The Minnesota Eye Foundation

proudly presents

30 Years

PERSPECTIVES IN EYE CARE

Hosted By The

MINNESOTA EYE FOUNDATION

Monday, May 20, 2024

Radisson Blu Hotel, Mall of America

COPE Activity ID # 128390

PERSPECTIVES IN EYE CARE

Hosted By The MINNESOTA EYE FOUNDATION

On behalf of the Minnesota Eye Foundation, welcome to the 2024 Perspectives in Eye Care program, a milestone occasion as we are celebrating 30 years! We are grateful for the continued support and participation received for **three decades** and honored you chose to attend this event to receive your continuing professional education.

Over the past 30 years, vision care has changed and evolved, and we have been right there providing insight, resources, and outstanding presenters from the community year in and out. Thank you for participating in this interactive and engaging forum. We have fun surprises during today's program, so we hope you take it all in!

You will have a wide array of learning opportunities with our esteemed faculty, time to connect with colleagues, and support the efforts of the Minnesota Eye Foundation (MEF)'s outreach and mission. The organization was established to enrich the quality of life of our community members through charitable outreach and continuing education in the field of vision care. Later today, you will have the opportunity to hear more about the Foundation's work, specifically The Vision Project and Strides 4 Sight. Please 'save the date' for Sunday, September 29, 2024, for our walk/run fundraising event, Strides 4 Sight, as we would welcome your participation and camaraderie outdoors at Normandale Lake Park Bandshell in Bloomington, MN.

Thank you for making an effort to be here today, and we are grateful for your commitment to continuing education and the Minnesota Eye Foundation's mission.

Omar E. Awad, M.D., F.A.C.S
President, Minnesota Eye Foundation

MINNESOTA EYE FOUNDATION

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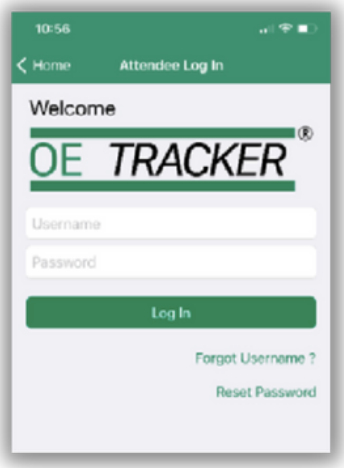

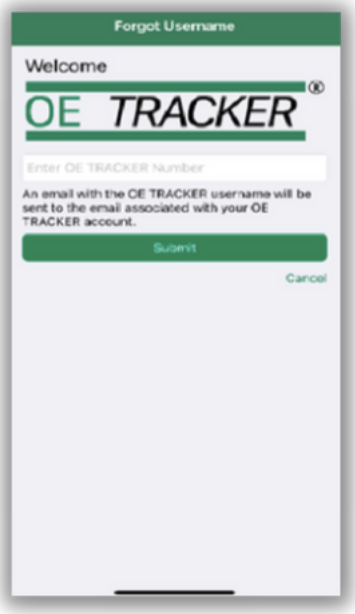

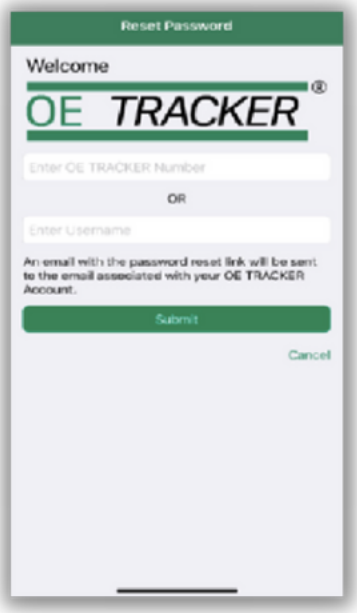

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(example)
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1. Your phone's camera will open and you will see "Scan QR Code" at the top of your screen.

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6. To exit, simply close the app. You will stay logged in to the app to scan another QR code. To log out of the app touch the “Logout” button.

AGENDA 2024

SESSION ONE

7:55 AM - Welcome & Announcements

8:00 AM - Neuro-ophthalmic Emergencies Involving the Afferent Visual Pathway: Variations on a Theme
Anne Abel, MD

8:50 AM - Oculoplastic Updates 2024
William Lipham, MD; Jill Melicher, MD; Krista Steward, MD

9:40 AM - Break in Exhibit Area

10:00 AM - Innovative Advancements and Treatments in Ocular Surface Disease
Ahmad Fahmy, OD, FAAO; Johnna Hobbs, OD; Mark Buboltz, OD, FAAO

10:50 AM - Updates in Pediatric Ophthalmology
Catherine Origlieri, MD; Tanya Glaser, MD

11:40 AM - The Vision Project & Strides 4 Sight
Omar Awad, MD, FACS; Matthew Field, MD, PhD; Mark Larson, MD

11:55 AM - Announcements

12:00 PM - Lunch in Exhibit Area

SESSION TWO

1:00 PM - Dr. Richard Lindstrom Remarks
Richard Lindstrom, MD

1:10 PM - Glaucoma Updates 2024
Glaucoma Case Management: Consensus or not??!! - Thomas Samuelson, MD
Tube Shunts in Glaucoma Care - Patrick Riedel, MD
The Suprachoroidal Space in Glaucoma Management - Christine Larsen, MD
Glaucoma and Pregnancy - Clara Choo, MD
Neovascular Glaucoma: An acute emergency - Chase Liaboe, MD

3:00 PM - Break in Exhibit Area

3:20 PM - Navigating Diagnostic and Therapeutic Challenges in Cataract Patients
Mark Hansen, MD; Omar Awad, MD; Sherman Reeves, MD, MPH
Panelists: David Hardten, MD, FACS; Elizabeth Davis, MD, FACS; Matthew Field, MD, MPH

4:10 PM - Advancements in the Treatment of Keratoconus
David Hardten, MD, FACS; Elizabeth Davis, MD, FACS

5:00 PM - Adjourn and Cocktail Reception

CONTENTS

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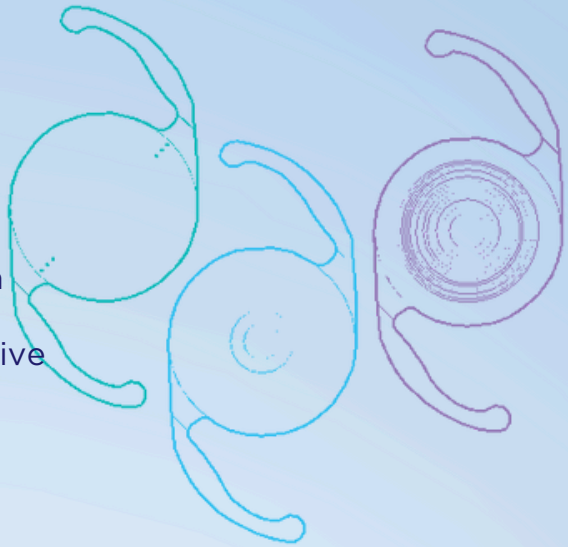

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* Defined as modified Miyata grade 0, <25mv/mm22 over 3 years (n=138), and over 9 years (n=20), respectively. ATIOL=Advanced Technology IOL.
† In vitro comparison, P <0.05.
‡ Results from a prospective, randomized, parallel group, subject- and assessor-masked, multisite trial of 107 subjects bilaterally implanted with the AcrySof® IQ Vivity® Extended Vision IOL and 113 with the AcrySof® IQ IOL with 6 months follow-up.
¶ Snellen VA was converted from logMAR VA. A Snellen notation of 20/20-2 or better indicates a logMAR VA of 0.04 or better, which means 3 or more of the 5 ETDRS chart letters in the line were identified correctly.
§ N=297.
|| Q4 2022.

IMPORTANT PRODUCT INFORMATION: CLAREON® FAMILY OF IOLS

CAUTION: restricts these devices to sale by or on the order of a physician.

