

Rapid Fire Ophthalmic Surgical Update  
COPE#33343-PO  
Walter O. Whitley, OD, MBA, FAAO

Walter Whitley has received honorarium from Alcon, Allergan, Bausch and Lomb, Inspire, Ista, Science Based Health. He is on the Advisory Board, Research and Speaker's Bureau for Alcon, Advisory Board, Research and Speaker's Bureau for Allergan, and Speaker's Bureau for Bausch and Lomb.

This course will review the most common ophthalmic surgical procedures including cataracts surgery, cornea transplants, glaucoma filtering procedures, retina treatments and oculoplastic surgery. Attendees will have a better understanding of the roles that ODs and MDs play in the co-management of various ophthalmic procedures to improve patient care.

- I. Introductions – Optometric Co-management
  - a. Basis of optometric co-management
  - b. Benefits for patient care
  - c. When to refer patients for surgery
  - d. How to refer patients for surgery
  - e. Preparing patients for ophthalmic surgery
  - f. How to establish/improve relationships with ophthalmology
- II. Cataract Surgery
  - a. Indications for referral for surgery
  - b. Preparing patient for cataract surgery
    - i. Patient education
    - ii. Your role in perioperative care
  - c. Communicating with your surgeon
    - i. Referral request form
    - ii. Pertinent patient notes
    - iii. Consent for co-management
  - d. IOL options for patients
    - i. Monofocal
    - ii. Monovision
    - iii. Lifestyle IOLs – Toric / Multifocal / Accommodating IOLs
  - e. Review cataract surgery procedure
  - f. Femtosecond laser assisted cataract surgery
  - g. Postoperative care
    - i. Patient education
    - ii. Minimizing and managing complications
- III. Cornea Procedures
  - a. Indications for referral for surgery
  - b. Preparing the ocular surface
  - c. Updates on corneal refractive procedures
    - i. Corneal collagen crosslinking
    - ii. Presbyopic corrections – PresbyLasik, Intracor
  - d. Corneal transplants
    - i. ABC's of corneal surgery
      1. Penetrating Keratoplasty (PK)
      2. Deep Lamellar Endothelial Keratoplasty (DLEK)

3. Descemet's Stripping Endothelial Keratoplasty (DSEK)
4. Descemet's Stripping Automated Endothelial Keratoplasty (DSAEK)
5. Descemet's Membrane Endothelial Keratoplasty (DMEK)
- ii. Normal adult corneas
  1. 3,500 cells/mm<sup>2</sup>
  2. CCT 550 um
- iii. Fuch's Dystrophy
  1. 515 cells/mm<sup>2</sup>
  2. CCT 650um or greater
- iv. DSEK / DSAEK
  1. Inclusion
    - a. Corneal endothelial dysfunction
    - b. Previous glaucoma procedures
    - c. Failed PK with minimal astigmatism
  2. Exclusion
    - a. Corneal scarring
    - b. Aphakic
    - c. Iris loss/atrophy
  3. Advantages of DSEK vs. PK
    - a. Sutures
    - b. Visual recovery
    - c. Astigmatism/ametropia
    - d. Epithelial complications
    - e. Corneal allograft rejection
    - f. Wound strength
    - g. Globe stability
    - h. Post op clinic time
  4. Complications
    - a. Graft-recipient interface
    - b. Fragile graft tissue
    - c. Graft location
    - d. Glaucoma
    - e. Infection
    - f. CME
    - g. Retinal detachment
  5. Difference between rejection vs. failure
  6. Discuss post-operative care
- v. Penetrating keratoplasty – review of the procedure
  1. Indications
    - a. Deep scarring
    - b. Endothelial pathology
    - c. Perforation
    - d. Disease corneas
  2. Contraindications
    - a. Glaucoma
    - b. Vascularization
    - c. Previous graft failure
  3. Intraoperative complications

