POSTERIOR SEGMENT SURGERY: COMPLICATIONS IN RELATION TO ANTERIOR SEGMENT SURGERY
with Joan W. Miller, MD, Lecture

Brian Kim, MD
MODERATOR
Fina Barouch, MD
PROGRAM COMMITTEE COORDINATOR

INNOVATIONS IN OPHTHALMOLOGY

Peter Veldman, MD
MODERATOR
Robert Noecker, MD
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MARCH 9, 2018
Back Bay Event Center
180 BERKELEY STREET | BOSTON, MA 02110
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Accreditation:
Accreditation: The New England Ophthalmological Society designates this live activity for a maximum of 7 AMA PRA Category 1 Credits™. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

The New England Ophthalmological Society is accredited by the Massachusetts Medical Society to provide continuing medical education for physicians.
PRESIDENT’S MESSAGE

Welcome to the 768th meeting of the New England Ophthalmological Society. Again, we have a captivating program for you that will enhance your acumen and practice. Enjoy.

I would like to invite all NEOS members to review the Ophthalmic Services Committee minutes. This is a permanent committee of the Board. It is the only such committee, as far as we know, in the US of its kind. It always great information as regards insurance and practice updates.

Another NEOS advantage is the Hal Freeman Video Library. This has been made much more viewer friendly as of late. It is a fabulous resource that all NEOS members should take advantage of.

We continue to have early morning Grand Rounds presented by the various ophthalmic residency programs throughout New England. The cases presented are thought provoking and the panel of attendings does a great job in developing the differential diagnostic lists.

Enjoy your stay in Boston. Again, thank you for your attendance.

John J. Dagianis, MD
President
Peter K. Kaiser, MD graduated magna cum laude with Highest Honors from Harvard College and magna cum laude from Harvard Medical School. He completed an internal medicine internship at Massachusetts General Hospital, an ophthalmology residency at the Massachusetts Eye and Ear Infirmary, and a vitreoretinal fellowship at Bascom Palmer Eye Institute before joining the vitreoretinal department of the Cole Eye Institute at the Cleveland Clinic Foundation, Cleveland, Ohio where he is the Chaney Family Endowed Professor of Ophthalmology Research at the Cleveland Clinic Lerner College of Medicine.

As a National Eye Institute and National Institute of Health RO1-funded principle investigator, Dr. Kaiser leads a team involved in the evaluation of vascular biology in age-related macular degeneration (AMD) and diabetic retinopathy (DR). In addition, Dr Kaiser is actively involved in clinical research having served as Study Chairman for numerous major, multi-center, international clinical trials, and principal investigator in over 60 trials evaluating new treatments for AMD, DR, and other retinal disorders. He is the founder and director of the Digital Optical Coherence Tomography Reading Center (DOCTR), which is the OCT reading center for over 700 international sites and 45 multi-center, clinical trials. Dr. Kaiser has been honored to receive the Lew R. Wasserman Award from the Research to Prevent Blindness for his research. Complementing his research endeavors, Dr. Kaiser serves on numerous scientific advisory boards and addresses his research interests as an invited speaker at national and international conferences. He is a major contributor to the medical literature having authored 7 textbooks, 25 book chapters, and more than 250 peer-reviewed manuscripts. He is Editor-in-Chief of Retinal Physician, Associate Editor of International Ophthalmology Clinics, and serves on the editorial boards of American Journal of Ophthalmology, Retina, Retina Today, and Ocular Surgery News. Dr. Kaiser has been recognized by the American Academy of Ophthalmology and American Society of Retina Specialists with Achievement and Senior Achievement Awards, and has been listed as one of the “Best Doctors in America” since 2002. He is the team ophthalmologist for the Cleveland Cavaliers (National Basketball Association).
RONALD R. KRUEGER, MD

Dr. Ronald R. Krueger, Medical Director of Refractive Surgery at the Cleveland Clinic Cole Eye Institute in Ohio, is a renowned ophthalmologic surgeon with more than 30 years of experience in the field of refractive surgery, specifically in excimer and femtosecond laser research and wave front optics.

In 1982, Dr. Krueger graduated Summa Cum Laude from Rutgers University with a BSEE in Electrical Engineering, followed by an MSE in Bioengineering from the University of Washington in the following year. After receiving his medical training at the UMDNJ -New Jersey Medical School in 1987, he completed a Residency in Ophthalmology at Columbia Presbyterian Medical Center in New York City in 1991, followed by both a Cornea Fellowship at the Dean McGee Eye Institute at the University of Oklahoma and a Refractive Surgery Fellowship at the Doheny Eye Institute of the University of Southern California in 1993.

Professionally, Dr. Krueger has performed over 20,000 refractive surgery procedures and has published more than 150 peer-reviewed manuscripts, as well as numerous abstracts, book chapters and trade journal articles. He is credited with documenting the first physical description of the effects of the excimer lasers on corneal tissue in 1985, and coauthoring the first book on “Wavefront Customized Corneal Ablation” in 2001. He also pioneered the development of femtosecond laser treatment of the crystalline lens and cataracts, leading to the co-founding of LensAR, Inc in 2004, and publication of the first textbook on the subject in 2013, “Refractive Laser Assisted Cataract Surgery (ReLACS)”.

