ASCRS ♦ ASOA Symposium & Congress

Technicians & Nurses Program

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The Patient Experience: Before and After Surgery

Sunday, May 8, 2016, 10:30-11:30am
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Objectives
- Identify the tech work-up components of 3 common surgeries (plastics, glaucoma, cataract) before and after surgery
- Connect how the accuracy of the pre-op measurements are important to the surgery and post-operative outcomes
- Provide a general overview of what the patient goes through in surgery
- Describe common post-operative exam procedures ordered after surgery to measure post-operative outcomes

Three Common Ocular Surgeries:
- Ptosis Repair and Blepharoplasty
- Trabeculectomy (and other glaucoma surgeries)
- Phacoemulsification with Intraocular Lens Implant

Financial Disclosures
- I have none

PTOSIS and DERMATOCHALASIS

Function of the Eyelids
- Protect the eyes from debris and injury; maintain a healthy tear film and corneal surface
Ptosis

- Ptosis is the drooping or falling of the upper eye lid
- Caused by the dysfunction of the muscles that raise the eyelid or their nerve supply
- Multiple causes including age-related weakening of the muscle, congenital weakness, trauma, or sometimes neurologic disease

Dermatochalasis

- Dermatochalasis is a condition in which there is excessive skin on the upper or lower eyelid
- Typically caused by age-related loss of skin elasticity and fat prolapse
- Sun exposure and genetics can also be factors

Patient Symptoms

- Complaints of loss of visual field
- Aesthetically unpleasing
- Self-awareness, emotional impact

Goldmann Visual Field

- Distance between upper lid margin and iris reflects (MFRD)
- Mild ptosis (2 mm or droop)
- Moderate ptosis (3 mm)
- Severe ptosis (4 mm or more)

Ptosis GVF Field, Lid taped and not taped

Ptosis Repair– Before and After
Glaucoma Evaluation

- Patient complains of:
  - Sometimes nothing!
  - Decreased Peripheral Field
  - Nuisance of taking eye drops
  - Dosing schedule
  - Don’t seem to help
  - Expensive

Types of glaucoma:

- Primary Open Angle Glaucoma (POAG)
- Normal Tension Glaucoma (NTG)
- Narrow/Closed Angle Glaucoma (ACG)
- Congenital Glaucoma
- Types of Secondary Glaucoma
  - Pigmentary Dispersion Glaucoma
  - Pseudoexfoliative glaucoma
  - Inflammatory glaucoma
  - Traumatic glaucoma
  - Neovascular Glaucoma
  - Herpes Simplex Virus
  - Herpes Zoster Virus

Optic Nerve

- The optic nerve, also called Cranial Nerve II (CNII), transmits visual information from the retina to the brain.
- ~30mm long from posterior globe to orbital apex

Vision with Glaucoma

- Vision with moderate glaucoma
- Normal Vision

Types of secondary glaucoma:

- Pigmentary Dispersion Glaucoma
- Pseudoexfoliative glaucoma
- Inflammatory glaucoma
- Traumatic glaucoma
- Neovascular Glaucoma
- Herpes Simplex Virus
- Herpes Zoster Virus

Anatomy Affected

- Normal angle
- Angle closure

Progression of Optic Nerve Damage

- Image 1
- Image 2
- Image 3
- Image 4
**Intraocular Pressure (IOP)**
- The amount of pressure inside the eye
  - Normal range: 10-21mmHg
- The pressure is necessary to maintain the eye's shape, nourishment, and function
- Increased IOP (ocular hypertension)
  - Can cause ON damage
  - One sign of possible glaucoma
  - Medical and surgical treatment

**Glaucoma Evaluation**
- Special Testing Required:
  - IOP (Intraocular Pressure)
  - Manifest Refraction for Best Corrected Visual Acuity
  - Visual Field Test
  - Optic Nerve Analysis - OCT (Ophthalmic Coherence Tomography)
  - Pachymetry: Corneal thickness can affect IOP results
  - Slit Lamp Exam: Check angles
  - Gonioscopy
  - Optic Nerve Assessment: Dilated Fundus Exam

**Goldmann Applanation**

**Other Tonometry**

**Pachymetry (Corneal Thickness)**
- IOP Measured on the Cornea
- Normal thickness around 550µm (1/2 mm)
- Thickness matters…
  - Compare a balloon to a basketball... thicker material less indentation
  - Thinner cornea (<400µm) allows less indentation, false high IOP readings
  - Thicker cornea (>500 µm) allows more indentation, false low IOP readings
Humphrey Visual Field

Normal Nerve and Field

Damaged Optic Nerve with Visual Field Loss

OCT- Optic Nerve

OCT- Optic Nerve

• Captures images of the Optic Nerve
• Shows swelling, thinning, atrophy, etc.

