THE NEW YORK EYE
AND EAR INFINARY

DEPARTMENT OF OPHTHALMOLOGY

PRESENTS

17TH ANNUAL RESIDENT AND FELLOW RESEARCH DAY

FRIDAY, MAY 17, 2013 8:00AM - 1:00PM

MAIN CONFERENCE ROOM
THIRD FLOOR
# Residents and Fellows Research Day

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Descemet's Stripping Automated Endothelial Keratoplasty (DSAFEK) Lenticle Detachment Rate in Eyes with and without Altered Anterior Segment

Vora, AV; Hong AE; Jenkins TC; Kim JT; Seedor JA; Wu EI; Ritterband DC

**Purpose:** To examine the lenticle detachment rate in eyes with normal anterior segment anatomy versus eyes with pre-existing anterior segment pathology.

**Methods:** A retrospective review of DSAFEK surgical procedures performed by our group including clinical corneal fellows from January 2011 to May 2012 was performed. Preoperative assessment of anterior segment pathology, including the presence/absence of trabeculectomy, glaucoma drainage implant (GDI), peripheral anterior synechiae (PAS), and anterior chamber intraocular lens (ACIOL) were noted. Postoperative attachment/detachment status of the lenticle was documented. The two sample t-test statistic was used to compare rates of lenticle detachment between DSAFEK procedures in eyes with and without anterior segment pathology.

**Results:** 223 DSAFEK procedures from 184 eyes were examined. 20 of 123 (16.3%) surgeries in eyes with normal anatomy had lenticle detachment. 26 of 100 (26.0%) procedures in eyes with abnormal anterior segment anatomy experienced detachment. The detachment rate difference was marginally statistically significant (p=0.074). The following were subgroup analysis detachment rates: 15 of 51 (29.4%) procedures in eyes with trabeculectomies; 10 of 27 (37.0%) in eyes with GDIs; 6 of 26 (23.1%) in eyes with PAS; 4 of 10 (40.0%) in eyes with ACIOl; 4 of 19 (21.1%) in narrow angle eyes.

**Conclusions:** Altered anterior segment anatomy may be associated with increased lenticle detachment rate after DSAFEK surgery, possibly due to the difficulty of retaining a proper air fill following surgery. Our study suggests that those eyes with previous glaucoma surgery and ACIOlS may be associated with a higher lenticle detachment rate.
Clinical Outcomes and Complications of Iris Sutured Posterior Chamber Intraocular Lens Implants at the New York Eye and Ear Infirmary

Alice Hong MD, Jocelyn Kuryan MD, Elaine Wu MD, David Ritterband MD, John Seedor MD

**Purpose:** To report the predisposing risk factors, visual outcomes and intra-operative and post-operative complications of patients that underwent iris sutured posterior chamber intraocular lenses (IOls) in eyes with inadequate capsular support for capsular bag or ciliary sulcus supported IOls.

**Methods:** A retrospective chart review and data analysis was completed of all patients that underwent iris fixation of a three piece foldable acrylic IOls for correction of aphakia in the absence of capsular support.

All surgeries were performed by the same team of surgeons at the New York Eye and Ear Infirmary. Data collected included clinical risk factors, pre-operative and post-operative vision, surgical history, concomitant procedures, intra-operative and post-operative complications including elevated intraocular pressure (IOP), corneal edema, IOL dislocation, hyphema, macular edema , vitreous hemorrhage and retinal detachment.

**Results:** Medical records from 2003 to 2010 were reviewed and 132 cases of iris sutured posterior chamber IOls were analyzed. Mean age at the time of surgery was 69.4 years old. Length of follow-up ranged from 1 month to 5 years with a mean follow-up of 24 months.

Most common predisposing risk factors in decreasing order of incidence were trauma 19.6% (26/132), pseudoexfoliation 12.8% (17/132) and ectopia lentis 3% (4/132). Most had prior intraocular surgery 85.6% (113/132) and 14.3% (19/132) had prior pars plana vitrectomy (PPV) and 6% (8/132) had prior penetrating keratoplasty (PK). Many underwent concurrent PPV 43.9% (58/132) and a few had combined PK surgery 15.1% (20/132).

Best corrected visual acuity ranged from 20/20 to light perception. And 90.1% (119/132) had a significant improvement from pre-operative visual acuity.

There were no intra-operative complications. The most common post-operative complications included elevated IOP 19.6% (26/132) that were all controlled with intraocular pressure lowering drops, IOL dislocation 18.9% (25/132), irregular pupil 8.3% (11/132) and corneal edema requiring DSAEK 7.5% (10/132). Other post-operative complications were vitreous hemorrhage 6.8%(9/132), hyphema 5.3% (7/132), macular edema 2.2% (3/132), retinal detachment 1.5% (2/132). There were no cases of pupillary capture (0/132) or chronic uveitis (0/132).

**Conclusions:** Iris fixated posterior chamber intraocular lens implants can be an excellent option for rehabilitation of eyes that do not have adequate capsular support for posterior chamber IOls. Most patients had significant improvement of their best corrected visual acuity with few complications.
Pupillary Capture in Fibrin-Assisted Intrasceral Fixation of Intraocular Lenses

Kim, Joan; Ritterband, David; Wu, Elaine; Vora, Amit; Hong, Alice; Seedor, John

Purpose: To report a new complication associated with intrasceral fixation of posterior chamber intraocular lenses (PCIOL) assisted by fibrin glue

Methods: Retrospective cases series

Results: Of the 43 patients who underwent PCIOL placement via intrasceral fixation assisted with fibrin glue performed between January 2011 and August 2012 by a single surgeon, 5 experienced pupillary capture of the IOL postoperatively. 2 cases were clinically apparent by postoperative day 1, 2 were apparent by postoperative day 7 and 1 at postoperative day 30. All 5 cases of pupillary capture resolved with surgical intervention and/or laser iridotomy.

Conclusion: Patients undergoing intrasceral fixation of an IOL assisted by fibrin glue may be at risk for developing pupillary capture, particularly in the first postoperative month. Surgery and/or laser iridotomy should be considered in these cases. Further studies need to be performed to evaluate risk factors associated with this complication.
Outcomes of Combined Descemet Stripping Automated Endothelial Keratoplasty and Tube Repositioning in Glaucoma Patients

Lauren Schneider MD, Alice Hong MD, Amit Vora MD, Travis Jenkins MD, Joar Kim MD, David Ritterband MD, Elaine Wu MD, John Seedor MD

**Purpose:** To evaluate the intra-operative and post-operative complications as well as intraocular pressure maintenance in eyes undergoing concurrent Descemet stripping automated endothelial keratoplasty (DSAEK) and glaucoma drainage repositioning surgery.

**Methods:** A retrospective review of thirteen eyes in eleven glaucoma patients with a history of tube shunt placement that underwent DSAEK and concurrent repositioning of their anterior chamber glaucoma drainage implant to the posterior chamber with pars plana vitrectomy were analyzed. All surgeries were performed by the same team of surgeons at the New York Eye and Ear Infirmary. Data collected included prior surgeries, intra-operative complications and post-operative complications including graft dislocation, graft failure, graft rejection and intraocular pressure control.

**Results:** Thirteen eyes of eleven patients (7 male and 6 female) with a mean age of 76 (range 34-94 years old) were included. All patients had a history of cataract extraction, of which one patient had an anterior chamber intraocular lens that was exchanged for an iris sutured lens at the time of DSAEK surgery. The remaining 12 eyes had posterior chamber lenses. One patient had prior iris implant surgery for iris reconstruction secondary to iris injury, which was not removed at the time of DSAEK surgery. All patients had glaucoma with an anterior chamber tube shunt and eight of the 13 eyes (61.5%) were post trabeculectomy. Three of the 13 (23%) eyes had peripheral anterior synechiae requiring synechiolysis at the time of DSAEK surgery. The mean length of follow-up after surgery was 17.4 months (range 4-35 months). The average lenticule size used was 8.4 mm (range 8.25-9.0 mm) and there were no intraoperative complications in all eyes. Postoperative complications included graft dislocation in 4 of 13 eyes (30.7%). Of these four dislocations, 3 were successfully rebubbled and 1 required repeat endothelial keratoplasty for persistent detachment on post operative day 10. No eyes had graft decentration, primary graft failure nor endothelial rejection. No eyes had loss of intraocular pressure control and no eyes required further glaucoma surgical intervention after the DSAEK surgery.

**Conclusions:** DSAEK surgery combined with and glaucoma drainage implant repositioning from the anterior chamber to the posterior chamber can be performed with good postoperative outcomes. Concurrent tube repositioning did not affect the rate of intraoperative complication, but the rate of graft dislocation may be higher.

