Rapid Fire Ophthalmic Surgical Update
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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/mm²
   2. CCT 550 um

iii. Fuch’s Dystrophy
   1. 515 cells/mm²
   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

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. **Entropian**
         1. Discuss causes of entropian
         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 5-7 days
   ii. Post-operative hematoma
   iii. Ecchymosis
   iv. Edema
   v. Allergic reactions
   vi. Infection
   vii. Unsatisfactory outcomes