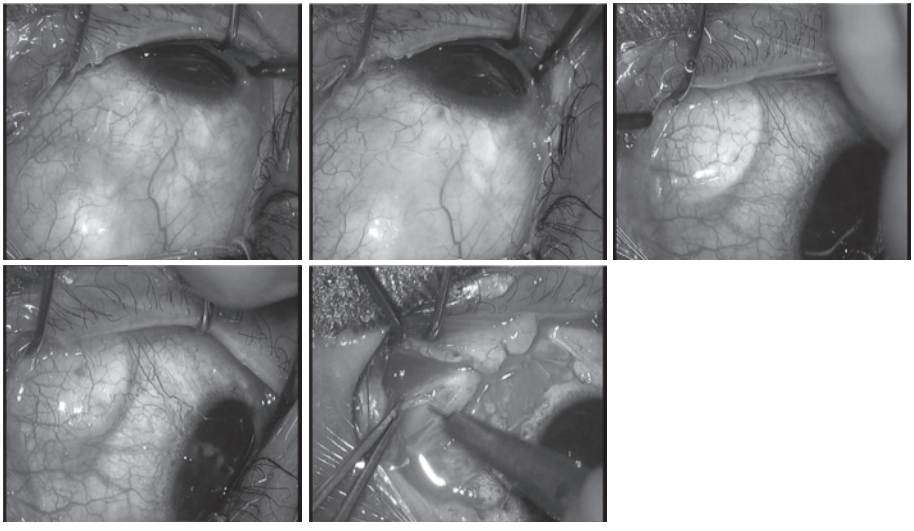
Background: Glaucoma drainage devices (GDD) have been the focus of interest of many different researches because of their effectiveness as a primary or secondary treatment option especially in cases of refractory glaucoma. The bi-plate Ahmed glaucoma valve (AGV) was introduced in 1999 to provide a larger surface area and lower intraocular pressure. However, there were only few reports on their use, long-term outcome, and causes of failure. We aim to report a case of failed bi-plate AGV and to determine the cause of failure.



Methodology: We reviewed the case of a 24-year old male patient who presented with refractory glaucoma with failed biplate AGV. Surgery was done to remove bleb adhesions and check the patency of the Ahmed tubes. The non-functioning plate was removed and sent to pathology for evaluation. A new AGV implant was placed

Discussion: Tube occlusion from the anterior chamber to the first plate will lead to loss of flow on both plates, which can occur at any time post-operatively. On the other hand, presence of fibrous tissue inside the connecting tube leads us to believe that because of lack of flow restriction in the early post-operative period, the tubes were exposed to post-operative intracameral inflammatory mediators, leading to blockage. Because of the tube blockage, flow of aqueous fluid from the first plate to the second plate is occluded leading to a non-functioning second plate with a flat, dry bleb around it. Hence, the available surface area for filtration is only equivalent to a single plate AGV, thus giving similar outcomes.

Results: Patency of the main plate was re-established after tube flushing, but not the second plate. The connecting tube was in place and not kinked. Dissection was done and bleb adhesion and fibrosis around the second plate was noted. The connecting tube and the second plate were removed and sent for histopathology evaluation. The report revealed blockage of the connecting tube with fibrous tissue associated with some macrophages, scattered chronic inflammatory cells, and some birefringent and refractile material.

Conclusion: In spite of the larger surface area offered by bi-plate AGVs, tube blockage by fibrous tissue and inflammatory cells may defeat its purpose and cause GDD failure.

P155 Management of complications in glaucoma surgery

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We know that the surgical procedures for glaucoma disrupt the integrity of the globe, & they are known to produce various complications. Some of these complications may be vision-threatening. The surgeon should be able to prevent them, recognize them and treat them. Objective of this review article is to provide insight into some of those complications that will help the ophthalmologists in treating glaucoma patients in their clinical practice.