**References:**
Kim P, Amiran MD, Lichtinger A, Yeung SN, Slomovic AR, Rootman DS. 
Outcomes of Descemet stripping automated endothelial keratoplasty in patients with previous glaucoma drainage device insertion.
Phillips PM, Terry MA, Shamie N, Chen ES, Hoar K, Dhoot D, Shah AK. 
Descemet stripping automated endothelial keratoplasty in eyes with previous 
trabeculectomy and tube shunt procedures: intraoperative and early postoperative 
complications. 

Riaz KM, Sugar J, Tu EY, Edward DP, Wilensky JT, Namavari A, Djalilian AR. 
Early results of Descemet-stripping and automated endothelial keratoplasty (DSAEK) in 
patients with glaucoma drainage devices. 

Wiaux C, Baghdasaryan E, Lee OL, Bourges JL, Deng SX, Yu F, Aldave AJ. 
Outcomes after Descemet stripping endothelial keratoplasty in glaucoma patients with 
previous trabeculectomy and tube shunt implantation. 
Cornea. 2011 Dec;30(12):1304-11.
Descemet-stripping automated endothelial keratoplasty (DSAEK) lenticule position on post-operative day one and correlation with graft success

Travis Jenkins MD, Alice Hong MD, Amit Vora MD, Elaine Wu MD, John Seedor MD, David Ritterband MD

**Purpose:** To evaluate for a correlation between initial attachment or detachment of DSAEK lenticule and clinical success.

**Methods:** A retrospective chart review of 224 surgeries on 183 eyes from 157 patients by three surgeons was undertaken. Lenticule attachment to the host cornea or lenticule detachment (> 1/3 detached) was documented on post-operative day one (POD1). Detached lenticules were re-bubbled promptly. The two groups were compared to evaluate for correlation with clinical success defined as a having an anatomically attached lenticule with a clear recipient host stroma and donor lenticule compatible with good vision three months after surgery.

**Results:** 174 of 224 (78%) cases had lenticule attachment on POD1. Fifty lenticules that were not attached initially were re-bubbled (22%) within one week. 17 lenticules were re-bubbled successfully and 33 were unsuccessful. If the graft is initially attached on POD1 the odds ratio of having a clear graft at the three month or later post-op visit defined as clinical success was found to be 17.93 (95% confidence interval 8.30 to 38.71, p<0.0001).

**Conclusion:** Initial graft attachment appears to be correlated with clinical success. This is in contrast to the published data on DMEK where clinically success can be achieved with re-bubble rates as high as 62%.
Non-infectious Uveitis Following Cataract Surgery: Workup and Results

Kresch Z, Kedhar S, Samson CM

**Purpose:** This project investigated the etiology of new-onset non-infectious uveitis in patients that presented to the uveitis service after cataract extraction and intraocular lens (IOL) implantation. We referred to this presentation as Uveitis Following Surgery (UFS). While it is critical to rule out infectious etiologies, there are multiple other common causes for uveitis in this setting. These include: lens-induced uveitis, IOL-related inflammation and non-surgery related causes of inflammation. This study looked at all the new uveitis patients that presented to New York Eye and Ear Infirmary Uveitis Service over a one year period.

**Methods:** Studied a cohort of patients that presented over a one year time period to two uveitis and ocular immunology specialists at New York Eye and Ear Infirmary. Most patients received a laboratory work-up for white blood count (WBC), Sedimentation rate, anti-nuclear antibody (ANA), Rheumatoid Factor (RF), Anti-neutrophil cytoplasmic antibody (ANCA), HLA-B27, syphilis serology and ultrasound biomicroscopy (UBM). Of forty-three patients seen, twelve were excluded due to other known causes of uveitis or evidence of other unrelated causes of uveitis (history of trauma induced sympathetic ophthalmia, varicella zoster positive PCR post shingles, history of multiple other invasive ocular procedures). These were listed as ‘non-classic’. The remaining patients (31) were examined for age, sex, time from cataract surgery to uveitis onset, unilateral vs bilateral, location of uveitis and positive labwork or UBM.

**Results:** There were a total of 31 patients that met the non-infectious uveitis following surgery criteria. 9/31 (29%) were male, 22/31 (71%) were female. Mean age at presentation was 58.6 years (range 47 – 92 years old). Time from surgery to uveitis onset ranged from within weeks (during steroid taper) to 10+ years. Location of uveitis was anterior in 30/31 (96.8%) and posterior in 1/31 (3.2%). In 21/31 (68%) the uveitis involved just the surgical eye and 10/31 (32%) were bilateral. 15/31 (48%) were idiopathic, of the remaining patients: 6/31 (19%) were due to lens position, 3/31 (9.6%) were ANA positive, 3/31 (9.6%) were RF positive, 3/31 (9.6%) were HLA-B27 positive, 1/31 (3.2%) was ANCA positive, 1/31 (3.2%) was biopsy proven Sarcoid, 1/31 (3.2%) was due to retained cortex.

**Conclusion:** This study examined common causes for new-onset non-infectious uveitis following cataract surgery. While approximately half of the cases were idiopathic, the other half were found to have a diagnosed etiology. These are important to consider when evaluating these patients as the treatment approach is very different from one cause to another. These results will help ophthalmologists be aware of some of the common non-infectious causes of uveitis following cataract surgery.
In Vivo Dimensions of Schlemm’s Canal and Number of Collector Channels in the Nasal and Temporal Areas of Normal Eyes

Wendy Kirkland, MD,1 Sung Chul Park, MD,1,2 Rafael L. Furlanetto, MD,1 Camila F. Netto, MD,1 Yiyi Liu, BA/BS,1,3 Jeffrey M. Liebmann, MD,1,4 Robert Ritch, MD1,2

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Purpose: To determine if differences exist in the dimensions of Schlemm’s canal (SC) and the number of collector channels (CCs) between the nasal and temporal areas of normal eyes using in vivo enhanced depth imaging optical coherence tomography (EDI OCT).

Methods: Serial horizontal EDI OCT B-scans were obtained in the nasal and temporal limbal areas from one eye of each normal subject (81 scans per 15x5 degree rectangle; interval between scans, ~35 μm; Fig A and B). The cross-sectional area of SC was measured in each EDI OCT B-scan (Fig C). After three-dimensional SC reconstruction, SC volume was calculated for the nasal and temporal areas. The CCs connected to the SC (Fig D) were counted in these areas. SC measurements and CC counting were performed by an independent observer, who was masked to the clinical information of the examined eyes.

Results: Eleven normal eyes (11 subjects; mean age, 28±5 years) were included. The cross-sectional area of SC varied considerably within (mean of coefficients of variation of all eyes = 36%) and among the eyes (coefficient of variation of means of all eyes = 35%) (Fig E). The mean cross-sectional SC area was significantly greater nasally than temporally (3837±1397 μm² vs. 3188±1204 μm²; p=0.034; Fig F), as was the SC volume (0.011±0.004 mm³ vs. 0.009±0.003 mm³; p=0.034). The SC cross-sectional area and volume were greater temporally than nasally in only one eye. The number of the CCs was significantly greater nasally than temporally (7.5±1.7 vs. 5.5±2.0; p=0.004; Fig G).

Conclusions: SC is larger with more CCs nasally than temporally in normal eyes. This may have important implications for the development of treatments that target the trabecular outflow pathway.

Figure caption: (A) 15x5 degree rectangle for 81 serial horizontal EDI OCT B-scans. (B) A horizontal EDI OCT B-scan of the limbus and sclera (red arrow = Schlemm’s canal [SC]). (C) SC was delineated (red dotted line) to measure its cross-sectional area. (D) Yellow arrows = collector channel. (E) Box-and-whisker plot for the SC cross-sectional area in 11 normal eyes (error bar = minimum and maximum values). (F and G) Mean SC area and the number of collector channels in 11 normal eyes.
Pachychoroid Pigment Epitheliopathy

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Purpose: To report nine cases of pachychoroid pigment epitheliopathy (PPE).

Methods: An observational case series of nine patients who underwent comprehensive ophthalmic examination, fundus photography, fundus autofluorescence (FAF), spectral-domain optical coherence tomography (OCT), and enhanced-depth imaging OCT (EDI-OCT).