Dr. Krueger teaches as a Professor of Ophthalmology at the Cleveland Clinic Lerner College of Medicine of Case Western Reserve University. He recently served as the President of the International Society of Refractive Surgery in partnership with the American Academy of Ophthalmology (ISRS/AAO) for years of 2014 & 2015. In addition, Dr. Krueger serves as the Associate Editor of the Journal of Refractive Surgery over the past 20 years, and has lectured on refractive surgery in more than 40 countries.

Dr. Krueger has received numerous awards, including the National Leadership Award, Castle Connolly America’s Top Doctors award in 2005 and 2010, the 2007 Kritzinger Memorial Award of the ISRS/AAO and the 2008 Lans Distinguished Award of the ISRS/AAO. In 2013, his thesis, “Ultrashort-Pulse Lasers Treating the Crystalline Lens: Will They Cause Vision Threatening Cataract?” was accepted for membership in the American Ophthamological Society (AOS), the oldest and most prestigious in U.S. Ophthalmology. In 2018, he will receive the Jose I. Barraquer Award and Lecture at the AAO meeting, which is the most prestigious honor in Refractive Surgery.
Joan W. Miller, MD, FARVO, is Henry Willard Williams Professor of Ophthalmology and Chair of the Department of Ophthalmology at Harvard Medical School (HMS). She also serves as Chief of Ophthalmology at both. A Massachusetts Eye and Ear and Massachusetts General Hospital (MGH) graduate of Massachusetts Institute of Technology, Dr. Miller received her MD and ophthalmology residency training at HMS. She completed a clinical and research fellowship in vitreoretinal disease at Mass. Eye and Ear. An internationally recognized expert on retinal disorders, Dr. Miller is credited with co-developing photodynamic therapy (PDT) with verteporfin (Visudyne®), the first pharmacologic treatment for age-related macular degeneration (AMD). She also co-discovered the role of vascular endothelial growth factor (VEGF) in eye disease, and demonstrated the therapeutic potential of VEGF inhibitors, forming the scientific basis of anti-VEGF therapy for neovascular AMD, diabetic retinopathy, and related conditions. Ongoing investigations include the genetics and metabolomics of AMD, strategies for early intervention in AMD, and neuroprotective therapies for retinal disease. Her clinical and scientific innovations have resulted in 11 U.S. patents and 10 international patents to date. Dr. Miller is the first female physician to achieve the rank of Professor of Ophthalmology at HMS, the first woman to chair the HMS Department of Ophthalmology, and the first woman to serve as Chief of Ophthalmology at Mass. Eye and Ear and MGH. Her scholarly contributions include more than more than 150 original research articles, 20 clinical trial reports (as a member of the investigative team), 40 reviews, and 30 book chapters. Dr. Miller is an editor of the journal Ophthalmology and several textbooks, including the 3rd edition of Albert and Jakobiec’s Principles and Practice of Ophthalmology (Saunders), Retinal Disorders: Genetic Approaches to Diagnosis and Treatment (Cold Spring Harbor Laboratory Press), and Endophthalmitis (Springer, forthcoming). Among Dr. Miller’s numerous honors, she is a laureate of the 2014 António Champalimaud Vision Award, the highest distinction in ophthalmology and visual science. In 2015, Dr. Miller became the first woman to receive the Mildred Weisenfeld Award for Excellence in Ophthalmology from the Association for Research in Vision and Ophthalmology (ARVO), and was inducted into the prestigious National Academy of Medicine (formerly the Institute of Medicine).

Since 2006, Dr. Miller has served in several leadership capacities for the New England Ophthalmological Society, including: Program Committee member, Admissions Committee member, Vice President, and President (2013-2014).

First Miller Lecturer
2016 - David Brown, MD, FACS
POSTERIOR SEGMENT SURGERY:
COMPLICATIONS IN RELATION TO ANTERIOR SEGMENT SURGERY

Moderator: Brian Kim, MD
Program Committee Coordinator: Fina Barouch, MD

Educational Gaps:
Feedback from NEOS members and program committee review identified current trends in posterior segments complications related to anterior segment surgery as a practice gap.

NEOS Program Objectives:
The content and format of this education activity has been specifically designed to fill the practice gaps in the audience’s current and potential scope of profession activities by:

1. Improving outcomes in the area of complications related to anterior segment surgery.
2. Improving the performance of the audience in placement of intraocular lenses.
3. Increasing the competence of the audience in the areas of recognition of infections related to intraocular surgery.