INDICATION: Clareon® intraocular lenses (IOLs)Clareon® Aspheric Hydrophobic AcrylicClareon® Aspheric Toric IOLs family of includes the and , the **Clareon® PanOptix® Trifocal Hydrophobic IOL Clareon® PanOptix® Toric Clareon® Vivity® Extended Vision Hydrophobic Posterior Chamber IOLClareon® Vivity® Toric IOLs** and . Each of these IOLs is indicated for visual correction of aphakia in **Clareon® Toric IOLs** adult patients with cataract surgery. In addition, the are indicated to correct pre-existing corneal astigmatism at the time of cataract surgery. The **Clareon® PanOptix®** lens mitigates the effects of presbyopia by providing improved intermediate and near visual acuity, while maintaining comparable distance visual acuity with a reduced need for eyeglasses, compared to a monofocal IOL. The **Clareon® Vivity®** lens mitigates the effects of presbyopia by providing an extended depth of focus. Compared to an aspheric monofocal IOL, the lens provides improved intermediate and near visual acuity, while maintaining comparable distance visual acuity. All of these IOLs are intended for placement in the capsular bag.

WARNINGS / PRECAUTIONS:

General cautions for all Clareon® IOLs: Careful preoperative evaluation and sound clinical judgment should be used by the surgeon to decide the risk / benefit ratio before implanting any IOL in a patient with any of the conditions described in the Directions for Use that accompany each IOL. Physicians should target emmetropia, and ensure that IOL centration is achieved.

For the **Clareon® Aspheric Toric**, **PanOptix® Toric** and **Vivity® Toric IOLs**, the lens should not be implanted if the posterior capsule is ruptured, if the zonules are damaged, or if a primary posterior capsulotomy is planned. Rotation can reduce astigmatic correction; if necessary lens repositioning should occur as early as possible prior to lens encapsulation.

For the **Clareon® PanOptix® IOL**, some visual effects may be expected due to the superposition of focused and unfocused multiple images. These may include some perceptions of halos or starbursts, as well as other visual symptoms. As with other multifocal IOLs, there is a possibility that visual symptoms may be significant enough that the patient will request explant of the multifocal IOL. A reduction in contrast sensitivity as compared to a monofocal IOL may be experienced by some patients and may be more prevalent in low lighting conditions. Therefore, patients implanted with multifocal IOLs should exercise caution when driving at night or in poor visibility conditions. Patients should be advised that unexpected outcomes could lead to continued spectacle dependence or the need for secondary surgical intervention (e.g., intraocular lens replacement or repositioning). As with other multifocal IOLs, patients may need glasses when reading small print or looking at small objects. Posterior capsule opacification (PCO), may significantly affect the vision of patients with multifocal IOLs sooner in its progression than patients with monofocal IOLs.

For the **Clareon® Vivity® IOL**, most patients implanted with the **Vivity® IOL** are likely to experience significant loss of contrast sensitivity as compared to a monofocal IOL. Therefore, it is essential that prospective patients be fully informed of this risk before giving their consent for implantation of the Clareon® Vivity® IOL. In addition, patients should be warned that they will need to exercise caution when engaging in activities that require good vision in dimly lit environments, such as driving at night or in poor visibility conditions, especially in the presence of oncoming traffic. It is possible to experience very bothersome visual disturbances, significant enough that the patient could request explant of the IOL. In the parent AcrySof® IQ Vivity® IOL clinical study, 1% to 2% of AcrySof® IQ Vivity® IOL patients reported very bothersome starbursts, halos, blurred vision, or dark area visual disturbances; however, no explants were reported.

Prior to surgery, physicians should provide prospective patients with a copy of the Patient Information Brochure available from Alcon informing them of possible risks and benefits associated with these IOLs.

ATTENTION: Reference the Directions for Use labeling for each IOL for a complete listing of indications, warnings, and precautions.

REFERENCES:1. Werner L, Thatthamla I, Ong M, et al. Evaluation of clarity characteristics in a new hydrophobic acrylic IOL. J Cataract Refract Surg. 2019;45:1490-1497. **2**. Oshika T, Fujita Y, Inamura M, Miyata K. Mid-term and long-term clinical assessments of a new 1-piece hydrophobic acrylic IOL with hydroxyethyl methacrylate. J Cataract Refract Surg. 2020 May;46(5):682-687. **3**. Maxwell A, Suryakumar R. Long-term effectiveness and safety of a three-piece acrylic hydrophobic intraocular lens modified with hydroxyethyl-methacrylate: an open-label, 3-year follow-up study. Clin Ophthalmol. 2018;12:2031-2037. **4**. Alcon Data on File, 2017. **5**. Lane S, Collins S, Das KK, Maass S, Thatthamla I, Schatz H, Van Noy S, Jain R. Evaluation of intraocular lens mechanical stability. J Cataract Refract Surg. 2019 Apr;45(4):501-506. **6**. Clareon® Vivity® Extended Vision Hydrophobic IOL (CNWET0) Directions for Use – US. **7**. Clareon® PanOptix® Trifocal Hydrophobic Acrylic IOL Model: CNWTT0 DFU. **8**. Lehmann R, Maxwell A, Lubeck DM, Fong R, Walters TR, Fakadej A. Effectiveness and Safety of the Clareon® Monofocal Intraocular Lens: Outcomes from a 12-Month Single-Arm Clinical Study in a Large Sample. Clin Ophthalmol. 2021;15:1647-1657. Published 2021 Apr 20. **9**. Alcon Data on File, 2022.

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SESSION ONE

Anne Abel, M.D.

Anne Abel, MD
Hennepin Healthcare:
Neuro-Ophthalmologist and Cataract Surgeon Department of Ophthalmology

Neuro-ophthalmic Emergencies Involving the Afferent Visual Pathway: Variations on a Theme

COPE Course ID # 91209-NO

Course Description

Utilizing illustrative cases, we will discuss the evaluation and recognition of neuro-ophthalmic emergencies involving the afferent visual pathways. Clinical differentiation of various causes of optic neuropathy will be explored and treatment paradigms will be discussed.

Course Objective

1. Review the evaluation of bilateral optic disc edema and the radiographic findings of increased intracranial pressure.
2. Discuss atypical clinical findings in patients with suspected papilledema.
3. Review the clinical features of typical versus atypical optic neuritis and discuss systemic diseases that may present with acute optic neuropathy

SESSION ONE

William J. Lipham, M.D.

Minnesota Eye Consultants
Ophthalmic Plastics, Orbit
and Reconstructive Surgery

Krista J. Stewart, M.D.

Minnesota Eye Consultants
Ophthalmic Plastics, Orbit
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Jill S. Melicher, M.D.

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Oculoplastics Updates 2024

COPE Course ID # 91239-TD

Course Description

This lecture will discuss the pathophysiology, etiology, epidemiology, prognosis, patient education, clinical presentation, physical exam findings, associated disorders and treatment and management of Floppy Eyelid Syndrome (FES). It will also note that internal brow lifting procedures performed through an eyelid crease incision are now considered cosmetic in nature by Medicare and all insurance carriers. The attendees will also learn through case presentation of three Oculoplastic Cases where the initial presentation led to clinical misdiagnosis. The presenter will walk through critical clinical thinking using real life examples of clinical conundrums leading to misdiagnosis.

Course Objective

1. Understand the pathophysiology etiology, epidemiology, and prognosis of FES.
2. Recognize how patients present clinically as well as other conditions associated with FES.
3. Learn how to educate your patients with these conditions as well as treat and manage FES and understand when it is appropriate to refer them to an oculoplastic surgeon.
4. Presentation and management of a pigmented eyelid lesion resulting in the misdiagnosis of malignant melanoma of the eyelid.
5. Presentation of a nodular eyelid lesion resulting in the misdiagnosis of malignant lymphoma of the eyelid.
6. Presentation of an orbital lesion clinically consistent with orbital hemangioma with clinical presentation consistent with rhabdomyosarcoma requiring systemic medication and management.
7. Presentation will discuss medical management of neurotrophic keratopathy patients including insulin, Oxervate and contact lens use.

Floppy Eyelid Syndrome and Cosmetic Considerations

William Lipham, M.D.