Results: Eighteen eyes of 9 patients, age 27-89 years, were diagnosed with PPE based on a characteristic funduscopic appearance of reduced fundus tessellation with overlying retinal pigment epithelial (RPE) changes in one or both eyes, FAF abnormalities and increased subfoveal choroidal thickness confirmed by EDI-OCT (mean 460.2 microns). The five older patients had been previously diagnosed with age-related macular degeneration (AMD), while the four younger subjects were referred for possible inflammatory chorioretinitis, pattern dystrophy, or nonspecific drusen. No subjects had a history of, or subsequently developed subretinal fluid (SRF).

Conclusion: PPE falls within a spectrum of diseases associated with choroidal thickening that includes central serous chorioretinopathy and polypoidal choroidal vasculopathy and should be suspected in eyes with a characteristic fundus appearance related to choroidal thickening and associated RPE abnormalities, but no history of SRF. EDI-OCT confirming an abnormally thick choroid and characteristic RPE changes on FAF support the diagnosis. As these patients are frequently misdiagnosed, the recognition of PPE may avoid unnecessary diagnostic testing and interventions.
Use of Artificial Tears vs Cold Compresses for the Treatment of Dry Eye

Andrew A. Kao MD, Robert Latkany MD

**Purpose:** The purpose of this study is to compare the use of artificial tears and cool compresses for the treatment of dry eye syndrome.

**Methods:** A total of 15 consecutive patients with dry eye were enrolled. 11 completed the study. Symptoms were evaluated using the Ocular Surface Disease Index (OSDI) score. The level of meibomian gland dysfunction (MGD), punctate epithelial erosions (PEE), and tear break-up time (TBUT) were recorded. The patients were randomized to two groups. One was instructed to use artificial tears 3 times per day for one month, then switch to cold compresses, 3 times a day for 30 seconds at a time, for one month. The OSDI score and clinical examination were re-evaluated at one and two month follow-up visits. The second group was given the same instructions, except that they started with cold compresses for the first month and switched to artificial tears for the second month.

**Results:** A majority of the patients (7/11) preferred cold compresses to artificial tears.

**Conclusions:** Cold compresses may be a viable alternative to artificial tears for dry eye. Additionally, they are a more natural and less expensive alternative to medications.
Review of pars plana vitrectomy with silicone oil for endophthalmitis

Anu Patel, MD and Ronald Gentile, MD

**Purpose:** The purpose of this study was to perform a literature review of cases of endophthalmitis treated with pars plana vitrectomy and silicone oil tamponade in response to a recently published article “Pars plana vitrectomy with or without silicone oil endotamponade in surgical management of endophthalmitis.”

**Methods:** A pubmed literature search was performed to locate all articles published in English regarding cases of endophthalmitis treated with pars plana vitrectomy and silicone oil tamponade.

**Results:** 5 articles regarding surgical technique were reviewed. 3 of the studies were retrospective and 2 were prospective. Most patients included had HM or LP vision. Each study had a unique approach to the management of endophthalmitis including surgical technique, pre-operative tap and injection, classification (post-operative versus post traumatic), and intraoperative use of antibiotics. Patients were evaluated for their final visual outcome, need for further surgery, and incidence of post-operative retinal detachment retinal detachment. Visual acuity improved in many patients although patients with an initial acuity of HM, LP, or NLP were more likely to remain the same or worsen Excluding 1 study, which only included eyes with retinal detachment, the rate of postoperative retinal detachment ranged from 5.7% to 25%.

**Conclusions:** Severe endophthalmitis has a poor prognosis in many cases. There are many different surgical techniques that may be beneficial in trying to eradicate infection and prevent future retinal complications. The Endophthalmitis Vitrectomy Study specifically addressed patients with acute post-operative endophthalmitis treated with a core vitrectomy and broad-spectrum intravitreal antibiotics. In other cases of severe endophthalmitis, retinal surgeons should utilize all of the tools and techniques available on a case-by-case basis. Further prospective study is warranted to compare a more limited vitrectomy with intravitreal antibiotics compared to a more aggressive approach with full vitrectomy and silicone oil in select cases.
Transcriptional Regulatory Network Analysis of Uveal Melanoma

Ronald Tongbai, M.D.

Purpose: Uveal melanoma is the most common form of intraocular melanoma in adults and metastasis to the liver and lungs is associated with a worse prognosis. A study by Onken et al utilized microarrays to characterize the gene expression profiles of tumors which metastasized and compared them with the gene expression profiles of tumors which did not metastasize. The study identified specific genetic signatures which discriminated between tumors that do and do not metastasize. The study provides an important insight into the molecular pathways and biological processes that govern the establishment and growth of these metastases.

Methods: Promoter region sequences from a 600 bp region (-500 bp upstream to +100 bp downstream) were obtained for each gene in each of the gene lists using the ProSpector free web-based promoter annotation tool (4). The promoter regions of each of the gene signatures were analyzed for matches to approximately 300 position weight matrices (TFBS) using the MatInspector module of the GEMS Launcher 4.1 (Genomatix, Munich, Germany).

Results: A regulatory profile was generated based on the methods described above. Each of the gene lists were analyzed to generate p-values representing the degree of statistical enrichment for each of the approximately 300 TFBS in the promoter regions of these genes as described in the methods.

Conclusions: These results provide an important insight into the cell biology that governs the regulatory networks involved in uveal melanoma. Transcription factors implicated in the cell biology of uveal melanoma include AP2, ATF, and MapK/ERK.
Management and Outcomes of Bilateral Simultaneous Rhegmatogenous Retinal Detachments

Mitul C. Mehta, Robert A. Sisk, Christopher D. Riemann

**Purpose:** To describe a series of patients with bilateral simultaneous rhegmatogenous retinal detachment (BSRRD), and their surgical management.

**Methods:** IRB approved, retrospective chart review of all adult patients who presented to the Cincinnati Eye Institute with BSRRD between 1989 to 2006 requiring surgical management without prior retinal detachment (RD) or history of ruptured globe. Thirty-three patients (66 eyes) met the inclusion criteria and underwent surgical repair. Eyes amenable to laser treatment alone were excluded. Snellen visual acuity was converted to LogMAR for statistical analysis.

**Results:** There were 12 patients (with 24 eyes) who were younger than 40 years old, 11 of those 24 eyes (46\%) had atrophic holes as cause of RD, 20 of 24 had lattice degeneration, 22 of 24 had no posterior vitreous detachment (PVD) at presentation. In the 42 eyes of patients over 40 years of age, 20 of them had retinal tears as the cause of the detachment. Of our 33 patients, 15 had both maculae spared, 8 had both maculae involved in the detachment, and 10 had one eye in which the RD involved the macula and one eye did not. We achieved primary anatomical reattachment in 97\% of eyes. Eight eyes had recurrent detachment, 6 (9.1\%) of which required reoperation. There was a statistically insignificant difference in the postoperative visual acuity between the first and second operated eyes (0.18 1\textsuperscript{st} eye, 0.45 2\textsuperscript{nd} eye with p = 0.059).

**Conclusions:** RD in the absence of a specific initiating event may represent a less progressive process, in contrast to the rapid progression of RD resulting from an acute PVD. In the absence of PVD and in eyes with evidence of chronicity to the RD, RD progressed slowly and allowed repair of the eye with the detached macula first without further visual compromise to the second eye. This may warrant a change in the paradigm of surgical management of BSRRD.
Refractive State, Axial Length, and Choroidal Thickness in Central Serous Chorioretinopathy

Gaetano R Barile, Andrew B Nightingale, Luna Xu

Purpose: To investigate relationships between choroidal thickness, axial length, and refractive state in eyes with central serous chorioretinopathy (CSC).

Design: Prospective, case-control study

Methods: A complete ophthalmic examination including axial length evaluation, cycloplegic refraction, and measurement of choroidal thickness using enhanced depth imaging spectral domain optical coherence tomography was performed on 42 consecutive subjects with CSC and 34 healthy controls. The relationships between choroidal thickness, axial length, and refractive state were analyzed using a mixed effects model.

Results: Subjects with CSC had mean age of 54.0 ± 12.8 years, and controls had mean age 52.3 ± 17.4 years. Eyes with CSC were more hyperopic (62 eyes, mean spherical equivalent +1.24 D) than control eyes (68 eyes, mean +0.09 D; p < 0.01). Eyes with CSC had a shorter mean axial length (23.06 ± 1.13 mm) compared to controls (23.84 ± 0.89 mm, p < 0.01). The mean choroidal thickness was 437 ± 87 μm in the CSC group and 284 ± 69 μm in the control group (p < 0.0001). In patients with one eye affected by CSC, the fellow eye had similar choroidal thickness, axial length, and refractive state as the affected eye.