7:00 am Registration/Exhibits

7:30-8:15 NEOS GRAND ROUNDS – Freedom Room – Lower Level
7:30 Best of the NEOS Hal Freeman Video Library – MAIN HALL
8:30 Introduction..........................................................Brian Kim, MD
8:35 Endophthalmitis .....................................................Miriam Barshak, MD
8:45 Update on Vancomycin-Associated Hemorrhagic
Oclusive Retinal Vasculitis..............................................Andre Witkin, MD
8:55 Meeting Expectations and Avoiding Disease Progression in Patients
Undergoing Cataract Surgery in the Setting of Diabetic Retinopathy
and Macular Degeneration............................................Jeffrey Moore, MD
9:05 Introduction of Guest of Honor and Miller Lecturer.........Brian Kim, MD
9:10 Joan W. Miller, MD, Lecture:
Future Management of Wet Age-related
Macular Degeneration....................................................Peter Kaiser, MD
9:30 Business Meeting
9:40 Refreshment break / Exhibits
10:10 Management of Dislocated Intraocular Lens ...............Peter Kaiser, MD
10:30 Introduction of Pros/Cons Session.............................Brian Kim, MD
10:35  Laser for Floaters: .................................................... PRO: Chirag Shah, MD
       CON: Shlomit Schaal, MD
10:50  Fixated PCIOL vs ACIOL ................................. PRO: Gregory Blaha, MD
       CON: Jay Duker, MD
11:05  Combination Macular Surgery and
       Cataract Extraction ................................. PRO: Lucian Del Priore, MD
       CON: Robert Millay, MD
11:20  Panel Discussion ............................................. Brian Kim, MD, *Moderator*

       Gregory Blaha, MD
       Lucian Del Priore, MD
       Jay Duker, MD
       Peter Kaiser, MD
       Robert Millay, MD
       Shlomit Schaal, MD
       Chirag Shah, MD

11:45  LUNCHEON SEMINARS:

I.  **OCT for the Anterior Segment Surgeon**
    Peter Kaiser, MD
    Freedom Room

II. **Screening Keratoconus Risk in LASIK with Anatomical and
    Biomechanical Metrics**
    Ronald Krueger, MD
    Patriot Room

*Be Sure to Scan in for Luncheon Seminars and Afternoon Session to Receive Credit*
INNOVATIONS IN OPHTHALMOLOGY

Moderator: Peter Veldman, MD  
Program Committee Coordinator: Robert Noecker, MD

Educational Gaps: Feedback from NEOS members and Program committee review identified: Limited knowledge of the latest advances in ophthalmic gene therapy, treatment of proliferative vitreo-retinopathy, screening and management of amblyopia, K-pro, surgical glaucoma, advances in refractive treatments, OCT imaging analysis and uveitis management.

NEOS Program Objectives: The content and format of this education activity has been specifically designed to fill the practice gaps in the audience’s current and potential scope of profession activities to:

1. Improve awareness of emerging and evolving technologies and techniques in ophthalmology as outlined above.

2. Improved ability to counsel and patients regarding important new technologies and techniques in the management of PVR, glaucoma, amblyopia, refractive error/presbyopia and uveitis.

1:00 pm Introduction................................................................. Peter Veldman, MD
1:05 Boston Keratoprosthesis, Present and Future Designs .................................................. James Chodosh, MD
1:17 Glaucoma Surgical Innovations................................. Robert Noecker, MD
1:29 Pharmacological Prevention of PVR................................. Dean Eliott, MD
1:41 Amblyopia Screening and Management ....................... David Hunter, MD
1:53 Introduction of Guest of Honor................................. Peter Veldman, MD
1:58 Lenticular Extraction (SMILE) And Implantation As The Next Frontier In Refractive Surgery ........................................................... Ronald Krueger, MD
2:18 Refreshment Break/Exhibits
2:48 Advances in Gene Therapy .............................................. Eric Pierce, MD
3:00 Combination Therapy of Rituximab and Intravenous Immunoglobulin for Recalcitrant Ocular Cicatricial Pemphigoid .............. Peter Chang, MD
3:12 Emerging Novel Automatic Image Analysis to Allow Early Detection of Systemic Diseases based upon OCT and OCTA Imaging...................................................... Shlomit Schaal, MD
AFTERNOON SESSION (continued)

3:24   Topography Guided Lasik for Correction of Astigmatism ........................................ Ronald Krueger, MD, Moderator

3:44   Panel Discussion .............................................. Peter Veldman, MD, Moderator
        Peter Chang, MD       Ronald Krueger, MD
        James Chodosh, MD     Robert Noecker, MD
        Dean Elliott, MD      Eric Pierce, MD
        David Hunter, MD      Shlomit Schaal, MD

4:00   Adjourn
Objective: To review new developments related to postoperative endophthalmitis.

Endophthalmitis is bacterial or fungal infection within the eye, including involvement of the vitreous and/or aqueous humors. Endophthalmitis may develop via exogenous or endogenous (hematogenous) routes, with different microbiology depending on the mechanism of infection. Post-operative endophthalmitis can occur following various ocular procedures, most commonly cataract surgery. This talk will highlight new literature on postoperative endophthalmitis, which focuses on updating understanding of the microbiology, approaches to prevention including intracameral and systemic antibiotics and intraoperative iodine irrigation, and treatment, particularly in regard to the rising concern about hemorrhagic occlusive retinal vasculitis (HORV) following intraocular vancomycin injections.