Checking Angles
Checking Angles

Narrow Angle

View on Gonioscopy Exam

Non-pigmented trabecular meshwork
Schwalbe’s line
Pigmented trabecular meshwork
Scleral spur
Ciliary body band

Gonioscopy

Glaucoma Treatment

- First, treat with medications to reduce IOP
  - Reduce production of aqueous
  - Increase outflow
  - Combination of actions

- Types of Glaucoma Medications:
  - Beta Blockers: (Timolol, Latanoprost, Betaxolol, Betagan, Ocupress)
  - Alpha adrenergic Agonists: (Alphagan P)
  - Carbonic Anhydrase Inhibitors: (Trusopt, Acetazolamide, Diamox, Mannitol)
  - Prostaglandin Analogues: (Travatan, Lumigan, Zioptan, Xalatan)
  - Hyperosmotics: (Osmotrol, Mannitol)
  - Myotics: (Pilocarpine)
  - Combination Drops: (Simbrinza, Cosopt, Combigan)

Common Side Effects of Glaucoma Medications

- B-blockers: Heart and respiration rate affected
- Discoloration on eyelids and surrounding areas
- Itching, swelling around the eyelids
- Mid-dilated pupil
- Eye lid growth
- Loss of appetite
- Tingling in extremeties
- Kidney stones
- Bad taste

- Glaucoma patients and non-compliance
  - Drops “Don’t seem to be doing anything”
  - They're not making my vision better
  - Drops are too expensive
  - I don’t remember to take them
  - It’s inconvenient to take multiple doses every day
  - They taste bad
  - They sting
  - I can’t get them into my eye
  - Just don’t like putting drops in my eye
  - They irritate my eye (or eyelids)
Glaucoma Treatment

- If medications are ineffective or if patient becomes intolerant of the drops, Laser Surgery may be scheduled
  - Selective Laser Trabeculoplasty (SLT)
    - Now the treatment of choice in most glaucoma patients
    - Uses a non-thermal "cool" laser
    - Does not cause scarring of the trabecular meshwork
    - Can be repeated several times
  - Argon Laser Trabeculoplasty (ALT)
    - Uses a thermal laser which does create a hole in the TM
    - Can only be treated inferior and superior 180°
  - Laser Peripheral Iridotomy (LPI) - for angle closure

- Cycloablation - Destroys the ciliary body, thereby destroying the mechanism for producing aqueous

Glaucoma Treatment

- If Medications and Laser Surgery are not effective, then conventional surgery may be scheduled
  - Common types of conventional glaucoma surgery:
    - MIGS (Micro-invasive glaucoma surgery)
    - Trabeculectomy ("Trab")
    - Drainage Devices (Molteno, Baerveldt, Ahmed Valves)

MIGS

- Trabectome

Drainage Devices

- Glaukos iStent (FDA approved with Cataract Surgery)
  - Reduces IOP by a few points, not very aggressive, but able to use earlier in treatment course
Drainage Devices

- Ahmed Valve

Trabeculectomy

- Reduces IOP by removing part of the trabecular meshwork and surrounding structures

Trabeculectomy

- Creates an alternate route for fluid to exit the eye
- Ultimate goal is to prevent visual field loss and/or progression

- Conjunctival Flap
- Scleral Flap
- Enter into anterior chamber
- Iridotomy if needed
- Close Scleral flap and Conjunctival flap with suture
- Fluid in the AC drains into conjunctival sac forming the bleb

Trabeculectomy

- Prevent Inflammation
  - Anti-inflammatories used to decrease inflammation and scarring