Conclusions: Eyes with CSC exhibit a significantly thicker choroid, and many eyes have a shorter axial length with a higher incidence of hyperopia. The uninvolved fellow eye of patients with unilateral CSC has a similar profile compared to the affected eye, consistent with an anatomic predisposition to developing bilateral disease in CSC.
Visual and anatomic outcomes of surgical repair of macular holes at the New York Eye and Ear Infirmary

Julia Mathew Padiyedathu, Anna Gabrielian

**Purpose:** The evaluation of anatomic and visual outcomes in macular hole cases treated surgically at the New York Eye and Ear Infirmary from 2006 to 2012.

**Methods:** 14 eyes of 13 patients with the diagnosis of macular hole who underwent pars plana vitrectomy with at least 6 months of follow-up were included in this retrospective clinical study. Pre- and postoperative macular assessment was conducted with spectral-domain optical coherence tomography.

**Results:** The mean age was 62 years. 3/14 eyes (22%) had a prior history of unsuccessful MH repair. 10/14 (71%) eyes were phakic at the time of surgery. All patients underwent PPV, 13/14 (93%) had membrane peel, 12/14 (86%) had intraocular gas tamponade. 10/14 (71%) eyes had improvement of BCVA following surgical repair of MH. In 3/14 eyes (22%), the macular hole remained open following surgery. 2/3 of those cases were eyes undergoing re-operation for a prior unsuccessful MH repair.

**Conclusions:** Closure of macular holes is achieved after vitrectomy. Surgical repair of macular holes leads to an improvement of vision in the majority of cases. Prior unsuccessful surgical repair of macular hole is associated with failure to achieve macular hole closure.
Adaptive Optics Imaging of Photoreceptors following Repair of Rhegmatogenous Retinal Detachment

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Study Group:
Commercial Relationship(s) Disclosure:

Purpose: Patients with macula-off rhegmatogenous retinal detachments can have poor visual recovery or metamorphopsia despite successful retinal reattachment. Subtle changes in the foveal structure, causing such visual disturbances, can be difficult to identify with standard examination and imaging tools. Adaptive Optics (AO) allows in vivo imaging of individual photoreceptors. Using an AO camera, we present the foveal photoreceptor appearance following repair of macula-off retinal detachments. AO images were compared with infrared and OCT imaging. Visual acuity and microperimetry were obtained for functional correlation.

Methods: Three patients who underwent anatomically successful repair of rhegmatogenous macula-off retinal detachments were evaluated with AO following reattachment surgery. AO videos were recorded using a 790 nm light source and 1 degree field of view. Motion contrast images from several videos were used to create montages with a 2.5 degree field of view centered around the foveal pit. Montages from the affected eye were compared with corresponding montages from the never detached eye. Spectralis infrared imaging (870 nm), Spectralis HRA+OCT, visual acuity and microperimetry were also obtained.

Results: In reattached retina, mottling of the macula with infrared imaging (Fig 1A) and hyporeflectivity of the foveal IS/OS junction on HRA+OCT (Fig 1B) corresponded to patchy disruption of the foveal photoreceptor mosaic with AO imaging (Fig 1C). These findings were associated with decreased visual acuity and depressed sensitivity on microperimetry (Fig 2).
Conclusions: AO imaging of repaired macula-off retinal detachments demonstrated disruptions of the photoreceptor mosaic in regions of abnormal fundus infrared signal, an irregular IS/OS junction and reduced visual function. Further AO studies will help us better understand microstructural and pathophysiological changes following retinal detachment repair.

Figure 1: A) Infrared imaging of 43-year-old woman six weeks following successful anatomical repair of a macula-off rhegmatogenous retinal detachment. B) HRA-OCT of the fovea. Red arrows indicate hyporeflective skip regions in the IS/OS junction. C) AO imaging of foveal photoreceptors showing several black patches interrupting the photoreceptor mosaic.

Figure 2: Microrperimetry corresponding to Figure 1 showing several areas of depressed sensitivity within the macula.
CURRENT REVIEWING CODE: 210 imaging: adaptive optics - VI
KEYWORDS: 697 retinal detachment, 648 photoreceptors, 550 imaging/image analysis: clinical.
Clinical Trial
Registration: No
Other Registry Site:
Registration Number:
Date Trial Began (MM/DD/YYYY):
Date Trial was Registered (MM/DD/YYYY): Newsworthy: No
Newsworthy Audience:
Grant Support:
Yes
Support Detail: Marrus Family Foundation, Bendheim-Lowenstein Family Foundation, Wise Family Foundation, Chairman's Research Fund of the New York Eye and Ear Infirmary
Affirmations: Affirmation to pay Annual Meeting's full registration fee. Affirmation to present same work as abstract submission.
Affirmation that abstract data/conclusions have not been published; not redundant with other submissions from same investigators.
Affirmation to reveal essential structure, novel compound elements, or identify new gene compounds. Affirmation of copyright transfer from each author to ARVO, or certification of public domain abstract. Affirmation of compliance with ARVO's Statement for Use of Animals and/or Declaration of Helsinki. Affirmation of compliance with ARVO policy on registering clinical trials.

AWARDS:
Neural Canal Crowding at the Lamina Cribrosa in Non-arthritic Ischemic Optic Neuropathy (NAION)

Kevin Rosenberg, M.D.

**Purpose:** To compare neural canal dimensions at the optic nerve head in NAION vs. normal subjects using enhanced depth imaging optical coherence tomography (EDI OCT).

**Methods:** Horizontal and vertical diameters of the optic disc, Bruch's membrane opening, lamina cribrosa, and narrowest neural canal opening were compared between NAION patients and normal subjects.

**Results:** 42 eyes from patients with NAION and 43 eyes from normal subjects were included. Mean horizontal and vertical diameters of the lamina cribrosa were significantly smaller in the NAION group compared to those in the normal group, both before and after controlling for age and gender (P<0.001), as well as axial length.

**Conclusions:** Neural canal crowding at the lamina cribrosa may predispose to and play a role in NAION.
Choroidal Thickness and Intraocular Pressure Using EDI-OCT

Seebruck CJ, Gentile R, & Rosen R

**Purpose:** To investigate and compare choroidal thickness in eyes before and after intravitreal bevacizumab injections and to correlate choroidal thickness with intraocular pressure.

**Design:** Prospective case series.

**Methods:** Volunteers receiving an intravitreal bevacizumab injection at NYEE for any indication were recruited for evaluation of choroidal thickness before and after injections on the same day. Volunteers were imaged through undilated pupils with the Heidelberg Spectralis. Within 5 minutes prior to performing EDI-OCT imaging intraocular pressure was performed with a Goldmann applanation tonometer. Within 5 minutes after performing intravitreal injection EDI-OCT imaging and IOP check were repeated. All patients with IOP greater than 30mmHg received additional IOP checks and EDI-OCT every 30min until IOP was less than 30mmHg. Choroidal thickness was measured using enhanced-depth imaging optical coherence tomography using the method described by Spaide et al. 2009. Subfoveal choroidal thickness was measured by the vertical distance of the foveal center from Bruch’s membrane to the innermost scleral layer. A Pearson correlation was calculated for variation in choroidal thickness relative to intraocular pressure.

**Results:** Of the 20 volunteer eyes receiving intravitreal injection of 0.05cc of 1.25mg Bevacizumab, 11 met the criteria for inclusion based on EDI-OCT image quality. The most common indication for intravitreal injection of Bevacizumab was CSME or CNV. The Average pre-injection intraocular pressure (IOP) was 19mm Hg SD 3.7 and the average immediate post injection IOP was 36.7mm Hg SD 15.0. The average pre injection subfoveal choroidal thickness was 252 μm and the average post injection subfoveal choroidal thickness was 238 μm, a difference of -13.8 μm SD 7.7. Of the 11 eyes receiving IV Bevacizumab, 8 eyes had an IOP greater than 30mmHg immediately after injection. The average pre-injection subfoveal choroidal thickness of these 8 eyes was 262.6μm and the average 30 min post-injection subfoveal choroidal thickness was 262.3μm with a final IOP average of 20.8 mmHg. The Pearson correlation r-squared value of IOP and choroidal thickness was 0.809.

**Conclusions:** There was a high correlation between elevation of IOP following injection of 0.05cc of 1.25mg Bevacizumab and decreased subfoveal choroidal thickness. This decrease in subfoveal choroidal thickness was reversed after normalization of IOP.
Validity and Acceptance of Color Vision Testing on Smartphones

Omar K. Ozgur, MD, Rudrani Banik, MD

Color vision testing (CVT) is an important part of the standard ophthalmic exam. Several properties may affect the validity of CVT including the quality of the printed or displayed image, the distance of the image, and the patient’s visual acuity. Smartphone applications such as the Eye Handbook (Copyright © 2009 Cloud Nine Development LLC) provide CVT for smartphones; however, there is minimal evidence to support the validity of these non-standardized tools. In order to validate smartphone color vision testing, more testing is needed, especially in patients with congenital and acquired color vision deficits.