P156 Amniotic membrane transplantation for the late-onset glaucoma-filtrating bleb leak in a patient with Axenfeld-Rieger syndrome

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The use of antimetabolites for filtration surgery procedure often lead to complications such as avascular, cystic, and large leaking blebs. We report a patient with Axenfeld-Rieger syndrome which applicated an amniotic membrane transplantation for repairing the late-onset glaucoma-filtrating bleb leak. A 37-year-old male had a history of right eye trabeculectomy with antimetabolite, 11 years earlier. Visual acuity was the level of hand motions. Intraocular pressure was 9 mmHg in that eye. Late-onset bleb leak was observed with using fluorescein dye. The conjunctiva over the sclerotomy site had an appearance of avascular, flat, and cystic in the slit-lamp. Amniotic membrane transplantation was done for restore bleb formation after the dissection of the pre-existing bleb. Postoperatively, normal intraocular pressure was regained around 14 mmHg. The application of amniotic membrane for the bleb reconstruction also prevent destruction of the tissues over sclerostomy site and stabilize the intraocular pressure. Amniotic membrane transplantation seems to be good option late-onset bleb leakage following filtration surgery.

• ADDENDUM

P157 Non-penetrating surgery in glaucoma with high failure risk : Comparative study between 5FU and Healaflow

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Introduction: Momocentric, prospective, randomized, interventional study aiming at comparing two adjuvants used in glaucoma with high surgical risk failure: 5FU on one hand and Healaflow on the other.

Material and Methods: 72 eyes of 36 patients with chirurgical bilateral glaucoma with high risk of failure, operated by the same surgeon: one eye by non-penetrating deep-sclerectomy combined with 5FU, and the other eye by non-penetrating deep-sclerectomy combined with Healaflow. Eye and adjuvant allocations were performed by a pre-established randomization table. Patients were followed up at Day (D)1, D7, D15, D30, D60, D180, D270 and D360 with for every visit the corrected Intraocular Pressure (IOP), potential complication or concomitant treatments, filtration bleb aspect (stretched, transparent, vascularized, cystic ou necrotic). Actual follow-up varied from 9 to 14 months.

Results: All the 36 patients included in the study demonstrated a primitive glaucoma with open angle. The average age of patients was of 55.2 years old. The mean pre-operatory IOP evolved from 24.9 mmHg to 11.7 mmHg in the 5FU group and from 24.2 mmHg to 12.1 mmHg in the Healaflow group. Daily antiglaucoma medications respectively decreased from 3.2 to 0.4 in the 1st group and from 2.8 to 0.4 in the 2nd group. The absolute success rate was of 90%, with 79% qualified success rate, for the 5FU group vs. 92% absolute, with 77% qualified success rate in the Healaflow group. Needling was necessary in 49.7% of cases in 5FU group and in 38% of cases in the Healaflow group. Goniopuncture was performed in 47% of cases in the 1st group and 50% in the 2nd group. 2 cases of filtration bleb leaking with hypotonia were observed in the 5FU group; none in the Healaflow group.

Discussion: The analysis of results showed a comparable efficacy between those two adjuvants when using the deep-sclerectomy, but lower complications rate for the reticulated hyaluronic acid implant. The encysting of the filtration bleb was comparable in the two groups, but necrosis and conjunctiva's Seidel signs were observed only in the 5FU group.

Conclusion: Healaflow allows to prevent fibrosis at healing site and seems promising because without deleterious effects on the ocular surface. Never-the-less, longer follow-up and more important sample size would be required before final conclusions.

P158 Influence of preservative-free prostaglandin preparations on HCE-2 cells

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Purpose: Preservatives in eye drops have detrimental effects on ocular epithelial cells. Therefore many preservative-free formulations have recently been developed The aim of this study was to compare the cytotoxic and inflammatory effects of preservative-free latanoprost (Monoprost), preservative-free tafluprost (Taflotan) and 0.02% benzalkonium chloride (BAK) in concentration range of 0.1 to 10% in HCE-2 human corneal epithelial cell culture up to 48 h exposures.

Methods: HCE-2 cells were exposed to the commercial Monoprost and Taflotan eye drops and BAK. Cell viability after 24 and 48 h was determined using colorimetric MTT (3-(4,5-dimethyldiazol-2-yl)-2,5-diphenyltetrazolium bromide) and LDH assays. Production of the proinflammatory interleukin IL-6 was determined using an enzyme-linked immunosorbent assay (ELISA) method.