1. Financial Disclosures
2. Floppy Eyelid Syndrome: Background
   i. Floppy Eyelid Syndrome (FES) was first described by Culbertson and Ostler in 1981
   ii. Common Characteristics:
      1. Overweight men
      2. Floppy, rubbery, easily everted upper eyelids
      3. Chronic papillary conjunctivitis of the upper palpebral conjunctiva
   iii. Listen to your patient! (Or at least their symptoms)
      1. Typically, they describe redness and discharge that is worse upon awakening
      2. Frequently they have tried numerous drops, AT's, NSAID's, steroids and antibiotics with no relief
      3. More frequent in patients who are obese.
      4. Is associated with Obstructive Sleep Apnea (OSA)
      5. Ask them if they sleep on their side or their stomach, snore, or if they use a CPAP device
   iv. Pathophysiology
      1. Patients with OSA:
         a. Have intermittent airway obstruction when sleeping on their back
         b. To maintain their airway, they adapt by sleeping on their side or stomach to open their airway
      2. OSA can lead to:
         a. Awakening
         b. Thick mucoid discharge
         c. Sleep History:
            i. Snoring
            ii. Side or stomach sleepers
            iii. Dependent side is worse
      d. Past Medical History:
            i. OSA and use of CPAP
            ii. Congestive Heart Failure (CHF)
            iii. Hypertension

Notes

3.Physical Examination
   a.Lax upper eyelid that everts easily when pulled towards the eyebrow.
   b.Soft rubbery tarsal plate that can be folded upon itself. Stringy, mucoid conjunctival discharge
   c.Eyelash ptosis with loss of eyelash parallelism and eversion.
   d.Periorbital involutional Changes:
      i.Brow Ptosis
      ii.Dermatochalasis
      iii.Upper eyelid ptosis
      iv.Horizontal lower eyelid laxity
      v.Lacrimal gland prolapse.
4.Patient Education
   a.Significance of Sleeping face down or buried in the pillow/mattress
   b.Possibility of associated OSA and need for sleep study/CPAP device
   c. Connection between eye rubbing, keratoconus and FES
   d.Treatment options
5.Treatment and Management
   a.Topical lubrication
      i.AT during daytime
      ii.Erythromycin ung qHS
   b.Either taping lids shut at night or using eye shields to reduce lid eversion
   c.Lateral Tarsal Strip Procedure (LTS)
   d.Lateral Tarsal Resection

Notes

You've got Nerve: An Update on Oculoplastic Management of Neurotrophic Keratopathy

Krista J. Stewart, M.D.

1. Case Presentation: Neurotrophic keratopathy post brain tumor resection
   i. Patient presentation: recurrent corneal ulcerations post brain tumor resection
      1. Clinical findings
      2. Initial diagnostic assessment
      3. Discussion of initial treatments including
   i.Description of healing progression and surgical intervention
   ii.Characteristics of 5th and 7th nerve palsy combined
2. Case Presentation: Diabetic neurotrophic keratopathy
   i. Patient presentation: bilateral corneal thinning and recurrent preformation with visual outcomes
      1. Clinical findings
      2. Initial diagnostic assessment
      3. Discussion of initial medical and procedural treatments
   ii. Surgical approach
   iii. Characteristics of diabetic neurotrophic keratopathy

Notes

Making the Misdiagnosis: Lessons Learning from Management Challenges; Oculoplastic Surgery M&M

Jill S. Melicher, M.D.

1.Case Presentation: Pigmented Eyelid Lesion
   i. Clinical findings
   ii. Initial diagnostic assesment
   iii. Discussion of initial misdiagnosis of seborrheic keratosis
2.Description of lesion progression
3. Characteristics of malignant melanoma
4. Findings contributing to misdiagnosis
5. Multidisciplinary approach to the management of melanoma
   i. Lesion excision and reconstruction
6. Case Presentation: Eyelid Lymphoma
   i. Patient persenation: nodular lower eyelid lesion
      1. Clinical findings
      2. Initial diagnostic assessment
      3. Discussion of initial misdiagnosis of chalazion
   ii. Description of lesion progression
   iii. Characteristics of eyelid lymphoma
   iv. Findings contributing to misdiagnosis
   v. Multidisciplinary approach to the management of lymphoma
7. Case Presentation: Orbital rhabdomyosarcoma
   i. Patient presentation: superomedial orbital mass
      1. Clinical findings
      2. Initial diagnostic assessment
      3. Discussion of initial misdiagnosis of hemangioma
   ii. Description of lesion progression
   iii. Characteristics of orbital rhabdomyosarcoma
   iv. Findings contributing to misdiagnosis
   v. Multidisciplinary approach to the management of rhabdomyosarcoma
8. Questions

Notes

SESSION ONE

Ahmad Fahmy, O.D., FAAO

Minnesota Eye Consultants
Primary Eye Care and Dry Eye Specialist

Johnna Hobbs, O.D.

Minnesota Eye Consultants
Primary Eye Care and Dry Eye Specialist

Mark Buboltz, O.D., FAAO

Minnesota Eye Consultants
Primary Eye Care, Specialty Contact Lenses, and Dry Eye Specialist

Innovation Advancements and Treatments in Ocular Surface Disease

COPE Course ID # 90844-TD

Course Description

This lecture will focus on innovative clinical research and treatments in Ocular Surface Disease (OSD). By utilizing case-based learning, this course will highlight pertinent clinical studies and new, innovative treatments.

Course Objective

1. Review the key features of innate and adaptive immunity in dry eye disease.
2. Identify the key relationships between gut microbiota and adaptive immune cells.
3. Identify the key relationships between gut microbiota and innate immune cells.
4. Understand how antibiotic-induced gut dysbiosis can lead to increased ocular surface inflammation.
5. Review effective in-office treatments and when best to incorporate them into the treatment plan.
6. Identify new, promising treatments in the OSD pipeline

Innovative Advancements and Treatments in Ocular Surface Disease

Ahmad Fhamy, OD, FAAO;
Johnna Hobbs, OD;
Mark Buboltz, OD, FAAO

1.Inflammatory pathways in Ocular Surface Disease (OSD)
- a.Ocular surface desiccation and osmotic stress induced by multiple factors
- b.Disease perpetuation by ongoing, vicious cycle:
  - i.Inflammation, hyperosmolarity, tear film instability
  - ii.Disease perpetuation triggers key, ongoing immune processes
    - 1.Inflammatory cytokines involved in innate immune response
    - 2.Adaptive T-cells in adaptive immune response
    - 3.Inflammatory cytokines and chemokines involved in neuro-sensitization
      - a. Leading to patient discomfort, irritation symptoms
      - b.Most patients have episodic exacerbation of symptoms:
        - i.Flare – can be triggered by many factors
          - 1.Ocular surgery
          - 2.Low-humidity environment
          - 3.Ocular injury (trauma, chemical injury)
          - 4.Contract lens use
          - 5.Toxic oral or topical medications
            - a.Topical polypharmacy
          - 6.Allergens
          - 7.Exacerbation of auto-immune disease
        - ii.Pathophysiology of a flare
          - 1.In chronic OSD:
            - a.Adaptive immune response already active – pathogenic T-Cells
              - i.Leads to rapid increase of inflammation at lower thresholds.

4. Inflammatory cycle persists unless disrupted by introduction of anti-inflammatory treatment.

Notes

2.Gut microbiota and the immune system - uncovering a key link:
  a.Major pathways between gut microbiota and adaptive immune cells
  b.Major pathways between gut microbiota and innate immune cells
3.Gut-Eye Axis
  a.Autoimmune Uveitis
  b.Age-Related Macular Degeneration
  c.Primary Open-Angle Glaucoma
  d.Ocular Surface Disease
4.Systemic impact of gut microbiota
  a.Immunological pathway alterations are a result of distinct gut microbiota compositional changes
    i.Central nervous system
      1.Gut derived neurotransmitters and neuropeptides
      2.Specific gut species linked with amelioration of depression and anxiety
        a.Anxiety and depression: common OSD co-morbid conditions
5.Key communication routes impacting the Ocular Surface
  a.Microbial Diversity and Dry Eye
    i.Ocular surface microbiota overview
    ii.Differences in microbiota in dry eye vs healthy eyes
  b.Sjogren's Syndrome
    i.Gut dysbiosis in SS patients
    ii.Mechanism of gut-eye/lacrimal gland axis
  c.Meibomian Gland Dysfunction
    i.Changes in gland morphology
    ii.Changes in ocular surface/glandular microbiota
6.Emerging Therapeutics
  a.Probiotics/Prebiotics
    i.Effectiveness of oral probiotics and changing gut microbiota
    ii.Topical probiotics
      1.Treatment of vernal keratoconjunctivitis
    iii.Bacterial products as a treatment?
      1.Toll-like receptors
  b.Fecal Microbiota Transplantation
  c.Role of Oral Antibiotics
    i.Damage to Gut Microbial Diversity
    ii.Can microbial diversity be restored after oral/IV antibiotics
    iii.Are some oral antibiotics damaging to gut microbial diversity?