**Purpose:** To assess the validity and patient acceptance of iPhone® and Android® based smartphone color vision testing by comparing results using the Eye Handbook (EHB) color plate application to standard pseudoisochromatic Ishihara color plates (ICP).

**Methods:** The authors perform a prospective study looking at both male and female patients between the ages of 18-70 with a near visual acuity of 20/60 or better at 14 inches. The control group includes patients with no ocular pathology or color vision deficits. The study group includes patients with ocular pathology and possible color vision deficits. In both groups, the right eye is designated as the study eye and the left eye the non-study eye. CVT is performed under a standardized background illuminance for both testing strategies. The order of testing is randomized, i.e. ICP or EHB.

**Results:** 89% of patients had no difference between testing modalities, and 11% had a difference of 1 plate, performing better on EHB. 67% preferred EHB, 11% preferred ICP, and 22% had no preference.

**Conclusion:** In our study, CVT results were similar between the EHB and ICP, though there was a patient preference for EHB testing.
Proposed Diagnostic Criteria for IgG4-Related Orbital Disease

Kateki Vinod, MD, PI Tatyana Milman, MD

**Purpose:** The purpose of this study is to establish diagnostic criteria for IgG4-related orbital disease. These diagnostic criteria will incorporate clinical, serologic, histopathologic, and radiologic features in patients with IgG4-positive immunostaining of orbital biopsies.

**Methods:** This study will have prospective and retrospective arms. Inclusion criteria include patients between the ages of 18-90 who have been diagnosed with any inflammatory or lymphoproliferative disorder of the orbit and who have undergone orbital biopsy and laboratory studies within 4 weeks of systemic therapy. Exclusion criteria include insufficient data, and treatment with corticosteroids or other immunosuppressive agents for greater than 4 weeks at the time of recruitment. A total of 50 patients will be recruited. Data to be collected for each subject at the time of presentation will be clinical (demographic, history, ophthalmic and systemic examination), histopathologic (immunostaining for IgG and IgG4 and a limited immunohistochemical lymphoma panel assessed in a masked fashion by 2 ophthalmic pathologists), serologic (serum total IgG and IgG4), and radiologic (chest X-rays, orbital CT scans and MRIs). Type and duration of treatment will be recorded. Follow-up data will be collected at the 1, 3, 6, 12, 24, and 36 month intervals following initial presentation. These will include serology, and ophthalmologic examination with particular attention to changes in symptoms and signs, and recurrence of disease. If repeat biopsy or imaging is performed, this will be reviewed as well.

**Outcomes:** Patients will be classified as follows: 1) *IgG4 positive:* greater than 10 IgG4-positive plasma cells per high-power field or an IgG4:IgG ratio of 30% or greater in the tissue AND a serum IgG4 greater than 135 mg/dL; 2) *IgG4 intermediate:* patients who meet either histopathologic or serologic criteria; 3) *IgG4 negative:* patients who do not meet any of the criteria. This preliminary diagnostic algorithm will be reassessed and redefined with the goal of establishing diagnostic criteria that would yield the greatest sensitivity and specificity in diagnosing orbital IgG4-RD.

**Conclusions:** This clinical trial has been approved by the Institutional Review Board and is ongoing.
Characteristics of patients who attain remission of inflammatory eye disease following treatment and discontinuation of methotrexate

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Purpose: Immunomodulatory therapy (IMT) is becoming an increasingly used treatment for inflammatory eye disease. This study investigated the clinical course of patients with inflammatory eye diseases who were treated with methotrexate (MTX), obtained remission and were subsequently followed after discontinuation of the medication. The purpose of the study was to determine the characteristics of patients who stay in remission versus develop recurrences.

Methods: A retrospective chart review was conducted on a cohort of 45 patients initiating MTX in 2004 with inflammatory eye disease treated with MTX at a tertiary care center. Patients who were treated with MTX until their inflammatory eye disease was inactive were reviewed until follow up at two years following the discontinuation of MTX for recurrence. Factors examined included age, sex, length of MTX treatment and concurrent or serial use of other IMT.

Results: 69% of the patients reviewed were female; 31% were male. Average age of patients was 42 years old (range 4-73). Average length of MTX treatment was 2.0 years (range 0.3 to 5.9). 40% of patients, who were treated with MTX and attained remission, remained in remission; 60% developed recurrence. Average time to recurrence in the recurrence group was 0.55 years (range 0.5-1.9). 16% of patients were treated with concurrent or serial IMT. There was no difference (p=0.52) between the average age of patients who attained remission at two years (39 years old, range 4-73) and who developed recurrent disease within two years (44 years old, range 6-72). 43% of male patients and 39% of female patients attained remission at two years with no difference between groups (p=0.79). There was no difference (p=0.86) in average length of methotrexate treatment in patients who attained remission at two years (2.04 years, range 0.8-5.9) and who developed recurrent disease within two years (1.98 years, range 0.3-4.4). Patients treated with MTX for >1 year were more likely to achieve remission (46%) than those treated for <1 year (20%) at two years, but these results did not reach statistical significance (p=0.14). 43% of patients on concurrent or serial use of other IMT and 57% of patients on methotrexate alone attained remission at two years with no difference between groups (p=0.50).

Conclusions: There is currently no data to suggest how long MTX treatment should be continued for inflammatory eye disease after patients attain remission. This study found that patients treated with MTX for >1 year were more likely to achieve remission (46%) than those treated for <1 year (20%) at two years, but these results did not reach statistical significance likely due to small sample size. There was no association between mean length of MTX treatment and remission or recurrence of disease. Age, sex, concurrent or serial use of other IMT were also not associated with remission or recurrence. These results may help ophthalmologists in their treatment and counseling of patients with inflammatory eye disease.
In Vivo Evaluation of Peripheral Laminar Deformation in Glaucoma Using EDI OCT and Algorithms for Shadow Removal and Contrast Enhancement

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Purpose: The peripheral lamina cribrosa (LC) is often invisible on optical coherence tomography (OCT) imaging. We characterized the peripheral laminar deformation in glaucoma in vivo quantitatively and qualitatively using OCT images of improved quality for the LC.

Methods: Serial horizontal and vertical enhanced depth imaging (EDI) OCT optic nerve head scans (interval between scans ~30 μm) were prospectively obtained for glaucoma patients and healthy subjects. All EDI OCT images were enhanced further using algorithms for shadow removal and contrast enhancement [reference #1]. For one eye of each subject, the anterior LC insertion depth was measured at 3 points in each quadrant (reference plane: Bruch’s membrane opening) (Fig A and B). The mean LC insertion depth in each quadrant was compared between the two groups. Anterior laminar surface shape in the LC insertion area was compared between the two groups.

Results: 52 patients with glaucoma (mean age, 68±11 years; mean visual field mean deviation, -16.2±3.1 dB) and 50 healthy subjects (mean age, 60±11 years) were included. The mean anterior LC insertion depth was significantly greater in the glaucoma group in the superior and inferior quadrants (p=0.027 and p<0.001, respectively), but not in the nasal and temporal quadrants (p>0.3) (Fig C). In all healthy eyes and 19/52 glaucomatous eyes, the anterior laminar surface assumed a slightly upward sloping or a flat shape toward the insertion point. In 33/52 glaucomatous eyes, the anterior laminar surface in the insertion area assumed a wedge, step or bayonet shape focally (Fig D-I), which appeared to evolve into laminar disinsertion with various shapes as glaucoma advances (Fig J-M).

Discussion: The superior and inferior LC insertion regions were posteriorly displaced in glaucoma. In focal areas of the peripheral LC, the anterior laminar surface assumed characteristic deformation patterns.

Conclusions: Characteristic peripheral laminar deformation may be used for detecting or monitoring glaucomatous optic nerve head damage.

References:
Spatial Relationship between Bruch’s Membrane Opening and Lamina Cribrosa Determines Optic Disc Tilting

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Purpose: To investigate the association between tilted disc geometry and location of the lamina cribrosa (LC) relative to Bruch’s membrane opening (BMO).