- a. Damage to lens/iris from instruments
    - b. Irregular trephination of host
    - c. Poor graft centration onto host bed
    - d. Excessive bleeding from iris and wound edge
    - e. Choroidal hemorrhage and effusion
    - f. Iris incarceration in the wound
    - g. Damage to donor tissue during handling
  - 4. Immediate postoperative complications
    - a. Wound leak
    - b. Flat chamber/iris incarceration in wound
    - c. Primary donor failure
    - d. Persistent epithelial defect
    - e. Endophthalmitis
  - 5. Long-term complications
    - a. Glaucoma
    - b. Microbial keratitis
    - c. Suture-related problems
    - d. Wound dehiscence
    - e. Immunologic graft rejection
    - f. Late endothelial failure
    - g. Graft failure
    - h. Refractive error, astigmatism
  - 6. Discuss post-operative care
- e. Superficial keratectomy
  - i. Indications
    - 1. Recurrent corneal erosion
    - 2. Epithelial basement membrane dystrophy
    - 3. Salzmann's Degeneration
  - ii. Review of the procedure
    - 1. Topical anesthetic
    - 2. Corneal epithelium is removed
      - a. Dry cellulose sponge (Weck-cel) or a disposable scarifier blade
    - 3. Cleavage planes between the subepithelial fibrous tissue and Bowman's layer located and exploited
    - 4. Tissue can be stripped and peeled with the aid of jeweler's forceps
    - 5. Leaves Bowman's layer unharmed
  - iii. Review post-operative care
- f. Pterygium surgery
  - i. Indications
    - 1. Presence of benign thickening of the outer conjunctiva of the eye that grows onto the cornea
    - 2. Loss of clarity within visual axis
    - 3. Increasing corneal astigmatism
    - 4. Chronic irritation and inflammation
    - 5. Cosmesis
    - 6. Motility restriction
  - ii. Review of the procedure
    - 1. Abnormal tissue removed exposing bare sclera

2. Conjunctival autograft - transplant of tissue that has been painlessly removed from underneath the upper eyelid
  3. Stiches vs. No-stitch
    - a. Tisseel Glue - Fibrin tissue adhesive
  - iii. Discuss post-operative care
  - iv. Complications
    1. Recurrence
    2. Subepithelial scarring
    3. Scleral melt (mitomycin-C)
    4. Muscle insertion damage
    5. Graft inversion
    6. Dellen
    7. Steroid complication
- IV. Glaucoma Surgery
- a. Indications for referral for surgery
    - i. When should you refer?
    - ii. Combined cataract and glaucoma procedures versus stand-alone procedure
  - b. Preparing patient for glaucoma surgery
    - i. Patient education
    - ii. Your role in perioperative care
    - iii. Importance of performing baseline testing prior to referral
  - c. Surgical treatments for glaucoma
    - i. Laser treatments
      1. Selective laser trabeculoplasty
      2. Argon laser trabeculoplasty
      3. Transcleral cyclophotocoagulation
      4. Which is the preferred method?
      5. Review clinical studies
    - ii. Standard surgical treatments
      1. Trabeculectomy
        - a. Indications – target pressure not achieved
          - i. Optic nerve progression despite MMT and/or LT
          - ii. Visual field progression despite MMT and/or LT
          - iii. Inability to take drops adequately
          - iv. Moderate to advanced disease
        - b. Allows aqueous to bypass TM
        - c. Flows into subconjunctival space
        - d. Absorbed by epivenous system
        - e. Target pressure is LOW
        - f. Advantages
          - i. More efficient at lowering IOP compared to medical and laser therapy
        - g. Use of anti-metabolites
          - i. Decrease wound healing response
          - ii. Improve bleb survival
          - iii. 5 fluorouracil
          - iv. Mitomycin-C
        - h. Complications

- i. Scar formation-failure
  - ii. Bleb leak
  - iii. Blurring of vision
  - iv. Hypotony
  - v. Choroidal hemorrhage
  - vi. Infections – blebitis/endophthalmitis
  - vii. Cataract formation
- 2. Trabectome – review of procedure and indications
  - a. Candidates
    - i. Progression despite MMT/Laser
    - ii. On 1-2 glaucoma medications
    - iii. Target pressure in mid-teens
    - iv. Combined visually significant cataract and glaucoma
    - v. Glaucoma in its early-to-moderate-stage
  - b. Advantages
    - i. Non-penetrating/no disturbance of conjunctiva
    - ii. Requires no bleb
    - iii. Low patient risk
    - iv. Restores the eye's natural fluid balance
    - v. Simpler than traditional therapies
    - vi. Low complication rate
    - vii. Easily combines with cataract extraction
    - viii. Safe, economical and effective
    - ix. Reduction of glaucoma medications
    - x. Good for contact lens wearers
    - xi. Fewer follow-up appointments
  - c. Disadvantages
    - i. 20% had a post op iop spike
    - ii. Post op hyphema is typical
    - iii. Synechia formation around cleft
    - iv. Descemet's injury
    - v. Cost of equipment
- 3. Express shunt – review of procedure and indications
  - a. Candidates – Indicated when medical and laser therapy has failed
    - i. Previously failed trabeculectomy
    - ii. Patients with multiple other procedures such as corneal grafts, vitrectomies or retinal detachment repair with prior cataract surgery
  - b. Advantages
    - i. Little to no inflammatory reaction once implanted
    - ii. Implanted under partial thickness scleral flap
    - iii. Less traumatic to the eye
- 4. Tube shunt
  - a. Review of procedure and indications
  - b. Valved versus non-valved
  - c. Advantages
    - i. Safer for contact lens wearers