UPDATE ON VANCOMYCIN-ASSOCIATED HEMORRHAGIC OCCLUSIVE RETINAL VASCUITIS

Andre Witkin, MD
BOSTON, MA

Objective: To discuss a rare but potentially devastating condition associated with intraocular vancomycin, termed hemorrhagic occlusive retinal vasculitis (HORV).

Intraocular vancomycin has been associated with a rare but sight-threatening condition that has been termed hemorrhagic occlusive retinal vasculitis (HORV). It is thought to be a delayed hypersensitivity reaction, and occurs after an otherwise uneventful intraocular procedure that involved intraocular vancomycin. Characteristic clinical findings of HORV include unremarkable postoperative day 1 undilated examination, delayed-onset painless vision loss, mild anterior chamber and vitreous inflammation, sectoral retinal hemorrhages in areas of ischemia, and predilection for venules and peripheral involvement. Early treatment with corticosteroids is likely beneficial. Subsequently, anti-vascular endothelial growth factor injections and panretinal photocoagulation are important to prevent neovascular glaucoma, a common complication. Avoidance of additional intravitreal vancomycin is recommended if HORV is suspected.


MEETING EXPECTATIONS AND AVOIDING DISEASE PROGRESSION IN PATIENTS UNDERGOING CATARACT SURGERY IN THE SETTING OF DIABETIC RETINOPATHY AND MACULAR DEGENERATION

Jeffrey K. Moore, MD
PORTLAND, ME

Objective: The purpose of this talk will be to review macular findings in diabetic retinopathy and macular degeneration which may influence outcomes or be at risk of disease progression in the setting of cataract surgery.

Macular disease from diabetes and macular degeneration affect more than 1 in 20 patients aged 40 or older undergoing cataract surgery. Meeting the high demands of cataract surgery today requires an understanding of when retinal disease may affect cataract surgery results and when cataract surgery may lead to a progression of retinal disease. The purpose of this talk will be to review macular findings in diabetic retinopathy and macular degeneration which may influence outcomes or be at risk of disease progression in the setting of cataract surgery. Risk directed perioperative evaluation and counseling will be reviewed as well as recommendations to guide coordination of surgery in patients actively under treatment for macular disease.


Objective: To discuss promising new pathways and therapeutics for the treatment of neovascular AMD.

The advent of Anti-VEGF medications has revolutionized the management of wet age-related macular degeneration (AMD). Instead of losing vision, most patients maintain and in some cases improve vision. But despite these advances, current therapy requires frequent injections and does not cause CNV regression. The angiogenesis cascade is complex and VEGF is only one part. There are numerous other cytokines involved in the process and using these other pathways either alone or in combination with anti-VEGF may improve outcomes in this common blinding disease.


Unlabeled/Unapproved Uses of Drugs or Products: Bevacizumab
MANAGEMENT OF DISLOCATED INTRAOCULAR LENS

Peter K. Kaiser, MD
COLE EYE INSTITUTE | CLEVELAND, OH

Objective: To discuss surgical techniques to approach a dislocated PCIOL.

Dislocated PCIOL’s is a unfortunate complication of cataract surgery. Using appropriate management techniques the surgical and visual outcomes can be excellent. Not all techniques are necessary for any given case; however, certain principles favor one technique over another. Worst case scenario, removal of the lens with placement of an ACIOL is always a possibility with good visual outcomes. In this lecture, we will look at best practices for cataract surgeons when faced with a complicated cataract surgery, and tips and tricks for retina specialists in how to approach these surgical problems.

YAG VITREOLYSIS FOR SYMPTOMATIC FLOATERS

Chirag Shah, MD, MPH
OPHTHALMIC CONSULTANTS OF BOSTON | BOSTON, MA

Objective: To discuss the clinical data evaluating YAG vitreolysis.

About two-thirds of patients older than 65 years have a posterior vitreous detachment; many are bothered by their floaters. Ophthalmologists often inform patients they will neuro-adapt to the floaters with time, which is often true. But some patients have residual symptoms that can significantly affect their quality of vision and thus their quality of life.

There are only two known treatment options for floaters: vitrectomy and YAG vitreolysis. Small gauge vitrectomy systems may have lowered our threshold to offer vitrectomy for floaters, but there are inherent risks to vitrectomy. Everyone gets a cataract. Studies have reported rates of retinal detachment to be as high as 10.9% [1]. Further, there is a small risk of infection, as well as the inherent risks of anesthesia.

YAG vitreolysis may serve as a middle-ground treatment option for floaters between observation and vitrectomy. However, the evolution of YAG vitreolysis has contributed to its controversy; providers have performed the procedure for years without sufficient clinical trial data.

Recently, a pilot study randomized 52 patients to YAG vitreolysis versus sham laser, reporting a moderate improvement in floater symptoms with no significant adverse events [2]. YAG treated patients reported a 54% improvement in their symptoms compared to a 9% improvement in sham treated patients after a single treatment session. The VFQ-25 showed improved general vision and peripheral vision, with less role difficulties and dependency among the YAG laser group. Objectively, a masked grader found that the floater appearance was significantly or completely improved in 94% of YAG treated eyes on wide-field color photography.