Notes

7.Case Presentation:
  a.Pertinent history:
    i.55-year-old male patient
    ii.Refractory to multiple single therapies to treat OSD
      1.Could not tolerate Doxycycline
    iii.Mostly struggles with irritation, foreign body sensation
    iv.Onset of symptoms 10 years ago
    v.Struggles with depression
    vi.Significant co-morbid facial rosacea
    vii.Current smoker – cigars
    viii.Overall unhealthy diet
      1.Pro-inflammatory, fast food
  b.Clinical evaluation:
    i.Hyperosmolar both eyes, strong (+) MMP-9 both eyes
    ii.Significant eyelid telangiectasia, conjunctival injection each eye
    iii.Diffuse punctate epithelial keratopathy (PEK) each eye
    iv.Floppy eyelid syndrome
  c.Treatment:
    i.Chronic anti-inflammatory immunomodulators
    ii.Nutritionist
  d.Follow up:
    i.Introduced pro-biotic through his nutritionist
      1.The is the key treatment that resulted subjective improvement
    ii.Osmolarity and MMP-9 normal
    iii.Mild, improved PEK and significantly improved conjunctival injection
    iv.Future treatments of similar patients
      1.Likely to be able to provide even more customized gut flora modulation in patients with additional systemic and ocular co-morbidities.
8.Innovation in OSD Treatments
  a.Anti-inflammatories
  b.Lid Margin Treatments
    i.Eyelid debridement, Microblepharoexfoliation (MBE)
  c.Thermal pulsation
    i.Combined with evacuation of the meibomian glands with eyelid expression
    ii.Combined with IPL
    iii.Frequency of Treatment
    iv.Treatment options in this category
      1.Matching the OSD patient with the best treatment

Notes

d.Eyelid expression
i.Multiple tools now available
ii.Frequency of treatment
e.Meibomian Gland Probing
i.Proper technique
ii.Frequency of treatment
iii.Combined with thermal pulsation and IPL
iv.Proper anesthesia
v.Drug delivery into the meibomian glands
1.Stem cells
2.Platelet Rich Plasma (PRP)
f.Intense Pulsed Light (IPL) and IRPL
i.General treatment approach
ii.Combined with other procedures
iii.Frequency
iv.Unique treatment benefits
g.Low Level Light Therapy
i.Fairly new treatment option
ii.Changes in tear break-up time, OSDI, MG score in early clinical studies
1.Karl Stonecipher, et al. LLLT as an adjunct treatment for MGD. Acta Scientific Ophthalmology
h.Treatment of Eyelid Abnormalities
i.Floppy Eyelid Syndrome
ii.Blepharospasm
iii.Exposure / ectropion
iv.Eyelid imbrication
i.Punctal Plugs
i.Extended v. dissolving plugs
ii.Tear meniscus height
iii.Micro-Flow
j.Dilation and irrigation
i.Proper technique
ii.Importance of tear clearance
iii.Sinus infections
k.Compounded medications
i.Blood derived eye drops
9. Promising Pipeline Medications
a.Mechanisms of action
b.Timeline for approval
c.When to use in clinical practice

Notes

SESSION ONE

Tanya Glaser, M.D.

Northwest Eye
Pediatric Ophthalmology and
Pediatric Eye Alignment Specialist

Catherine Origlieri, M.D.

Northwest Eye
Pediatric Ophthalmology and
Pediatric Eye Alignment Specialist

Updates in Pediatric Ophthalmology

COPE Course ID # 90870-FV

Course Description

This course will review current updates in pediatric ophthalmology including low-dose atropine for the treatment of myopia progression, advances in amblyopia treatment using digital dichoptic therapies, new statewide newborn CMV screening, and developments in pediatric cataract evaluation.

Course Objective

1. Attendees will learn the rationale for using low-dose atropine for myopia control based on the review of key clinical trials.
2. They will be able to describe treatment for amblyopia with dichoptic digital therapies.
3. Attendees will better understand the state-level changes in congenital CMV screening and potential ocular findings associated with congenital CMV.
4. They will learn about a disease called cerebrotendinous xanthomatosis (CTX) and describe how to screen for this condition when examining children and young adults with cataracts.

Updates in Pediatric Ophthalmology

Tanya Glaser, M.D.; Catherine Origlier, M.D.

1. Myopia
   a. 50% world population by 2050
   b. High myopia: 10% world population by 2050
   c. Associations:
      i. Presenile cataract
      ii. Glaucoma
      iii. RD
      iv. Myopic maculopathy (choroidal neovascularization, myopic macular degeneration, macular hemorrhage)
      v. Strabismus (heavy eye syndrome)
2. Low-dose Atropine for Treatment of Myopia Progression
   a. Non-selective muscarinic blocker
   b. Unknown mechanism in myopia control – thought to inhibit scleral thinning/stretching and thereby inhibit eye growth
3. ATOM1
   a. Atropine 1% over 2 years slowed myopia progression by 77% and reduced axial length elongation
   b. Adverse effects
4. ATOM2
   a. Atropine 0.5%, 0.1%, 0.01% over 2 years slowed myopia progression by 75%, 70%, 60%, respectively
   b. Rebound effect associated with the higher doses
   c. After 5 years, myopia progression remained lowest in the 0.01% group
5. LAMP
   a. Atropine 0.05%, 0.025%, 0.01% over 1 year slowed myopia progression by 67%, 43%, and 27%, respectively
   b. Similar efficacy at year 2 for 0.05% and 0.025%, and slightly better for 0.01%
   c. After 3 years, myopia progression remained lowest in 0.05% group
   d. 5-year data is currently in publication

Notes

6. Amblyopia
   a. Unilateral or bilateral reduction of best-corrected visual acuity in the setting of an otherwise normal eye
   b. Developmental disorder of the central nervous system that results from the abnormal processing of visual images, leading to reduced visual acuity
   c. Refractive: Anisometropic, High bilateral refractive (isoametropic)
   d. Strabismic
   e. Visual deprivation: Media opacities, Ptosis
7. Traditional amblyopia treatment
   a. Optical correction
   b. Patching
   c. Atropine
8. Dichoptic digital therapies
   a. To treat amblyopia in children who have binocularity (i.e no strabismus or small angle strabismus)
   b. High-contrast image is presented to the amblyopic eye and low-contrast image to the fellow eye
   c. Initial data was not promising, however improved outcomes have been associated with more recently developed technologies, e.g. tablet, virtual reality headset
   d. Research is ongoing
9. Congenital CMV
   a. The incidence of congenital CMV infection ranges from 0.5% to 2%
   b. Up to 85% of infected newborns are asymptomatic
   c. Symptoms of congenital CMV infection include microcephaly, jaundice, hepatosplenomegaly, petechiae, hearing loss and chorioretinitis
   d. Long-term sequelae include progressive hearing loss, neurodevelopmental disabilities
   e. Long term ocular findings include chorioretinitis, optic atrophy, strabismus, and cortical visual impairment
10. Chorioretinitis
   a. Chorioretinitis is not generally believed to develop later if not present in the neonatal period
   b. Though there exists rare case reports of late onset or reactivation
   c. Typically, without hemorrhages (hemorrhages typical in immunocompromised individuals)