Results: Osmolarity of all drop dilutions were on similar levels, pH measurements showed slightly decreased pH in all Monoprost samples. Cell viability, as measured by the MTT assay, declined in a concentration gradient dependent way from 100% to 60% after exposure to Taflotan, from 80% to 5% after exposure to Monoprost and from 80% to 5% after exposure to BAK after 24 or 48 h. Levels of LDH were associated with cell death and raised especially in the Monoprost and BAK samples. However, LDH remained on similar level as in control culture in Taflotan samples. Monoprost elevated the secretion of inflammation markers IL-6 by seven to nine fold at the concentration of 1%, as analyzed with ELISA. Taflotan was well tolerated and BAK induced mild IL-6 response in comparison to control culture.

Conclusions: Preservative-free Monoprost evokes cytotoxicity and increased secretion of IL-6 in cultured HCE-2 cells. Our results indicate that these effects of Monoprost solutions should be further evaluated *in vitro* and *in vivo*.

AUTHORS INDEX

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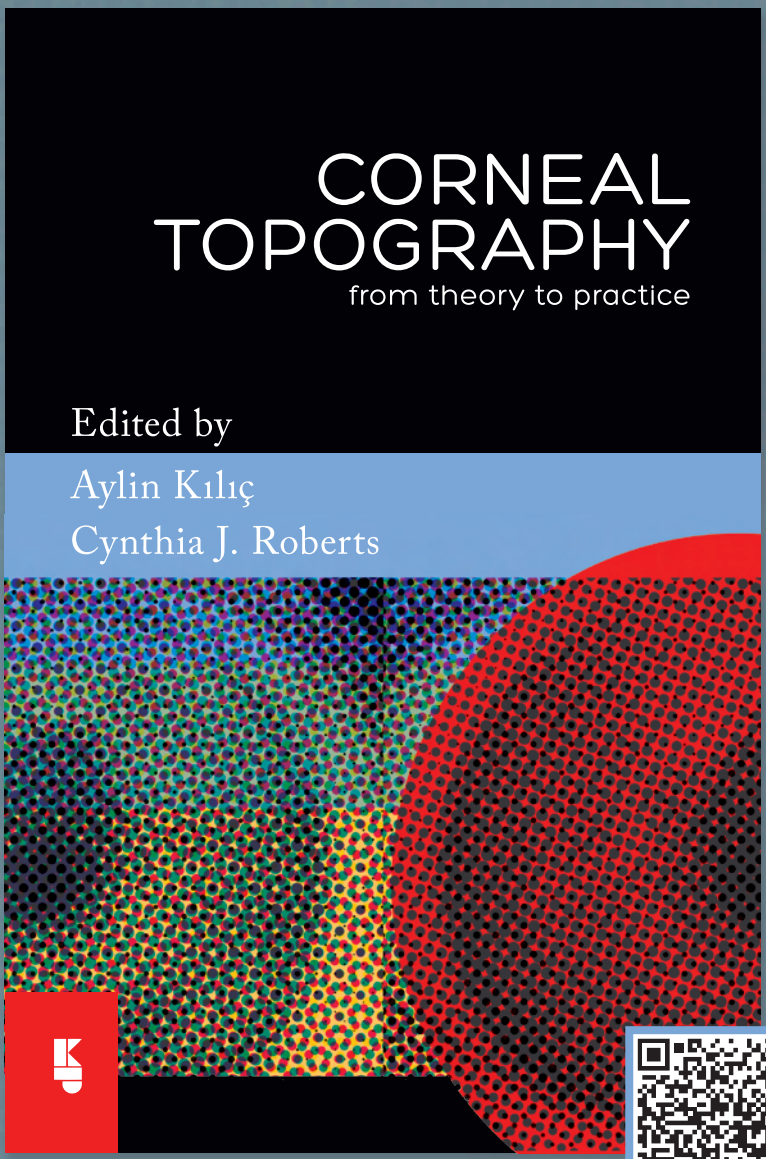

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