The field of YAG vitreolysis is still in its infancy, with more studies needed to better understand its efficacy and safety, as well as to better identify which floater-types and patient-types are best suited for this procedure. Indeed, further randomized controlled trials are underway in Japan, Germany, and France. At present, glaucoma, cataract, retinal damage, and retinal detachment are all known risks of YAG vitreolysis, but we need large studies with long follow-up to determine the rates of these risks. We should have more clinical trial data about YAG vitreolysis in the next few years.


Shah CP, Heier JS. YAG Laser Vitreolysis vs Sham YAG Vitreolysis for Symptomatic Vitreous Floaters: A Randomized Clinical Trial. JAMA Ophthalmol. 2017 Sep;135(9):918-923.
AGAINST TREATING FLOATERS WITH LASER

Shlomit Schaal, MD, PhD
UNIVERSITY OF MASSACHUSETTS MEDICAL SCHOOL | WORCESTER, MA

Objective: To discuss the arguments against laser for treating floaters.

Use of laser vitreolysis for symptomatic floaters has increased in recent years, but prospective studies are not available to determine the efficacy of this procedure, and the complication profile of this intervention is poorly understood. In 2017 a retrospective assessment was performed of all cases of complications following laser vitreolysis that were voluntarily reported by practitioners throughout the United States to the ASRS ReST Committee. Complications included elevated intraocular pressure leading to glaucoma; cataracts, including posterior capsule defects requiring cataract surgery; retinal tear; retinal detachment; retinal hemorrhages; scotomas; and an increased number of floaters. Although the rate of complications cannot be determined because the denominator of total cases is unknown, these serious sight threatening complications merit the performance of prospective studies to better understand the efficacy of this procedure and the frequency of attendant complications. Until then, practitioners should be aware of the profile of potential complications to properly inform patients during the consent process.

FIXATED PCIOLS ARE OFTEN A BETTER OPTION THAN ACIOLS

*Gregory Blaha, MD, PhD*

*Peabody, MA*

**Objective:** To discuss the pros and cons of the multiple alternatively-fixated intraocular lens (IOL) options that are available.

Anterior chamber intraocular lenses (ACIOLs) have improved greatly since early versions which often caused severe side effects. Newer versions are better but still have risks of corneal damage, glaucoma, and inflammation and require a large corneal incision for implantation.

There are multiple options for fixating posterior chamber IOLs when there is not sufficient capsular support including iris-sutured, scleral-sutured, and scleral-fixated without sutures. These techniques continue to improve and can allow individualized surgery for each patient with excellent results. This talk will discuss all of these techniques with special focus on IOL optic and haptic composition, optic size, foldability, incision size, suture selection, and wound construction.

Fixated PCIOLs offer many advantages over ACIOLs and are often a better choice for the patient.

**References:**


WHEN THE CAPSULE LETS YOU DOWN – GO ANTERIOR

Jay Duker, MD
NEW ENGLAND EYE CENTER | BOSTON, MA

Objective: Discuss the clinical scenarios of poor capsular support.

In 2018, ophthalmic surgeons rarely encounter situations of poor or absent capsular support in an eye that requires an IOL placement. While several options exist to make such eyes pseudophakic, the literature and common sense suggests that AC IOLs are the way to go.


COMBINING CATARACT SURGERY WITH PARS PLAN'A VITRECTOMY: THE PRO POSITION

Lucian Del Priore, MD, PhD
YALE UNIVERSITY | NEW HAVEN, CT

Objective: To discuss the pros of combining cataract extraction with vitreous surgery for patients requiring pars plana vitrectomy for macular and other diseases.

There are two options for management of the crystalline lens during planned pars plana vitrectomy surgery for macular disease; namely, phacoemulsification combined with pars plana vitrectomy, versus separate cataract surgery performed before or after pars plana vitrectomy. The major advantages of the combined approach include one surgical procedure rather than two; faster visual rehabilitation, since a combined approach avoids a delay of 1-3 months between surgeries; decreased cost to the patient and the health care system; and theoretical lower risk of endophthalmitis related to breakdown of sterility in the surgical field. Additional considerations during the combined surgical approach include sequence and location of port placement; management of the corneal wound (sutures versus rehydration); and possible need for adjustment of IOL calculations in the presence of preoperative macular disease. When presented with the option, most patients will favor the combined approach as it eliminates the need for a second surgical procedure. All options need to be carefully weighed in counseling patients regarding choices around vitrectomy surgery.

References:

Objective: Discuss Pros and Cons of Combining Vitrectomy with Cataract Surgery- Con Position

Arguments and Evidence to support separating phaco/IOL and vitrectomy will be presented. Minimizing potential for surgical complications involves playing to our strengths and avoiding more surgery than is necessary in an effort to achieve the best results for our patients. KEEPING IT SIMPLE!

Combining cataract surgery with vitrectomy will at a minimum prolong surgery and invites the immediate potential for anterior segment problems including corneal edema and pupillary constriction or distortion or inflammation that may make an otherwise straight forward vitrectomy surgery much tougher and more traumatic and more complicated. Splitting the surgery into its component parts may preserve lens function for an extended period of time and sometimes indefinitely when the vitrectomy is done first or if cataract surgery is done first, may avoid vitrectomy altogether if the patients visual needs prove to be met by the cataract surgery alone.