Notes

11. Developments in Minnesota
    a. Dr. Mark Schleiss at the U of MN and his team developed a test for congenital CMV using dried blood spot taken a birth (standard to check for more than 60 other diseases)
    b. Minnesota legislature passed the Vivian Act in 2021, advocated for by parents, the law is meant to promote education, awareness, and early detection of congenital CMV
    c. In January 2022, the Advisory Committee recommended adding congenital CMV to the newborn screening panel.
    d. On February 6, 2023, Minnesota became the first state in the nation to screen every newborn for CMV.
    e. It is estimated that up to 300 babies out of 65,000 born each year in Minnesota will have congenital CMV
12. In Real Time
    a. Dr. Mark Schleiss at the U of MN and his team developed a test for congenital CMV using dried blood spot taken a birth (used for standard newborn screen for 60+ other diseases)
    b. Follow-up urine testing within 21 days will determine whether the baby was infected with cytomegalovirus at birth
    c. If positive, patient then referred for additional hearing testing, head US and ophthalmologic exam
13. Review of literature
    a. "Long-term Visual and Ocular Sequelae in Patients with Congenital Cytomegalovirus Infection"
    b. "Ophthalmologic findings in children with congenital cytomegalovirus infection"
14. Follow Up and Screening
    a. Influx of babies with positive congenital CMV testing
    b. Asymptomatic infants still at risk for hearing loss
    c. Asymptomatic infants are low risk for ocular findings
    d. No current guidelines for how often to repeat ocular exam
        i. If immunocompetent then exam within 3 months of birth, then 3-6 months after that to confirm no findings, then every 6-12 months.
        ii. If immunocompromised then scleral depressed exam
    e. More updates coming soon

Notes

15.Case Presentation – Juvenile Cataracts and Cerebrotendinous Xanthomatosis (CTX)
   a.Review case presentation, ocular exam/findings, query audience on next steps
   b. Suggest additional history that may be helpful: jaundice after birth, history of diarrhea, gait or balance issues, history of xanthomas.
16. Cerebrotendinous Xanthomatosis (CTX)
   a.Cerebrotendinous Xanthomatosis (CTX) is a rare, likely underdiagnosed disease
   b.Autosomal recessive metabolic storage disorder
   c.Caused by mutations in the CYP27A1 gene, leading to a deficiency in sterol 27- hydroxylase, an important enzyme in bile acid synthesis
   d.This deficiency leads to a buildup of 5-alpha-cholestanol, which affects the brain, connective tissue, and the crystalline lens
   e.CTX has variable onset and severity
   f.Irreversible neurological deterioration is present in late disease
17.CTX symptoms and signs
   a.Neonatal jaundice
   b.Chronic diarrhea
   c.Gait or balance issues, progressive neurologic changes
   d.Xanthomas
18.How common is CTX?
   a. Estimated prevalence, 3 to 5 per 100 000
   b.Barriers to diagnosis:
      i.Variability in phenotype
      ii.Can be mild initially
   c.Often long delay (decades) between symptom onset and diagnosis
   d.Diagnosis often occurs after irreversible neurological damage
19.Literature review
   a.“Prevalence of Cerebrotendinous Xanthomatosis Among Patients Diagnosed with Acquired Juvenile-Onset Idiopathic Bilateral Cataracts”
   b.1.8% prevalence among children and young adults with bilateral cataracts compared to 0.00005% in the general population.

Notes

20. Importance of Considering CTX when evaluating Juvenile-onset Cataracts

a.Juvenile Cataracts may be the presenting sign in this condition. Early detection can prevent later symptoms and neurological decline.

b.Long-term treatment includes supplementation with supplementation of chenodeoxycholic acid (CDCA), which normalizes bile acid synthesis

c.Treatment in presymptomatic individuals prevents clinical manifestations

d.Early treatment in symptomatic patients can limit progression and reverse neurologic symptoms • It is our job as eye care providers to keep CTX in mind when evaluating Juvenile or early-onset cataracts.

e.By making this diagnosis we can have a huge impact in a patient's life

21. Q&A

Notes

STRIDES 4 SIGHT 5K & KIDS FUN RUN

A community event benefiting The Vision Project

Join us in changing lives, one eye at a time, through the Strides 4 Sight 5k Walk/Run and Kids Fun Run!

SUNDAY, SEPTEMBER 29

8:00 AM Check in
8:30 AM Kids Fun Run
Silent Auction Opens
9:00 AM 5K Run/Walk
9:45 AM Auction Closes
10:00 AM Awards*

**Silent Auction will take place onsite to raise additional funds for the Minnesota Eye Foundation's Vision Project*

Normandale Lake Bandshell
5901 W 84th St.
Bloomington, MN 55438

$30 **5K RUN/WALK**
**Day of Event Registration Fee for 5K Run/Walk is $40/person.*

$15 **KIDS 12 AND UNDER FUN RUN**
**Processing fee will apply for all registrants.*

STRIDES 4 SIGHT
MINNESOTA EYE FOUNDATION

REGISTER TODAY!

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MINNESOTA EYE FOUNDATION

For sponsorship information,
contact Maura at **mjmitchell@mneye.com**

SESSION TWO

Chase A. Liaboe, M.D.

Minnesota Eye Consultants
Glaucoma & Cataract Specialist

Christine L. Larsen, M.D.

Minnesota Eye Consultants
Glaucoma & Cataract Specialist

Clara M. Choo, M.D.

Minnesota Eye Consultants
Glaucoma & Cataract Specialist

Patrick J. Riedel, M.D.

Minnesota Eye Consultants
Glaucoma, Cataract and Refractive Specialist

Thomas W. Samuelson, M.D.

Minnesota Eye Consultants
Cornea, Cataract
& Refractive Specialist

Glaucoma Updates 2024

COPE Course ID # 90922-GL

Course Description

Attendees will get an overview of current medication management options as well as current surgical management options in glaucoma care. We will also discuss the diagnosis, etiology, triage, of management of neovascular glaucoma. We will also discuss management options of glaucoma during pregnancy as well as a review of how surgeries performed within the suprachoroidal space may be a potential option for lowering IOP.

Course Objective

1.Overview of current glaucoma medication management options and surgical management options as well as their advantages and disadvantages.
2.Briefly review the anatomy of the suprachoroidal space and how it may be utilized to lower IOP.
3.Discuss pre-conception counselling and examination paradigms in glaucoma and pregnancy.
4.Discuss how to recognize and diagnose neovascular glaucoma with a multimodal exam, including detailed history and exam.

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Neovascular Glaucoma: An acute emergency

Chase A. Liaboe

a. Overview of Neovascular glaucoma
   i. Etiology
   ii. Clinical presentation
   iii. Exam
   iv. Testing
b. Work-up for neovascular glaucoma
   i. Based on etiology
c. In-office management – prior to referral
   i. IOP control
d. Triage for neovascular glaucoma
   i. Retina
   ii. Glaucoma
   iii. PCP / ED
e. Treatment of neovascular glaucoma
f. Conclusion
g. Q&A

Notes

The Suprachoroidal Space in Glaucoma Management

Christine L. Larsen, M.D.

a.The suprachoroidal (or supraciliary) space
  i.Anatomy
    1.Uveoscleral outflow pathway
    2.Cleft
      a.Etiology
        i.Trauma
        ii.Iatrogenic
        iii.Surgical
      b.Treatment
        i.Medical
        ii.Laser
        iii.Surgical
  ii.Accessing the suprachoroidal space to lower IOP
    1.Surgical creation of a cleft
    2.Historical Devices
      a.Ab Externo
        i. Gold Micro-Shunt
        ii. STARflo
        iii. Aquashunt
      b. Ab Interno
        i. Cypass Micro-Stent
        ii. iStent Supra
    3. Devices Under Investigation
      a. CycloPen
      b. MINIject
        i. Current research opportunity for patient

Notes

Glaucoma and Pregnancy

Clara M. Choo, M.D.

a. Pre-conception counseling
   i. Women of childbearing age using glaucoma medications should be warned that none of the medications have FDA category A recommendation.
   ii. Eye development begins at week 3 and continues throughout gestation.
   iii. Ideally, the discussion of how glaucoma will be management during pregnancy happens before conception

b. Examination and monitoring
   i. Intraocular pressures typically lower in healthy eyes but can variable in glaucomatous eyes.
   ii. Monitoring may need to be as frequent as once a trimester if there is more severe glaucoma.
   iii. Examination drops
      1. Punctal occlusion upwards of 2 minutes with drop administration if deemed necessary for exam. All examination drops are category C, but no definitive adverse events have been reported.
      2. Anesthetics: Topical anesthetics used in routine examinations are Category C.
      3. Mydriatics: Phenylephrine is Category C but used in obstetric anesthesia (treatment for hypotension related to spinal anesthesia). Phenylephrine 2.5% is thought to be well tolerated given systemic use. 10% strength may increase hypertension.
      4. Anticholinergics: Category C. Consider neonatal dosing (0.2% cyclopentolate, 0.5% tropicamide) if needed.

c. Medication Therapy
   i. Brimonidine
      1. Brimonidine is the only Category B drug (no evidence of risk to humans). It is considered first line therapy for all trimesters, but there should be plans to discontinue the medication a few weeks prior to delivery (week 36-37) and during lactation due to CNS depression effect on the neonate.
   ii. Beta Blockers
      1. Beta Blockers are Category C drugs. It is used systemically to manage maternal hypertension, but animal studies have shown teratogenicity. May be considered 2nd line therapy to be used with brimonidine.
         2. First line therapy in post-partum period (if neonate does not have cardiac issues).