Methods: Normal subjects with axial length less than 26.5 mm were recruited. Serial horizontal and vertical enhanced depth imaging optical coherence tomography (EDI OCT) B-scans of the optic nerve head (interval between scans, ~30 μm) were obtained for one eye of normal subjects. After reconstructing a 3-dimensional image of BMO and the anterior LC insertion points, the distance between the centroids of BMO and the LC was measured (Fig A). The direction of lateral LC displacement from BMO was measured as an angle (θ₁) between the line connecting the two centroids and temporal horizontal line (Fig B). Disc ovality index (longest disc diameter/shortest disc diameter) was measured using infrared disc photographs. The direction of disc tilting was measured as an angle (θ₂) between the axis of shortest disc diameter and the temporal horizontal line (Fig C).

Results: 23 normal eyes (23 subjects) were included (mean age, 42±15 years). Mean distance between the centroids of BMO and the LC was 222±93 (range, 70 to 368) μm. Mean disc ovality index was 1.14±0.08 (range: 1.00 to 1.28) mm. The distance between the two centroids was significantly correlated with the disc ovality index (p<0.001, R=0.739; Fig D). The direction of lateral LC displacement from BMO (θ₁) was also significantly correlated with the direction of disc tilting (θ₂) (p<0.001, R=0.896; Fig E).

Conclusions: Lateral displacement of the LC from BMO underlies optic disc tilting. The severity and direction of lateral LC displacement from BMO determines the severity and direction of optic disc tilting.
Artifacts in Retinal Nerve Fiber Layer Thickness Measurement Using Spectral Domain Optical Coherence Tomography (SD-OCT)

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Purpose: RNFL thickness measurement using SD-OCT is becoming increasingly important for glaucoma evaluation. Other than scan circle misplacement and low signal strength, artifacts related to co-existing posterior segment pathologies remain largely unexplored. In this study, we aimed to determine the types of SD-OCT retinal nerve fiber layer (RNFL) thickness measurement artifacts.

Methods: RNFL scan data (raw RNFL images, RNFL segmentation images and RNFL thickness profiles) were reviewed for artifacts in 436 eyes (218 glaucoma patients).

Results: RNFL thickness was falsely overestimated in eyes with retinoschisis/subretinal fluid (7 eyes), vitreous traction (16 eyes), epiretinal membrane (14 eyes), or thick posterior hyaloid membrane (1 eye) and underestimated when the scan circle intersected beta-zone parapapillary atrophy (15 eyes). Scan circle misplacement (13 eyes), cut-off scans (7 eyes), upside-down scans (2 eyes) and poor-quality scans (43 eyes) also caused erroneous RNFL thickness results.

Conclusion: SD-OCT RNFL thickness measurement can be affected by the presence of ocular co-morbidities or technical problems during image acquisition, leading to locally or generally erroneous RNFL thickness results, and can be uncovered by review of the raw RNFL images and RNFL segmentation images. Understanding artifacts can help avoid or rectify them. Raw RNFL data should routinely be analyzed to detect and correct for artifacts.
Emergency Ophthalmic Care in the Disaster Setting: A Survey of Urgent Care Visits at the New York Eye and Ear Infirmary During Hurricane Sandy

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Purpose: To investigate the diagnoses encountered in ophthalmology urgent care visits during a five day period at the height of Hurricane Sandy in New York City.

Methods: Retrospective review of medical records of all patients seen in ophthalmology urgent care during the week of 10/29/12-11/02/12. Information on demographics and diagnoses were recorded on 49 patients that visited ophthalmology urgent care at New York Eye and Ear Infirmary during this week.

Results: Of the 49 patients that were seen, 31 were female and 18 were male. Age ranged from 16-86 with a mean age of 49.8. The most common diagnosis encountered was trauma in 26% of patients. Corneal abrasions were the most common type of trauma. Retina related diagnoses were seen in 18.3% of patients. Infections accounted for 14.2% of all diagnoses. Acute conjunctivitis was the most frequent infection. Inflammatory diagnoses were made in 14.2% of patients. Glaucoma related diagnoses were seen in 8% of patients. Miscellaneous diagnoses comprised 18.3% of all visits.

Conclusion: This study describes the typical types of patients and eye problems that ophthalmologists may expect to encounter during natural disasters in a major metropolitan setting. During Hurricane Sandy a wide range of patients were seen at the New York Eye and Ear Infirmary ophthalmology urgent care department. Corneal abrasion related to trauma was the most common diagnosis seen during this week.
Structure-Function Relationship in Optic Nerve Head Drusen

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Purpose: To assess the relationship between optic nerve head drusen (ONHD) and retinal nerve fiber layer (RNFL) or visual field (VF) loss.

Methods: Patients with ultrasound B-scan positive ONHD and no other ocular or systemic disease that could affect RNFL or VF were recruited. Each participant had standard automated perimetry (SAP; 24-2 SITA-standard, Humphrey Field Analyzer), circumpapillary RNFL thickness measurement using optical coherence tomography (OCT), and serial enhanced depth imaging (EDI) OCT of the optic nerve head (interval between scans, ~30 μm). After delineating the ONHD mass in each EDI OCT scan, 3-dimensional images were created and ONHD volume was calculated for each eye. ONHD volume, RNFL thickness and VF sensitivity were correlated.

Results: 37 eyes with ONHD (23 patients; mean age = 58±15 years) were included. Mean ONHD volume, VF mean deviation (MD), and RNFL thickness were 0.242±0.232 (range, 0.005 to 0.855) mm³, -4.5±4.6 (range, -17.0 to -0.1) dB and 76±19 (range, 42 to 113) μm, respectively. ONHD were most prevalent in the nasal quadrant (36 eyes, 97%), followed by superior, inferior and temporal quadrants (33 [89%], 28 [76%], and 15 [41%] eyes). Twenty-two (59%) eyes had VF defects and 32 (86%) had focal or diffuse RNFL defects. ONHD volume had a moderate correlation with average RNFL thickness (p<0.001, R=-0.677; Fig A) and VF MD (p<0.001, R=-0.739; Fig B). Nineteen eyes had abnormal and asymmetric VF (mean VF sensitivity difference between hemifields > 1 dB). Among these 19 eyes, VF sensitivity was worse in the hemifield corresponding to the ONH side (superior vs. inferior half) with larger ONHD in 12 eyes (p=0.153, Cramér’s correlation coefficient V = 0.328), whereas RNFL was thinner in the same ONH side as larger ONHD in 14 eyes (p=0.027, Cramér’s V = 0.452).

Conclusions: ONHD mass is formed before detectable RNFL or VF loss. ONHD volume had a moderate correlation with RNFL thickness and VF MD. ONHD had a significant spatial correlation with RNFL, but not with SAP, probably because ONHD occur preferably in the nasal quadrant (Fig C-G).

Figure caption: (A) Relationship between ONHD volume and RNFL thickness. (B) Relationship between ONHD volume and VF MD. (C) White dotted arrow = location of EDI OCT scans (F). (D) Reconstructed ONHD mass (red and blue dots = Bruch’s membrane edges). (E) RNFL thickness sector map. (F) Red dotted circle = ONHD mass. (G) 24-2 Humphrey SITA-standard VF.
Tumor Necrosis Factor-α (TNF-α) Inhibitors in the Treatment of Pediatric Noninfectious Uveitis


Objectives: To evaluate the outcome of TNF-alpha inhibitors in the treatment of pediatric noninfectious uveitis.

Methods: We retrospectively reviewed the charts of children (≤18 years) with noninfectious uveitis who received TNF-α inhibitors at five tertiary uveitis referral centers and one pediatric-rheumatology center. Incident treatment success was defined as minimal or no uveitis activity at ≥2 consecutive eye exams ≥28 days apart while being on no oral and ≤2 drops of topical corticosteroids daily. All eligible children had active uveitis and/or were taking high-dose systemic corticosteroids.

Results: Among the 56 eligible children followed over 33.73 person-years, 52% had juvenile idiopathic arthritis (JIA) and 75% had anterior uveitis (AU). The Kaplan-Meier estimated that the proportion achieving treatment success within 12 months to be 75% (95% confidence interval [95% CI]: 62-87%). Complete absence of inflammatory signs with discontinuation of all corticosteroids was observed in an estimated 64% of the patients by 12 months (95% CI: 51-76%). Diagnoses of JIA or AU were associated with greater likelihood of success, as was the oligoarticular subtype amongst JIA cases. In a multivariable analysis, compared to those with JIA-associated AU, those with neither or with JIA or AU alone had a 75-80% lower rate of achieving quiescence with TNF-α inhibitors, independent of the number of immunomodulators previously or concomitantly prescribed. Uveitis recurred within 12 months of quiescence in 14% of those continuing TNF-α inhibitors (95% CI: 6-31%). The incidence of discontinuation secondary to adverse effects was 8%/year (95% CI: 1-43%).