Macular pucker induced distortion, thickening or edema has the potential to cause inaccuracies in IOL power determination. this could be alleviated by doing the pucker surgery first, allowing the macula to “defervesce” and then performing a more accurate calculation.

Cataract formation is probably the most common “complication” of vitrectomy surgery. Innovative approaches to certain macular surgeries can be done to moderate the cataractogenic nature of vitrectomy.

Certainly one can concede that there are instances where strong patient preference or cost may push one to do combined anterior and posterior segment surgery. In general more surgery equals longer OR times, more risk of complications and more inflammation. The KISS principle of surgery and life dictates we follow a staged approach as necessary in the setting of surgical vitreous pathology.


Unlabeled/Unapproved Uses of Drugs or Products: Avastin
Objective: To discuss coming design innovations in the Boston keratoprosthes.

Invented by Claes H. Dohlman, MD PhD, and first approved for marketing by the FDA in 1992, the Boston keratoprosthesis design has been in near continuous evolution since its inception. As the most widely used keratoprosthesis in the world with over 13,000 devices implanted to date, implantation of a Boston keratoprosthesis is indicated for corneal blindness in patients with good visual potential who have previously failed or are very likely to fail traditional corneal allograft surgery. This presentation will focus on current and future design innovations conceived to increase safety and reduce costs associated with implantation of the device.
GLAUCOMA SURGICAL INNOVATIONS

Robert Noecker, MD

BEAUMONT EYE INSTITUTE | ROYAL OAK, MI
Objective: To attempt to prevent recurrent retinal detachment due to proliferative vitreoretinopathy in a series of high risk eyes.

PURPOSE: Methotrexate is an antiproliferative and anti-inflammatory agent with minimal ocular and systemic toxicity, and it is a good candidate to study for the prevention of proliferative vitreoretinopathy (PVR). The purpose of this study was to attempt to prevent recurrent retinal detachment (RD) due to PVR in a series of high risk eyes.

METHODS: We conducted a prospective study of 10 eyes with RD due to PVR. Eight of these eyes had undergone multiple procedures for recurrent RD and two eyes had RD after primary repair of severe open globe injury. All 10 eyes underwent surgery which included retinectomy and silicone oil. A total of 10 intravitreal injections of methotrexate (400 mcg/0.1 ml) were administered per patient: one at the conclusion of surgery, eight weekly injections from postoperative week 1 through week 8, and one additional injection at postoperative week 12. Outcomes included recurrent RD and PVR. We then treated an additional 16 eyes with 13 injections each.

In addition, fibrous proliferations excised at the time of PVR surgery were grown in culture. The cells were exposed to varying concentrations of methotrexate.

RESULTS: There was 99% compliance, as 99 out of a possible 100 total injections were given. All patients had 3-4 years of follow-up except for one patient who had only 4 months. One trauma patient developed severe PVR at month 4 (one month after the last injection), which is much later than expected. Three eyes developed RD without any observable evidence of PVR. Only one eye developed an observable epiretinal membrane and it was clinically insignificant. For the additional 16 eyes, only 1 eye developed recurrent RD due to PVR.

Cultured human PVR cells exhibited uncontrolled proliferation and extracellular band formation. Methotrexate exposure resulted in decreased cell proliferation and decreased band formation in a dose response manner.

CONCLUSIONS: The use of multiple intravitreal methotrexate injections is a reasonable approach for the prevention of PVR. This small prospective study with long term follow-up demonstrates safety and tolerability, and there is a suggestion of efficacy in this cohort and in the additional 16 eyes. In addition, there is some confirmatory laboratory evidence using cultured human PVR cells. There is enough favorable evidence that this approach warrants further study

Unlabeled/Unapproved Uses of Drugs or Products: Methotrexate
AMBLYOPIA SCREENING AND MANAGEMENT

David G. Hunter, MD, PhD
BOSTON CHILDREN'S HOSPITAL | BOSTON, MA

Objective: To learn about innovations in the detection and treatment of amblyopia

Although amblyopia can be treated effectively at a young age, it remains the leading cause of monocular vision loss in children due to (1) delays in detection and (2) poor compliance with prescribed treatment. In this presentation we will discuss new approaches to amblyopia screening and its treatment. For screening, a method known as retinal polarization scanning has been significantly more accurate than existing approaches for detection of amblyopia and strabismus. For treatment, new approaches focusing on binocular therapy have the promise of better compliance with treatment, while both binocular therapy and prolonged dark exposure may reawaken the brain's plasticity and enhance treatment even in older patients. The successes and ongoing challenges of these innovations will be discussed.

References:


LENTICULAR EXTRACTION (SMILE) AND IMPLANTATION AS THE NEXT FRONTIER IN REFRACTIVE SURGERY

Ronald Krueger, MD
CLEVELAND CLINIC COLE EYE INSTITUTE | CLEVELAND, OH

Objective: The participant will be able to understand the new technique and technology of SMILE and its potential benefits and complications in comparison to LASIK, in addition to the trends toward refractive eye banking and tissue addition in the future.