Notes

iii.Carbonic Anhydrase Inhibitors
1.Topical CAIs are Category C and 3rd line therapy, with limited systemic absorption. Systemic CAIs should be avoided due to teratogenicity in animal studies.
2.Can be used during lactation.
iv.Prostaglandins
1.Prostaglandins are Category C and 3rd line therapy. It can cause contractions of uterine muscle, and is used as an abortion induction agent in the first trimester.
2.Can be used during lactation.
v.Laser therapy
1.Selective Laser Trabeculoplasty and Laser Peripheral Iridotomy
a.No known risk to fetus. These lasers can be useful in reducing use of topical medications before conception.
2.Cyclophotocoagulation
a.These are shorter procedures that require a limited amount of local or systemic anesthesia.
vi.Surgical Therapy
1.Second trimester may be the best time to consider surgical therapy. The first trimester has higher risks to fetal anesthetic exposure. The third trimester may become more difficult with maternal positioning and maternal/fetal hypotension.
2.MIGS therapies may be explored given smaller incision sites and shorter surgical times/recovery periods.
3.Mitomycin C and 5-fluorouracil are known teratogenics. These agents are peri-operatively and post-operatively used in trabeculectomy surgeries.
4.Valsalva during labor may put post-surgical patients at risk for hypotony and choroidal detachments, especially if the patient has had a trabeculectomy or tube shunt. C-section should be discussed with the obstetrician.

Notes

Tube Shunts in Glaucoma Care

Patrick J. Riedel, M.D.

a.Current tube shunts (most common)
  i.Baerveldt (J&J Vision):
    1.350 mm2
    2.250 mm2
  ii.Ahmed (New World Medical)
    1.FP7
    2.FP8
    3.S2
    4.ClearPath 250 mm2
    5.ClearPath 350 mm2
b. How do they work?
  i.Shunt aqueous from anterior chamber to sub-conjunctival space via tube
  ii.Tube shunt plate allows for reservoir formation in sub-conj/sub-tenons space
  iii.Flow through tube should be controlled
    1.Valved tube shunt device
    2.Temporary closure/ligation of tube
c.When should they be used?
  i.Can be used as primary trans-scleral filtering surgery
    1.Neovascular glaucoma
    2.Uveitic glaucoma
    3.Post-traumatic glaucoma
    4.Patients requiring simultaneous or near-term corneal transplant surgery
    5.Aphakic patients
    6.Significant conjunctival scarring from non-glaucoma surgery
  ii.More often used after other glaucoma surgeries fail or are insufficient
  iii.Allow option to be placed inferiorly, unlike other filtering surgeries

Notes

d. What are their advantages/disadvantages?
   i.Advantages
      1.Avoid surgical limbus which often is scarred
      2.Allow an option after other sub-conjunctival incisional surgeries have been performed
      3.Can be placed anywhere 360o on the eye
      4.Proven effective at lowering IOP
      5.More than one can be placed
      6.Can be used in inflamed eyes
   ii.Disadvantages
      1.Large piece of permanent “hardware”
      2.Failure
      3.Corneal edema
      4.Diplopia
      5.Erosion
e. What studies support the use of tube shunts in glaucoma surgical management?
   i.Trab versus Tube study (TVT)
   ii.Primary Trab versus Tube (PTVT)
   iii.Ahmed versus Baerveldt study (ABC)
   iv.Ahmed versus Baservledt study (AVB)
f. How do you care for post-operative tube shunt patients?
   i.Early post-op period (first 4 weeks post-op)
   ii.Intermediate post-op period (1-2 months post-op)
   iii.Late post-op period (>2 months post-op)

Notes

Minnesota Eye Consultants Glaucoma & Cataract Specialist

Thomas W. Samuelson, M.D.

a. Financial Disclosures
b. Glaucoma Diagnostics; Drugs and drug delivery
c. What is the primary method of IOP measure used in your office?
- **i. Goldman applanation**
- **ii. Handheld digital device (tonopen, iCare, pneumotonometer)**

d. Results:
- **i. Correlation between home and Goldman was 0.99 (p< 0.001)**
- **ii. Goldman showed excellent correlation**
- **iii. Bias toward Goldman being higher than Home over a large range of IOP**

e. Visual Field Testing
- **i. Recommend 10-2 visual field testing**
  - **1.In addition to or instead of 24-2**
- **ii. What is your go-to testing format?**
- **iii. When 10-2?**
- **iv. When size V?**

f. OCT/Imaging
- **i. Recommended NFL and GCL/ macula**
- **ii. Do you imagine both NFL and GCL?**
- **iii. Which becomes abnormal first?**
- **iv. If lack of correlation, which do you rely on more?**
- **v. Is one of the other more susceptible to artifact?**

g. Medication Pitfalls
i. Compliance
ii. Follicular conjunctivitis
iii. Punctate staining
iv. Hyperemia
v. Corneal verticillate
vi. Corneal edema

Notes

h. Potential “pre-surgical” therapies:
  i. Eye drop therapy
  ii. Laser therapy
  iii. Intracameral/sustained release- procedural therapeutics
i. Surgical management of Cataract and Glaucoma
  i. Cataract and mild to moderate, stable glaucoma
    1.More often than not, preferred procedure is phaco plus
      a. iStent
      b. Hydrus
      c. Excisional goniotomy
      d. Canaloplasty
      e. Incisional goniotomy + canaloplasty
      f. Canal stent + viscodilation
      g. Bleb forming surgery
      h. ECP or micropulse
  ii. Standalone MIGS
    1.Glaucoma Therapies
      a. SLT
      b. Eyedrop therapy
      c. Procedural therapeutic
      d. Micropulse laser
      e. Cataract surgery
      f. Canal based MIGS
      g. Transcleral surgery
  iii. How do you know when to intervene surgically?
  iv. Must we exhaust laser or pharma options first or can MIGS be used as alternative to meds?
  v. Are canal-based interventions less effective with more advanced disease?
    1.Stenting vs. incisional vs excisional vs canal dilation
j. Surgical Management of Severe Glaucoma
  i. How often have you heard this statement?
    1.Trabeculectomy is the gold standard procedure for glaucoma?
  ii. Glaucoma management=
    1.Risk mitigation, no matter what we do, there is risk
  iii. Disease risk=
    1.Mild, asymptomatic -> severe, blinding
  iv. Surgical risk=
    1.Risk of disappointment -> catastrophic
  v. Trabs and tubes are still quite relevant

Notes

SESSION TWO

Moderators

Mark S. Hansen, M.D.

Minnesota Eye Consultants
Cornea, Glaucoma, Cataract
& Refractive Specialist

Omar E. Awad, M.D., F.A.C.S

Minnesota Eye Consultants
Cornea, Cataract
& Refractive Specialist

Sherman W. Reeves, M.D., M.P.H.

Minnesota Eye Consultants
Cornea, Cataract
& Refractive Specialist

Panelists

Elizabeth A. Davis, M.D., F.A.C.S.

Minnesota Eye Consultants Cornea,
Cataract & Refractive Specialist

David R. Hardten, M.D., F.A.C.S.