Conclusion: Treatment with TNF-α inhibitors was successful and sustained in a majority of children with noninfectious uveitis and treatment-limiting drug toxicity was infrequent. JIA-associated AU may be especially responsive to TNF-α inhibitors.
Surgical Management of Diabetic Macular Edema

Apurva K. Patel MD and Ronald C. Gentile MD

**Purpose:** To review the literature on pars plana vitrectomy in the treatment of diabetic macular edema (DME) and develop a classification scheme for vitreomacular interface changes in patients with DME.

**Methods:** Literature review, development of classification scheme.

**Results:** Six small randomized controlled trials have been performed and numerous case series have been reported. The types of eyes included in these studies are heterogeneous which makes it difficult to apply the conclusions of these trials to clinical practice. We suggest classifying patients into one of three major categories: DME with abnormal vitreomacular adhesions and/or proliferation; Post-vitrectomy taut-ILM syndrome; and DME without abnormal vitreomacular adhesions. In the first group, we describe three subtypes: taut hyaloid, vitreomacular and vitreofoveal traction, and vascular or avascular epiretinal membrane.

**Conclusion:** Application of the existing literature on surgical management of DME is limited by heterogeneity in the types of patients studied. Using the proposed classification scheme may help to standardize inclusion criteria in future studies of vitrectomy for DME.
Anterior Segment Optical Coherence Tomography: Assessment of Angle Anatomy Changes after Descemet’s Stripping Automated Endothelial Keratoplasty and Penetrating Keratoplasty

Ambika Hoguet, Alice Hong, Nishit Shah, Trisha Emborgo, Don Lee, David Ritterband, Paul Sidoti

**Purpose:** The purpose of this study to investigate and compare the changes in the morphology of the anterior chamber angle in patients that undergo descemet’s stripping automated endothelial keratoplasty (DSEK) and penetrating keratoplasty (PK) using anterior-segment optical coherence tomography (AS-OCT).

**Setting:** New York Eye and Ear Infirmary.

**Design:** Prospective non-randomized study.

**Methods:** This study comprised patients who underwent either DSEK or PK exclusively. Those patients who underwent a combined procedure or had undergone another ocular procedure in the operative eye within 3 months prior to surgery were excluded from enrolment. The angle opening distance at 500um, trabecular-iris space at 500um and angle recess area at 500um were calculated using AS-OCT. These measurements were taken pre-operatively as well as at post-operatively at week #1, month #1, month #3 and month #6. Intraocular pressure and presence of any focal synechiae were noted at each visit.

**Results:** To date, six patients who underwent DSEK and nine patients who underwent PK with a minimum follow-up data of 1 month post surgery were included in the analysis. There was no significant difference (p>0.05) in pre-operative or post-operative (at post-operative month #1) anterior chamber angle measurements of patients undergoing PK or DSEK. However, measurement of anterior chamber depth showed a trend towards a greater shallowing of the anterior chamber angle in patients who underwent PK (mean 3.908mm pre-operatively vs. 3.279mm postoperatively at month #1) vs. patients undergoing DSEK (mean 3.172mm pre-operatively vs. 3.194mm postoperatively at month#1).

**Conclusion:** The current data shows that there is no significant difference in the anterior chamber angle morphology at POM#1 after DSEK or PK surgery. However, a larger sample size and greater follow-up period is necessary.
Structure and Clinical Significance of Central Optic Disc Pits

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Objective: To assess the structure of central optic disc pits (ODPs) using enhanced-depth imaging optical coherence tomography (EDI OCT) and to ascertain their clinical significance.

Design: Prospective, cross-sectional study.

Participants: Patients with an ophthalmoscopically visible central ODP in either eye, irrespective of accompanying ocular disease, were enrolled from the neuro ophthalmology and glaucoma referral practices. Each subject with a central ODP was matched with 2 healthy subjects with normal-appearing optic disc within 5 years of age.

Methods: Each participant received a complete ophthalmologic examination including standard automated perimetry, retinal nerve fiber layer (RNFL) thickness measurement by OCT, and serial horizontal and vertical cross-sectional EDI OCT of the optic nerve head.

Main Outcome Measures: Structure of the lamina cribrosa (LC) in relation to the central ODP in EDI OCT images.

Results: Eighteen eyes (13 subjects) with a central ODP and 52 healthy eyes (26 controls) were included. Four eyes (2 subjects) with a central ODP were otherwise normal with intact macula, neuroretinal rim, RNFL, and visual field. Fourteen eyes (11 subjects) with a central ODP had glaucoma with glaucomatous neuroretinal rim thinning, RNFL loss, and corresponding visual field defect. No eye had associated maculopathy. On EDI OCT, the central ODP corresponded with a full-thickness defect in the LC center with no serous retinal detachment or herniation of neural tissue through the LC defect. Central ODPs were separated from (type 1) or merged with (type 2) the LC opening for the central retinal vascular trunk. In control eyes, no LC defect was detected.

Conclusions: Central ODPs are full-thickness LC defects unassociated with maculopathy and different from glaucomatous acquired pits of the optic nerve, which represent focal laminar defect adjacent to the disc edge.
Macular Edema, Vascular Non-Perfusion, and Leakage on Ultra Wide-Field Fluorescein Angiography

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Background: The Optos Scanning Ophthalmoscope images 200 degrees of the retina, enhancing the ability to detect retinal ischemia and leakage in the far periphery.

Purpose: The primary purpose of this study is to examine the relationship between cystoid macular edema (CME), central and peripheral ischemia, and leakage on ultra wide-field fluorescein angiography (UWFA). Secondary goals were to evaluate the relationship of past ocular history and correlation of visual acuity and foveal thickness.

Methods: Retrospective case-control study of the UWFA of 133 eyes (77 eyes with CME on optical coherence tomography (OCT) and 56 eyes with retinal ischemia and/or leakage on UWFA but no CME on OCT).

Results: Compared to patients with no evidence of macular edema, patients with CME had 5x more central ischemia, 5x more central leakage, and 2x more peripheral leakage. Diabetics had 2x worse peripheral non-perfusion (p=0.0017) and showed a trend towards worse central ischemia (p=0.0598); uveitis patients with and without CME had similar amounts of vascular leakage (p= 0.0196). For every 0.325µm increase in foveal thickness, there was a 1.00 increase in logMAR visual acuity. However, there was no statistically significant linear relationship between the foveal thickness and the percentage of ischemia or leakage.

Conclusion: Macular edema is more common in eyes with ischemia or leakage in the central 55° of the retina. Diabetics tended to have worse ischemia and leakage than non-diabetics, and increased central foveal thickness was associated with worse visual acuity. UWFA is useful in detecting central and peripheral ischemia and vascular leakage.
Analysis of Post-surgical Astigmatism after Pterygium Removal in Patients without Significant Pre-operative Astigmatism

Garcia, A, Wen A, Ozgur O

Purpose: To analyze post-surgical changes in astigmatism in patients with large pterygia who do not exhibit significant pre-operative astigmatism

Methods: Patients with large pterygia who did not exhibit significant pre-operative astigmatism were identified and enrolled in the study. Inclusion criteria included any patient with pre-operative keratomeric and topographic cylindrical power less than or equal to 1.00 D with horizontal and vertical pterygia extension from the limbus greater than 1.00 and 5.00 mm respectively. Exclusion criteria included any patients with history of ocular surgery, contact lens wear, ocular trauma, and corneal scarring. A prospective analysis was then performed.

Results: Eight patients (4 male, 4 female) were analyzed. The average pterygium size of the patients was 4.2 ± 2.0 mm with an average pre-operative astigmatism of 0.65 ± 0.29 D. All enrolled patients had a pre-operative Va better than 20/30. At post-operative month 3, all patients had visual acuity of 20/25 or better. Average post-operative astigmatism at post-op month 3 was 0.75 ± 0.35.

Conclusions: Post-operative astigmatism following pterygium surgery in patients with large pterygia who do not exhibit significant pre-operative astigmatism tends to be higher than their pre-operative astigmatism; however, this does not appear to have a visually significant effect. Analysis is limited by patient follow-up and low enrollment. Comparison studies of patients with large pterygia and significant pre-operative astigmatism would be of additional benefit.
In vivo imaging of retinal microvascular changes using adaptive optics scanning light ophthalmoscopy

Toco Y Chui, Alexander Pinhas, Michael Dubow, Nishit Shah, Alexander Gan, Richard Rosen

**Purpose:** To study in vivo retinal microvascular changes in patients with diabetic retinopathy and hypertensive retinopathy using adaptive optics scanning light ophthalmoscopy (AOSLO).