Purpose: To highlight the new technology and future trends in refractive surgery introduced by lenticular extraction (SMILE).

Methods: Small incision lenticular extraction (SMILE) is a new generation form of laser vision correction that has been growing in popularity outside the U.S. over the past 9-10 years, and is now experiencing early U.S. adoption since its FDA approval 1 year ago. The technique involves a femtosecond laser created posterior lenticular shaped interface and anterior uniform thickness cap with a small external incision through which the refractive lenticule is extracted. The greater preservation of the ocular surface, anterior corneal fibers, and corneal nerves make it less invasive than LASIK. However, the steps of longer laser delivery, dissection and extraction make it more technically challenging than LASIK. With the laser assisted extraction of lenticules comes the possibility of lenticular implantation in the future.

Results: SMILE has grown to greater than 1 million procedures world-wide this past year with over 500,000 Chinese procedures being performed in 2017 alone. In many OUS locations, SMILE has become the dominant refractive procedure being 80+% of cases in Shanghai and South Africa and 60% in Sydney, Australia. SMILE’s growth in the U.S. is more tempered, due to only spherical myopic approval, but astigmatism approval is forthcoming within the next year. SMILE is believe to be superior to LASIK in its avoidance of flap related complications, less potential dry eyes, less biomechanical instability, closed system precision and the momentum of a new procedure without the historical limitations of LASIK. The potential for intraoperative complications can be minimized by redocking in the case of suction loss, careful dissection of the anterior and then posterior interface, and inspection of the extracted lenticule to avoid partial removal. So far, the potential for lenticular implantation has been proposed for the correction of hyperopia, presbyopia and keratoconus.

Conclusion: SMILE has the potential to strongly co-exist and even replace LASIK as the dominant procedure in refractive surgery. With refractive eyebanking of extracted lenticules, a new era of tissue addition in refractive surgery could revolutionize the way we correct certain refractive errors.

ADVANCES IN GENE THERAPY

Eric Pierce, MD, PhD

OCULAR GENOMICS INSTITUTE/MASSACHUSETTS EYE AND EAR INFIRMARY | BOSTON, MA

Objective: To provide an update on progress towards the development of gene and genetic therapies for inherited eye disorders, such as inherited retinal degenerations.

The recent FDA approval of gene augmentation therapy for RPE65-associated retinal degeneration suggests that gene and genetically directed therapies have great potential for the treatment of inherited eye disorders, such as inherited retinal degenerations (IRDs). The different therapeutic approaches currently being studied for the treatment of IRDs will be discussed. The status clinical trials of gene and genetic therapies for IRDs will be reviewed.
COMBINATION THERAPY OF RITUXIMAB AND INTRAVENOUS IMMUNOGLOBULIN FOR RECALCITRANT OCULAR CICATRICIAL PEMPHIGOID

Peter Chang, MD
MASSACHUSETTS EYE RESEARCH AND SURGERY INSTITUTION (MERSI) | WALTHAM, MA

Objective: To describe a series of patients with treatment-resistant ocular cicatricial pemphigoid (OCP) successfully and safely treated with a combination therapy of rituximab (RTX) and intravenous immunoglobulin (IVIg).

Six OCP patients, 4 of whom were monocular at baseline, received RTX and IVIg infusion in a particular regimen: RTX is given at 375mg/m2 BSA weekly for 8 weeks, followed by 4 monthly infusions; IVIg at the dose of 2g/kg divided over a 3-day cycle is given immediately before the institution of RTX therapy, then given monthly for a total of 6 months, then stretched to every 6, 8, 10, 12, 14, and 16 weeks. The total follow-up after the completion of the combination therapy is 104 months (8.7 years), and all 6 patients had no progression in OCP staging and maintained baseline BCVA. No infection or death was associated with the combination therapy. B-cell data and levels of auto-antibodies to human beta-4 integrin, the latter of which correlated with OCP disease activity, will be provided in this presentation.


Unlabeled/Unapproved Uses of Drugs or Products: Dapsone Methotrexate Mycophenolate mofetil, Cyclosporine Azathioprine, Adalimumab, Cyclophosphamide, Rituximab. Intravenous immunoglobulin
EMERGING NOVEL AUTOMATIC IMAGE ANALYSIS TO ALLOW EARLY DETECTION OF SYSTEMIC DISEASES BASED UPON OCT AND OCTA IMAGING

Shlomit Schaal, MD, PhD
UNIVERSITY OF MASSACHUSETTS MEDICAL SCHOOL | WORCESTER, MA

Objective: To discuss an innovative method for early diagnosis of systemic diseases based on OCT and OCTA image analysis.

Purpose: To develop and employ a novel mathematical software algorithm that enables the automatic detection of early microvasculature changes in the retina and to correlate these automatically detected changes with the presence of systemic diseases.