Minnesota Eye Consultants Cornea,
Cataract & Refractive Specialist

Matthew Field, M.D., Ph.D, M.P.H.

Minnesota Eye Consultants
Ophthalmic Fellow

Navigating Diagnostic and Therapeutic Challenges in Cataract Patients

COPE Course ID # 90871-PO

Course Description

This course will present a variety of diagnostic and therapeutic problems in regard to the patient presenting with cataract symptoms in a case based, panel discussion format.

Course Objective

1.Case-based diagnosis of cataracts, perioperative concerns and intraocular lens options for the cataract patient will be presented.

2.Panel discussion of therapeutic and management options of these conditions will be discussed.

Navigating Diagnostic and Therapeutic Challenges in Cataract Patients

Mark S. Hansen, M.D.; Omar E. Awad, M.D., F.A.C.S; Sherman W. Reeves, M.D., M.P.H.

Panelists:

Elizabeth A. Davis, M.D., F.A.C.S.

David R. Hardten, M.D., F.A.C.S

Matthew Field, M.D., Ph.D., M.P.H.

1. Cataract panel
   a. Faculty Disclosures
   b. Overview
2. Case 1: Cataract in a post-LASIK patient
   a. Presentation:
      i. 58 year old female
         1. History of LASIK
            a. Now with night driving halos
            b. BCVA 20/25 with BAT to 20/50 OU
            c. 1+PSC OU on exam
            d. Doesn't want to wear glasses for distance or near vision
            e. Audience Response Questions
   b. Preoperative history concerns:
      i. Are prior refractive records needed?
         1. Yes?
         2. No?
      ii. Monovision history?
   c. Exam findings
   d. Special testing:
      i. Role of corneal topography/tomography
      ii. Post-LASIK calculations
   e. Special counseling for post-LASIK status
      i. Setting expectations
         1. Over/under correction possibility
      ii. Understanding of accuracy post corneal refractive surgery

Notes

f.IOL options and counseling
i.Standard vs. premium options
ii.Which premium IOL to use
g.Postoperative concerns
i.Dealing with residual refractive error
ii.Enhancement strategies
h.Panel discussion
3.Case 2-Cataract with concurrent corneal disease
a.Presentation:
i.78-year-old male
1.Harder to see the TV
2.BCVA 20/40 OU
3.3+ NS with guttata OU
ii.Audience response questions
b.Preoperative history concerns
i.Symptomatic from Fuchs
1.Morning blur?
ii.Family history?
c.Exam findings/Special testing
i.Role of specular microscopy
ii.Role of CCT
d.IOL options and counseling
i.Cataract surgery alone or combined with DMEK
ii.What IOL's to offer
e.Postoperative concerns
i.Approach to postop corneal edema
f.Panel discussion

Notes

SESSION ONE

David R. Hardten, M.D., F.A.C.S.

Minnesota Eye Consultants Cornea, Cataract & Refractive Specialist

Elizabeth A. Davis, M.D., F.A.C.S.

Minnesota Eye Consultants Cornea, Cataract & Refractive Specialist

Advancements in the Treatment of Keratoconus

COPE Course ID # 90872-PO

Course Description

This course will review the treatments for keratoconus as well as introduce a new surgical modality for treatment called ALKRS (Automated Lamellar Keratoplasty using Regional Segments). The audience will learn about the indications, procedure, and postoperative course for patients having ALKRS.

Course Objective

1. Understand the current treatment options for keratoconus
2. Learn about the newest surgical treatment option
   a. Indication
   b. Surgical procedure
   c. Postoperative management
   d. Outcomes

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Advancements in the Treatment of Keratoconus

David R. Hardten, M.D., F.A.C.S.
Elizabeth A. Davis, M.D., F.A.C.S.

1. Financial Disclosures
2. Legacy of Keratoconus Patients
   a. PK for KCN
      i. Long history of PK for KCN
      ii. Because of large grafts, often iris issues, failed grafts
      iii. Newer management strategies for KCN hopefully will prevent late need for repeat PK, anterior segment reconstruction, glaucoma surgeries, scleral fixated IOLs
      iv. Identify & Manage Early (Avoid Progression with Progressive Disability)
3. Alternatives for KCN
   a. KCN – Avoid PK or DALK
      i. Improving options now with crosslinking and ALKRS (CAIRS, CTAK)
      ii. This patient had ALKRS and Crosslinking
      iii. Scleral Lenses can still be used
4. ALKRS
   a. Anterior Lamellar Keratoplasty with Regional Segments
      i. Also known as CAIRS (similar to Intacs but with corneal tissue)
      ii. Discuss customized corneal tissue segments (CTAK)
      iii. Crosslink after
5. Corneal Collagen Crosslinking
   a. Mechanism of Action
      i. Riboflavin excited by UVA radiation into triplet state, generating reactive oxygen species
      ii. Reactive oxygen species create covalent bonds between collagen molecules
6. Effects of Corneal Cross-Linking
7. Collagen Crosslinking
   a. Procedure Details
      i. Good full saturation with Riboflavin using KeraFlow irrigation device
      ii. Usually takes 5-10 min to saturate after epithelium removed
      iii. 30 min of light 3mW/cm2
      iv. Artificial Tears every 10-12 minutes to prevent desiccation

Notes

8. CXL
   a. Good full saturation with Riboflavin using KeraFlow irrigation device
   b. Usually takes 5-10 min to saturate after epithelium removed
   c. 30 min of light 3mW/cm2
   d. Artificial Tears every 10-12 minutes to prevent desiccation
   e. Expected 1 week post-operative findings
      i. Epi defect should be healed by 1 week
      ii. Bandage soft contact lens can come out 1-7 days postop
      iii. If still epi defect at one week, then likely will heal better without contact lens due to curvature issues
      iv. Frequent non-preserved lubricants
   f. CXL – Visit Schedule
      i. Early Postoperative
         1. 1-day post-op visit:
         2. 4-to-7-day post-op visit:
         3. 1 Month visit:
            a. Vision and pressure – epi should be back to normal, mild dryness, make sure hasn't had steroid response –separate visit related to keratoconus, not specifically to surgery
         4. 2–3-month visit – Might benefit from refit contact lens
         5. Recommend topography at 3 months, 6 months, then every 6 months in patient under 30 to monitor for keratoconus stability, annual if over age 30
9. IEK – Femtosecond Enabled Keratoplasty
   a. Lamellar or Penetrating Keratoplasty
      i. Useful for large degrees of ectasia
      ii. Patients unable to wear contacts
      iii. Patients not having good results with CXL or Intacs/CK
10. Deep Anterior Lamellar Transplant
   a. Anterior
      i. Partial thickness transplant for patients with anterior corneal disease
      ii. Keratoconus & post-refractive surgery ectasia
      iii. Anterior corneal scars
      iv. Technique
         1. Dissect off anterior cornea of patient – leaving Descemet's membrane
         2. Dissect off Descemet's from donor
         3. Then suture transplant onto patient over Descemet's membrane
         4. Suturing similar to that of a PK

Notes

11. Case Study: KCN
    a. 39-year-old with KCN OU
    b. OD: -12.5 + 8.00 x 175 = 20/50
    c. Pach 378
    d. 20/30 in contacts & difficult to wear
12. Case Study: KCN
    a. 41-year-old
    b. 2 years after DALK with IEK OD
    c. -2.25+3.25x105=20/20
    d. Still occasionally wears RGP
13. Diagnose Early/Monitor Closely
    a. 11-year-old with asymmetric astigmatism
        i. Stable for 2 subsequent exams 6 months apart
        ii. Still need close monitoring – thin, slight asymmetry, KCN suspect
        iii. Subtraction mapping – picks up subtle abnormalities/changes (N-O)
14. Diagnose Early/Cross-Link Early
    a. 14-year-old first exam with definite KCN
        i. "Normal" eye exam 2 years ago
15. KCN – Intolerant of Contacts
    a. Shape Change with Intacs/CK/CXL
        i. 36yo, contact lens intolerant, mild progression, poor vision in glasses
        ii. Pre
        iii. Post
16. KCN – Intolerant of Contacts: Supplement
    a. Shape Change with Intacs/CK/CXL
        i. 37yo, now contact lens tolerant (20/20), 20/25 in glasses
17. Should Intacs Still Play a Role?
    a. KCN
        i. Shape change and improve vision in glasses
        ii. More difficult to fit contacts afterwards
        iii. I think ALKRS/CAIRS/CTAK should replace Intacs in all of our patients now
        iv. ALKRS can now be used even in contact lens tolerant patients who want improved fit and occasional glasses wear
18. CTAK: Tissue and Plan
    a. Surgeon identifies candidate
    b. Sends raw data from Pentacam
    c. Planning and tissue provided
        i. Tissue thickness
        ii. Tissue width
        iii. Tissue length
        iv. Depth
        v. Incision angle
        vi. Offset
        vii. Tissue orientation