- ii. More standardized post-operative care
- iii. Used when previous trabeculectomy failed
- iv. Results comparable to trabeculectomy

5. Canaloplasty

- a. Review of procedure and indications
- b. Advantages
  - i. Non-penetrating
  - ii. Holds open Schlemm's canal
  - iii. Requires no bleb
  - iv. Requires no device
  - v. Safely lowers pressure by an average of nearly 40%
  - vi. Reduces or eliminates medications and costs
  - vii. Provides less risk of complications after surgery
  - viii. Fewer follow-up appointments
  - ix. Reduced scarring 1

6. Endocyclophotocoagulation

- a. Review of the procedure and indications
- b. Advantages
  - i. Non-penetrating/no disturbance of conjunctiva
  - ii. Requires no bleb
  - iii. Easily combines with cataract extraction
  - iv. Safe, economical and effective
  - v. Reduction of glaucoma medications
  - vi. Good for contact lens wearers
  - vii. Fewer follow-up appointments

V. Retina Surgery

a. Preparing patient for retina surgery

- i. Patient education
- ii. Your role in perioperative care
- iii. Importance of performing baseline testing prior to referral

b. Surgical treatment options

- i. Injections
  - 1. Macular degeneration – Anti-vegf, steroid
- ii. Laser procedures
  - 1. Glaucoma – Pan retinal photocoagulation for neovascular conditions
  - 2. Macular degeneration – focal laser
  - 3. Diabetes – focal laser, pan retinal photocoagulation
  - 4. Retinal tears/detachment - retinopexy

iii. Surgical treatments for the retina

1. Vitrectomy

a. Procedure

- i. Instruments, which pass through these incisions, include a light pipe, an infusion port, and the vitreous cutting device
- ii. The light pipe is the high-intensity flashlight and is used to illuminate inside of the eye

- iii. The infusion port is required to replace fluid in the eye and maintain proper pressure within the eye.
  - iv. Vitrector, or cutting device, works like a tiny guillotine, with an oscillating microscopic cutter to remove the vitreous gel in a slow and controlled fashion
  - v. Operating microscope and contact lenses allow a clear view of the vitreous cavity and retina at various magnifications
  - vi. The procedure is performed in an operating room under local or general anesthesia
- b. Candidates
- i. Advanced diabetic retinopathy
  - ii. ERM / macular holes
  - iii. Remove vitreous opacities
  - iv. Remove foreign bodies
  - v. Endophthalmitis
- c. Advantages
- i. Clear the media
  - ii. Manipulate retina intraocularly
  - iii. Perform laser intraocularly
- d. Intraocular gases - Sterile air or gases usually either perfluoropropane (C3F8) or sulfur hexafluoride (SF6) mixed with sterile air have been used in vitreous surgery
- i. Air remains in the eye for a week
  - ii. SF6 lasts 10-14 days
  - iii. C3F8 – last up to 2 months
  - iv. Gas is also used to close macular holes
  - v. Necessary to maintain a certain head position
  - vi. Vision in a gas filled eye is usually rather poor until at least 50% of the gas is absorbed
  - vii. May cause glare and double vision, especially when it is about halfway reabsorbed
  - viii. Complications of intraocular gas
    - 1. Progression of cataract and glaucoma.
  - ix. It is unsafe to fly in a plane while gas remains in the eye.
- e. Silicone Oil - clear viscous fluid, which is sometimes used instead of gas to keep the retina attached postoperatively
- i. Long term support of the retina as is required in the repair of very complicated retinal detachments.
  - ii. Unlike gas, patients are still able to see through clear silicone oil.
  - iii. Positioning is less critical with silicone oil
- f. Macular hole repair
- i. Consider for advanced stages (3 or 4)
  - ii. Release and remove macular/vitreous traction
  - iii. Perfluorocarbonpropane C3F8
    - 1. 8X denser than air
    - 2. Expands 4X