This is an ongoing a prospective, observational study that includes more than 500 patients with systemic diseases (sleep apnea, diabetes, hypertension, and pre-eclampsia) and age matched controls. Optical coherence tomography angiography (OCTA) was performed using Cirrus HD-OCT 5000 Angioplex (Carl Zeiss Meditech, CA. USA). Patients underwent 3x3mm and 6x6mm macular scans that were captured at ~840nm wavelength and 68,000 A-scans/second and the split-spectrum amplitude-decorrelation angiography algorithm was utilized. An automatic mathematical analysis software was developed to automatically detect retinal microvasculature on OCT and on OCTA images, including superficial and deep retinal cuts. The developed software consisted of three main stages: firstly reduce the noise and improve the contrast by using the GGMRF model, secondly retinal segmentation was performed by integrating current and prior intensity models, and a higher-order spatial MGFR model. Finally, total retinal microvasculature analysis was performed by applying connectivity analysis to present more accurate results.

The automatic OCT and OCTA analysis software detected early development of microvascular changes that were not apparent by other investigation modalities as well as areas of capillary loss. Alterations in vascular structure were noted as well as increased vessel and capillary tortuosity. Enlargement of the foveal avascular zone (FAZ) appeared to be one of the earliest changes in diabetic patients. The automatic software was able to accurately detect areas of non-perfusion and decreased vessel density. Automatic detection of early microvasculature pathology carries the promise of early detection of systemic diseases to allow prevention of progression towards more advanced retinopathy.
ADVANCED PLANNING STRATEGIES OF TOPOGRAPHY GUIDED LASIK FOR THE CORRECTION OF REGULAR AND IRREGULAR ASTIGMATISM

Ronald Krueger, MD
CLEVELAND CLINIC COLE EYE INSTITUTE | CLEVELAND, OH

Objective: Participants who perform laser vision correction can use the techniques and selection criteria in this study to better treat their patients with topography guided LASIK

Purpose: Since the U.S. approval of topography-guided customized treatments (TCAT), much debate has ensued regarding the appropriate planning strategies when manifest and topographically measured cylinder values differ in axis and magnitude. We wish to analyze our pattern of success among the eyes that gained one or more lines of best corrected visual acuity (BCVA).

Methods: 256 eyes undergoing TCAT by a single surgeon from Feb 2016 to May 2017 were enrolled in this retrospective study at the Cleveland Clinic. All eyes were healthy, and had at least 4 good quality topographic maps. The corneal shape was captured with the Topolyzer, and coupled with the eye’s refraction to generate an ablation profile with the Allegretto Wave Eye-Q laser. The cylinder magnitude and axis of laser entry were decided by the surgeon, based on both the manifest and measured values, assisted by additional data from a tomographer (Pentacam) and ocular wavefront (LADARwave). All patients were followed at 1 day, 1 week and 3 months.

Results: At three months, 95.7% achieved UDVA of 20/20 or better, while 81.4% were 20/15 or better. 25.6% gained one or more lines of BCVA. Among these eyes, measured and manifest axis differed by less than 15° in 59%, between 15° and 30° in 18% and more than 30° in 23%. When it differed by at least 5°, the measured axis was treated in 79%, 67% and 73% of eyes, respectively. In the 68% of eyes with greater measured cylinder magnitude, 75% were treated between manifest and measured with only 7% at full measured value (TMR). By contrast, when manifest was greater, 60% were treated at total measured value and 40% in between. Despite the improvement in vision, whole-eye aberrometry showed a significant increase in coma, spherical aberration and total RMS (all p < 0.001).

Conclusion: TCAT can achieve better than glasses vision in more than a quarter of eyes. In eyes gaining a line of vision, the measured axis is treated in ~75%. When the measured magnitude is higher, a value between the measured and manifest is chosen in 75% to avoid overcorrection. Tomography and ocular wavefront values assist in the selection process.

References:
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<td>April 20</td>
<td>Glaucoma (with Simmons Lecture)</td>
<td>Susan Liang, MD</td>
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<td>Lucia Sobrin, MD</td>
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<td>Complications</td>
<td>Samir Melki, MD</td>
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<td>Subspecialities: Neuro-ophthalmology</td>
<td>Thomas Hedges, MD Daniel Lefebvre, MD</td>
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<td>May 31</td>
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<td>Macular Degeneration</td>
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Residents, fellows, and trainees from all the New England ophthalmologic teaching programs are invited and encouraged to submit abstracts for a scientific poster presentation contest to be conducted at the June 1, 2018, NEOS meeting. Posters will be judged on originality and scientific merit. Awards will be made for the first prize $500.00, second prize $300.00, third prize $200.00 and three honorable mentions of $50.00 each. Funding for the awards is derived from a gift to the NEOS Education Endowment Fund honoring the late Sanford Hecht, MD. Poster presentations exhibited at ARVO in 2017 and at the AAO meeting in of 2016 may be submitted. We encourage all trainees to participate in this event.

To submit posters, go to neos-eyes.org – future meetings/June 1/abstract submission form. **Deadline for abstract to appear in printed program May 1.** Others may be accepted as space allows.

For questions, please contact Judy Cerone Keenan at 617/227-6484 or neosjudy@aol.com