Notes

19.KeraNatural
    i.2-year shelf life
    ii.Full thickness cornea
    iii.Either half-moon segment or full ring size
    iv.6mm or 8 mm diameter
    v.EBAA Accredited
  b.Surgeon plans treatment based on Pentacam, topo, pachymetry
    i.Trims segment to appropriate length
    ii.Trims segment as desired
    iii.Laser data entry:
      1.Center offset is manually done by surgeon.
      2. Can mark center prior to application of Intralase cone
  c.Splitting Tissue
    i.Comes as the original donor thickness – so – can split if need thinner tissue (usually for less hyperopic shift)
20.ALKRS Case 1
  a.OM - 21yo M OS, KCN (Milder OD)
    i.Pre: UCVA: 20/250, -6.75+3.75x063 = 20/40
    ii.3mo: UCVA: 20/40, -1.5+3.25x160=20/20
    iii.4mo: Scleral Lens: 20/20
    iv.Pre
21.ALKRS Case 1 Plan: 4-8mm, InfTemp:2.3mm, 115 incision, 200-micron depth, 300 micron thick, 260 degree length
  a.OM - 21yo M OS, KCN (Milder OD)
    i.Pre: UCVA: 20/250, -6.75+3.75x063 = 20/40
    ii.3mo: UCVA: 20/40, -1.5+3.25x160=20/20
    iii.4mo: Scleral Lens: 20/20
    iv.Pre vs 3 months, subtractions @ 2 months
22.ALKRS Case 2
  a.MJ - 41yo F OD>OS
    i.Pre: UCVA: 20/30, -6.0+7.75x121 = 20/30
    ii.3mo: UCVA: 20/40, -0.25+1.25x108=20/20
    iii.Pre
23.ALKRS Case 2 Plan: 4-8mm, InfTemp:2.3mm, 110 incision, 200-micron depth, 350 micron thick, 230 degree length
  a.MJ - 41yo F OD>OS
    i.Pre: UCVA: 20/30, -6.0+7.75x121 = 20/30
    ii.3mo: UCVA: 20/40, -0.25+1.25x108=20/20
    iii.Pre vs 3 months postop (Humphrey Topo Post only)

Notes

24. ALKRS Case 3: 4.5-7.5mm, InfTemp:2.3mm, 55 incision, 250-micron depth, 200-micron thick, 180 degree length
    a. JG - 40yo M OD>OS, Post-M-LASIK Ectasia
        i. Pre: UCVA: 20/250, -4.75+2.25x153 = 20/20
        ii. 3mo: UCVA: 20/50, -0.5+4.75x122=20/20
        iii. Pre vs 3 months post
25. ALKRS Case 4: 4.0-8.0mm, InfTemp:2,2mm, 113 incision, 200 micron depth, 250 micron thick, 220 degree length
    a. PD – 28yo F OD
        i. Pre: OD: UCVA: 20/60, -3.25+2.75x167 = 20/25
        ii. 3mo: OD: UCVA: 20/30, MR: -1.25Dsphere=20/20
        iii. Pre vs 3mo
26. ALKRS Case 5: 4.0-8.0mm, InfTemp:1.8mm, 067 incision, 200 micron depth, 200 micron thick, 250 degree length
    a. JS – 32yo F OD
        i. Pre: UCVA: 20/40, -1.25+1.75x163 = 20/25
        ii. 3mo: UCVA: 20/20, plano+0.5x105=20/15
        iii. Pre vs 3 months
27. ALKRS Case 6:
    a. OI – 25yo M OS
        i. Pre UCVA: 3/200E
        ii. Pre MR: -9.00+4.00x41=20/100, J16
        iii. Pre op topo:
28. ALKRS Case 6
    a. Plan 4.0-8.0mm, InfTemp:2.13mm, 061 incision, 200 micron depth, 450 micron thick, 300 degree length
    b. 4 mo. Postop
        i. UCVA: 20/80
        ii. BCVA: 20/40, J2
        iii. Ks: 22.4 D flattening
        iv. (65.5/62.69à43.51/41.88)
29. ALKRS Case 7:
    a. KW – 33yo M OD
        i. Pre: UCVA: 3/200E, J16
        ii. No MR gives improvement
        iii. Although no scarring, probably a good keratoplasty candidate at this level of steepening
30. ALKRS Case 7:
    a. Width 4.0-8.0 mm, Inf-Temp Offset (due to thinning) 2.0 mm, Depth 200 microns, Thickness 454 microns, Length 330 degrees
    b. 7 months:
        i. UCVA: 20/80, J14
        ii. MR: -1.00+1.50x59
        iii. BCVA: 20/40, J3
        iv. Average Ks: 49.89 D
        v. Flattening: 38.61 D
        vi. Currently being fit with sclerals

Notes

31. Billing/Coding Information: Keratoconus
    a. Progressive (unstable) – H18.62
    b. Irregular Astigmatism – H52.211,2,3
    c. Difficulty with glasses and contact lenses
    d. CXL: 0402T
    e. ALK: 65730 and Tissue: V2785
32. Drop Regimen: ALKRS
    a. Same as CXL Drop Regimen
        i. Abx QID until gone
        ii. Pred Forte QID 3 wks, TID 3wks, BID 3wks, qd 3wks
        iii. NSAID QID 1d, TID 1d, BID 1d, qd 1d
        iv. Muro ointment night after BSCL out for 6-12 months
        v. Vit C 1gm 3 months AFTER surgery
        vi. Norco
        vii. Neurontin or Lyrica
33. Current Thoughts On Criteria
    a. KCN Treatments
        i. Recognize no hard cut-offs for treatment guidelines or algorithms, patient discussion is key
    b. Young Patient: Observation – Yearly Topography/Tomography:
        i. Changing astigmatism without inferior steepening
        ii. Strong family history
        iii. Down's syndrome, atopic disease, or other genetic risk factors
    c. Older Patient: Observation – Yearly Topography/Tomography:
        i. No progression in last few years
        ii. Good vision and contact lens tolerance
        iii. Age over 40-50
        iv. Good about eye rubbing and sleep position
    d. CXL alone
        i. Good BCVA/UCVA in typical method of correction: glasses/contacts, comfortable fit and age at risk for progression (<50yo)
        ii. Recognize no hard cut-offs for treatment guidelines or algorithms, patient discussion is key
    e. ALKRS+CXL
        i. Poor UCVA or BCVA in glasses and Poor/uncomfortable fit in contacts
        ii. Unacceptable vision in contacts
        iii. Difficulty manipulating contacts
        iv. Strong aversion to wearing contacts
    f. DALK/PK
        i. Centrally visually significant scar that doesn't give acceptable vision in contacts
        ii. Cornea too thin to place ALKRS (250 microns at a 5mm optical zone)

Notes

34. ALKRS: Current Thoughts on Outcomes
    a. Which patients/eyes have biggest change in flattening?
        i. Like CXL, patients with the steepest and thinnest corneas will have the greatest change in flattening.
        ii. In general, age does not seem to be a factor.
        iii. The thicker the inserted tissue and the longer the segment, the more change will occur as well.
    b. What types of corneal topographies have best improvements in BCVA?
        i. Asymmetric cones (inferior steepening) seem to have the greatest improvements.
        ii. However, symmetric cones also do see benefit.
    c. Results when done after CXL
        i. Still of benefit.
        ii. Good for patients who aren't getting adequate VA with CLs/sclerals after previous CXL.
35. Q&A

Notes

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