- 3. Persists 4-6 weeks
        - iv. Patient must lie face down for short period of time
      - g. Epiretinal membranes
        - i. Consider for VA <20/60
        - ii. Peeled with forceps
        - iii. No tamponade
      - h. Proliferative Diabetic Retinopathy
        - i. Vitreous hemorrhage
        - ii. Tractional RD
        - iii. Chronic macular edema
      - i. Risks of surgery
        - i. Infection
        - ii. Bleeding
        - iii. Cataract
        - iv. Glaucoma
        - v. Retinal detachment
- 2. Retinal Tears
  - a. Laser photocoagulation
    - i. Laser beam directed through a contact lens or ophthalmoscope
    - ii. Burns are placed around the retinal tear
    - iii. Results in scarring that "welds" the retina to the underlying tissue.
  - b. Cryopexy
    - i. Local anesthetic numbs your eye
    - ii. Freezing probe to the outer surface of the eye directly over the retinal defect
    - iii. Freezes the area around the hole, leaving a delicate scar that helps secure the retina to the eye wall
  - c. Post-operatively – Need to remain relatively still for the next two weeks or so, as the bonds created by your procedure strengthen
- 3. Retinal detachments
  - a. May be performed with photocoagulation / cryopexy
  - b. Surgical approach dependent on the type, size and location of the retinal detachment
  - c. Pneumatic retinopexy
    - i. Involves injecting a bubble of air or gas into the vitreous
    - ii. Over the next several days, the gas bubble expands, sealing the retinal tear by pushing against it and the detached area that surrounds the tear
    - iii. With no new fluid passing through the retinal tear, fluid that had previously collected under the retina is absorbed, and the retina is able to reattach itself to the back wall of your eye
    - iv. Depending on location of RD, may need to hold head in a certain position for several hours in order to keep the bubble in place



- d. Scleral buckle - Indenting the surface of your eye
  - i. Involves suturing a piece of silicone rubber or sponge to sclera over affected area
  - ii. Indents the wall of the eye, relieving the tugging of the vitreous on the retina
  - iii. May be done 360 degrees if presence of several tears or holes or an extensive detachment
  - iv. Permanent
- e. Vitrectomy - Draining and replacing the fluid in the eye
  - i. Remove the gel-like fluid in the center of the eye, along with any tissue that is tugging on the retina
  - ii. Air, gas or liquids are injected into the vitreous cavity to reattach the retina
  - iii. A vitrectomy is often combined with a scleral buckling procedure

## VI. Oculoplastics Surgery

- a. Indications for referral for surgery
- b. Preparing patient for oculoplastics surgery
  - i. Patient education
  - ii. Your role in perioperative care
  - iii. Importance of performing baseline testing prior to referral
- c. Surgical Treatment for lid disorders
  - i. Inflammatory eyelid disorders – chalazion, hordeolum, blepharochalasis, floppy eyelid syndrome
    - 1. Steroid injections
    - 2. Curettage
    - 3. Blepharoplasty
    - 4. Tarsal wedge resection
    - 5. Lash ptosis correction
  - ii. Ectropian
    - 1. Discuss causes of ectropian
    - 2. Pre-operative management
    - 3. Surgical treatment
      - a. Eyelid shortening procedures
      - b. Tightening of canthal ligament
  - iii. Entropion
    - 1. Discuss causes of entropion
    - 2. Pre-operative management
    - 3. Surgical treatment
      - a. Botox
      - b. Quickert sutures
      - c. Horizontal tightening
      - d. Retractor placation
      - e. Orbicularis extirpation
      - f. Anterior lamellar recession
  - iv. Eyelid aging deformity – dermatochalasis, orbital fat prolapse, midface descent
    - 1. External blepharoplasty
    - 2. Skin tightening

3. Midface lift
  4. Facial fillers
- d. Post-operative management / complications
- i. Eyelid suture removal 5-7days
  - ii. Post-operative hematoma
  - iii. Ecchymosis
  - iv. Edema
  - v. Allergic reactions
  - vi. Infection
  - vii. Unsatisfactory outcomes