**Methods:** 3 subjects (2 diabetics and 1 hypertensive) were imaged using both offset AOSLO and fluorescein AOSLO. Reflectance AOSLO image sequences were obtained using a 790nm infrared light source at 15 Hz frame rate. 2-3 regions of interest were imaged in each subject. Fluorescein AOSLO image sequences were obtained using a 488nm light for excitation and an emission filter centered at 525nm with a 45nm bandwidth.

**Results:** Retinal microvasculature and scattering behavior of the blood content were clearly visualized in all subjects. Remodeled capillaries and microaneurysms were clearly visualized. Blood flow stasis, capillary sprouts, vessel changes, and varying blood flow patterns were found in all patients.

**Conclusions:** AOSLO imaging allows direct assessment of the microvascular structure and blood flow pattern in vivo, which leads to a better understanding of retinal vasculopathies.
In Vivo Imaging of Microvasculature in Normals and Venous Occlusive Disease Using Adaptive Optics Scanning Light Ophthalmoscope Fluorescein Angiography

Alexander Pinhas, Toco Chui, Michael Dubow, Nishit Shah, Alexander Gan, Mitul Mehta Meenakashi Gupta, Patricia Garcia, Richard B Rosen

**Purpose:** To demonstrate the use of oral and intravenous (IV) fluorescein angiography (FA) in combination with an adaptive optics scanning light ophthalmoscope (AOSLO) for in vivo visualization of human retinal microvasculature in normals and venous occlusive disease, and to compare it with the AOSLO reflectance imaging technique.

**Methods:** 10 healthy subjects between ages 20 to 38 years were recruited. The effectiveness of oral and IV fluorescein administration was tested using 7mg/kg and 20 mcg/kg oral fluorescein against 500 mg of IV fluorescein. 3 patients carrying the diagnosis of nonischemic CRVO and 1 patient carrying the diagnosis of BRVO, ages 50 to 65, showing angiopathic change on IV FA and with visual acuity of at least 20/60 in the affected eye were recruited. 20 mcg/kg oral fluorescein mixed in orange juice was administered. During AOSLO imaging, simultaneous reflectance (790 nm) and fluorescence (488 nm) image sequences were acquired and registered. Reflectance and fluorescence registered image averages were used as individual frames or for larger montages. For correlation and comparison with AOSLO images, IV FA and SD-OCT were performed.

**Results:** AOSLO FA registered images revealed details of the retinal microvasculature not visible with conventional FA. Oral fluorescein provided significantly longer fluorescence intensity compared to IV fluorescein, allowing sufficient time for the collection of multiple AOSLO fields throughout the fundus. We were able to resolve capillary beds at different depths, including the radial peripapillary capillary bed. The combination of AOSLO reflectance imaging and AOSLO FA enabled detailed *in vivo* visualization of microangiopathic sequelae common to CRVO and BRVO, including dilated and tortuous vessels, collateral vessels, ghost vessels, capillary dropout and areas of nonperfusion, localized vascular leakage, and various morphologies and stages of microaneurysms. Correlation to IV FA showed the superior resolution of the AOSLO.

**Conclusion:** *In vivo* imaging of the retinal microvasculature with AOSLO FA can be performed safely at light levels 6 times below ANSI standards using normal fluorescein dosages in human subjects administered orally or intravenously. Coupled with a method to analyze microvascular features quantitatively, the ability to examine retinal microvasculature at such enhanced magnification offers a new *in vivo* tool for studying physiological and pathological vascular processes, which may yield important new insights into natural history and response to therapy. Comparison with other imaging techniques, such as motion contrast, remains to be evaluated.
Late-Recognized Primary Congenital Glaucoma
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Abstract: To report a cohort of children with Late-recognized primary congenital glaucoma (LRPCG) and describe their age of presentation, age-related diagnostic signs, clinical abnormalities, and the results of glaucoma surgery.

Patients and Methods. The medical records of 32 patients with primary congenital glaucoma recognized after one year of age were reviewed to learn their clinical data and results of glaucoma surgery. Patients were recognized to have primary congenital glaucoma (PCG) based on their increased intraocular pressures, anterior segment abnormalities including gonioscopy, and the absence of other causes of childhood glaucoma and systemic diseases. The outcome of goniotomy glaucoma surgery was reviewed and success measured by control of the intraocular pressures, absence of significant complications, and the need for additional glaucoma surgery.

Results. The average age at diagnosis of glaucoma was 4.7 years with 38% of children diagnosed over 4 years of age. Corneal enlargement was the most common initial diagnostic sign for 46% and seen at an average age of 2 years. Photophobia alerted families and physicians in 20% of patients at an average of 3.3 years. Evaluation for poor visual acuity led to the diagnosis in 32% at an average of 9.9 years. Corneal cloudiness was not an initial sign for any patient. Haab's striae were present in 60% of the affected 50 eyes. Gonioscopy findings were all consistent with primary congenital glaucoma and abnormal in 82% of eyes. The ciliary body band was seen in 82% of 48 of eyes examined and the scleral spur was visible in 49% of eyes. Sixty goniotomy procedures were performed for 40 eyes with an overall success for 93% (38) eyes and complete success of 65% (27) eyes. The final visual acuity was 20/200 or worse in 31% (15) of eyes and 20/40 or better in 60% (29) of eyes.

Conclusion. In conclusion, an awareness of Late-recognized primary congenital glaucoma and familiarity with the more subtle diagnostic signs of this expression of PCG, contrasted to more easily recognized corneal opacification and other signs and symptoms of children with Newborn or Infantile PCG, can enable its earlier recognition and treatment. Differentiation from juvenile open-angle glaucoma (JOAG) is usually supported by the presence of corneal abnormalities and gonioscopic anomalies not present in patients with JOAG. Glaucoma surgery is often indicated for LRPCG and goniosurgery is the recommended initial procedure.
Uveitis with Optic Disc Edema Secondary to Concomitant Idiopathic Intracranial Hypertension

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Introduction: Optic disc edema (ODE) has been reported in association with uveitis, with an incidence ranging from 1.8% to 22%. Although the relationship between the two findings is poorly understood, the ODE is presumed to be secondary to ocular inflammation. We have identified cases in which the two findings were believed to be independent. We describe here several patients with uveitis found to have confirmed idiopathic intracranial hypertension (IIH) as the etiology for their ODE.

Methods: A retrospective chart review performed at The New York Eye & Ear Infirmary of patients with ODE and uveitis seen between January 2009 and September 2012.

Results: Of 294 (281 patients) eyes of ODE, we identified 21 patients (7%) who were diagnosed with uveitis. Of these 21 patients, 5 (24%) were diagnosed with IIH, confirmed by neuroimaging and lumbar puncture (LP). All 5 IIH patients were female with mean age of 37.6 years and reported symptoms consistent with IIH.

Conclusion: In addition to secondary disc edema, IIH should be considered in the differential diagnosis in a patient with uveitis and ODE, taking into account patient demographics and clinical presentation. Neuroimaging and lumbar puncture should be performed not only to confirm the diagnosis of IIH, but also to rule out other potential underlying systemic conditions.
Rate of retinal tears after Nd:YAG capsulotomy

Gintien Huang, M.D.

**Purpose:** To evaluate the rate of retinal tears after Nd:YAG laser capsulotomy

**Methods:** We retrospectively reviewed 43 Nd:YAG capsulotomies in 39 patients with a minimum follow-up period of 3 months for retinal tears. All patients received a dilated fundus exam by a 2\textsuperscript{nd} or 3\textsuperscript{rd} year resident.

**Results:** A total of 43 eyes underwent Nd:YAG laser in 39 patients. The median age of patients was 68 years old with a range of 47-89. The mean power used in was 122.3 mJ with a range of 30-272mJ. 2 patients were found to have lattice prior to Nd:YAG capsulotomy and all eyes were pseudophakic. No eyes were found to have a retinal tear.

**Conclusion:** Previous studies have showed that the rate of retinal tears can be up to 4\% after Nd:YAG capsulotomy. Our study showed that no eyes developed retinal breaks after Nd:YAG capsulotomy with a minimum follow up period of 3 months. However, the sample size of 43 is limited. In addition, all exams were performed by residents and did not include scleral depression leading to the possibility of peripheral breaks being missed. Despite these limitations, our study found no increased risk of retinal breaks after Nd:YAG laser capsulotomy.