Post-Operative Testing

- Monitor IOP results
- Monitor Visual Field Test results
- Monitor OCT imaging of the Optic Nerve
- Regularly check optic nerve during dilated eye exam
- Measure A’s and K’s to measure changes in eye length and curvature which may occur with large IOP changes
Post-operative Complications
- IOP too high or too low
- Conjunctival redness, irritation
- Conjunctival scarring (closes off the drainage port)
- Discomfort from the bleb
- Corneal edema
- Late infection, blebitis
- Bleeding inside the eye
- Choroidal detachments
- Hypotony maculopathy
- Cataracts
- CME
- Iris abnormalities
- Retinal tear or detachment

Needling the Bleb
- If IOP is high, could be related to conjunctival healing process
- Small gauged needle used to break up conjunctival scarring

Hypotony Maculopathy

CATARACTS

Cataract Evaluation
- Patient complains of:
  - Decreased Vision
  - Decreased confidence in driving at night/in the rain
  - Glare/Halos
  - Decreased Contrast Sensitivity
  - Need more light to read
- May also be worried about:
  - Ability to function in daily activities
  - Losing their driver’s license
  - “Going blind”
  - Scared of eye surgery
  - Cost of care
  - Transportation and other perceived inconveniences

Vision with Cataracts
- Vision with cataracts
- Normal Vision
Vision with Cataracts

- Vision with Glare and Halos as compared to normal

Cataract Evaluation

- Special Testing Required:
  - Axial Length
  - Keratometry
  - Refraction
  - Glare Testing
  - Contrast Sensitivity Testing
  - White-to-White (Corneal Diameter)

Axial Length

- Optical Biometers
  - IOL Master
  - LenStar
  - Aladdin
  - Pentacam

Axial Length - Ultrasound A-Scans

- Contact A-Scan
  - Immersion A-Scan

Measurements

- Axial length (AL)
- Keratometry (K)
- Anterior chamber depth (ACD)
- White-to-white (WTW)

IOL Calculations

- IOL Options listed
  - Standard IOL
  - Multi-piece IOL
  - Akers Toric IOL
  - ReSTOR IOL (+3.0D add power)
Manifest Refraction
- Check for best corrected visual acuity

BAT Glare Testing

Glare Testing

Contrast Sensitivity Testing
- 100% Contrast
- 63% Contrast

White To White

Keratometry (K-readings or K’s)
- Various ways to measure K’s:
  - Manual Keratometry
  - Topography (Zeiss Atlas, Pentacam, iTrace, etc.)
  - Optical Biometry (IOL Master, LenStar, Aladdin, etc.)
The Effects of Astigmatism

- Placido Topography of central 6mm (anterior cornea)
- K-readings at 2.3 and 1.65mm rings
- Links to Toric IOL Calculator

Keratometry

Zeiss Atlas Topography

Zeiss Atlas

T-Cone Toric Platform

LENSTAR Topography
iTrace

- Wavefront Exams-aberrrometer (refraction assessment)
- Corneal Topographer (map of cornea)

Pentacam

- Topography
- Pachymetry-based IOP correction
- 4 Refractive Maps
- Anterior segment tomography
- 3D anterior chamber analysis
  - chamber angle
  - chamber volume
  - chamber depth
- Iris camera and HWTW
- Indices Reports: Glaucoma and Refractive screen

IOL Calculations

- Use up-to-date IOL formulas
  - IOL power determined by the surgeon’s preference and intended lens placement
  - Surgeon will decide which IOL formulas to use
- Holladay II formula highly recommended
- Consider back-up IOL
Example Patient

- Cataract Surgery planned for both eyes with Toric IOL
- IOL Power measurement
- Toric IOL Power Measurement
- Toric IOL Axis Placement

- Monovision planned
  - Distance for dominant eye (OD), aim for plano
  - Near vision for non-dominant eye (OS), aim for between -2.00 and -2.50D

Marking the Eye Before Surgery

VERION™ Image Guided System
Callisto Guidance System

Post-Operative Evaluation
- Refraction
- IOP
- Slit Lamp exam
- Posterior exam

Phaco with Toric IOL Surgery
- Video

Post-Operative Complications
- Corneal edema
- Cell & Flare
- CME
- IOP increase

Goal: Happy Patients

Any Questions?