Glaucoma Surgical Update
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GLAUCOMA, CATARACT, AND ANTERIOR SEGMENT DISEASE

Financial Disclosures

Objectives
- Showcase some of the MIGS strategies currently available in the US
- Gain an understanding of the role of MIGS in the glaucoma treatment algorithm
Quick Aside - What is Glaucoma?

- Glaucoma is not just elevation in intraocular pressure.
- Intraocular pressure is the main risk factor and main modifying factor associated with glaucoma.
- Elevated intraocular pressure can cause structural and functional damage to the optic nerve -> glaucoma.

Micro-Invasive Glaucoma Surgery

- Ab-interno approach
- Minimally traumatic
- At least modest efficacy
- Extremely high-safety profile
- Rapid recovery

Aqueous Outflow
Aqueous Outflow Targets

Conventional Outflow
- iStent
- iStent inject
- Trabectome
- GATT
- KDB
- Omni/Visco/Trab360

Suprachoroidal Space
- Non-conventional Outflow
- Cypass*

Glaucoma Treatment Paradigm
- Medications
- Lasers
- Trabeculectomy
- Tube shunt
- MIGS

MIGS - Where are we now?
- Earlier intervention at mild-moderate disease
- Target IOP mid-teens
- Reduction of medications
- Safely suggests potential role in specific patients with advanced disease
- Combination with phacoemulsification
- Exploring newer surgical targets
MIGS - Where are we now?

- Earlier intervention at mild-moderate disease
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Augmenting Conventional Outflow

Phacoemulsification Reduces IOP

4mmHg (16.5%) drop
Sustained for 3 yrs

Ophthalmology 2012;119:1826-1831
Trabecular Meshwork

- Trabecular meshwork
- Uveal meshwork
  - 25-75 micron openings
- Corneoscleral meshwork
  - 5-50 micron openings
  - Increasing resistance
- Juxtacanalicular meshwork
  - Small openings, dense extracellular matrix
  - Most resistance

Canal of Schlemm

- 100-370 microns
- Circumferentially present, but not necessarily circumferential flow
- Subject to possible collapse?

Collector Channels

- Approximately 30 channels around the eye
- Connect SC to aqueous veins, intrascleral venous plexus
Aqueous Veins

- **Origin:**
  - ~1/2 from deep limbus
  - Form U or figure-6 arch
  - ~1/6 from limbal collaterals
  - ~1/3 from posterior scleral emissary vessels
  - 10-100 um width
  - 2-3 veins visible per eye
  - sometimes more (up to 6)
  - Visible in "almost every eye"

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**iStent**

iStent - FDA IDE

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**iStent - FDA IDE**

- Suttorp et al. Ophthalmology 2011;118:459-467
- Cosent et al. JGOG 2012;138:1365
**iStent 1.0**

- Single stent
- Learning curve
- Safe
- Mildly effective compared to phaco alone

**Multiple iStents**

- Increased flow with more stents
- Targeting to blood reflux, pigment collection
Multiple iStents

- Sustained IOP reduction with multiple stents
- 3 stents for eyes with greater need for IOP control

Belovay et al. JCRS 2012;38:1911-1917

More Coming to an OR Near You!

Ab-Intemo Trabeculotomy and Goniotomy
Ab-Interno Trabeculotomy and Goniotomy

- As opposed to cannulating and stenting Schlemm's canal, we instead try to unroof the canal.

Gonioscopy-Assisted Transluminal Trabeculotomy (GATT)

Trab360/Visco360/Omni360
Trab360/Visco360/Omni360
Single instrument that can be used to incise into 360°, then viscodilate or unroof it 180 degrees at a time

Visco360

Kahook Dual Blade
Subconjunctival Outflow - What’s Old is New Again

- Standard for glaucoma surgeons for decades
- Trabeculectomy first described in the 1960’s
- Tube shunts remain widely used in complex glaucomas
- Very low pressure floor, but also subject to risks from altering normal physiology
- Wound healing, infection, hypotony

XEN
- 6mm long, 45 micron lumen
- Composed of cross-linked gelatin
- Delivery through a 27g needle using a clear corneal incision
XEN

Angle Surgery Setup

- Often combined with cataract surgery
- Sometimes can be done as solo procedures
- Additional instrumentation needs:
  - Goniprism: Swann-Jacobs direct goniprism
  - Requires the head to be turned 30-40 degrees and the microscope to be tilted the same amount
  - Viscoelastic agents as there can be blood reflux, a cohesive viscoelastic like HealonGV is helpful to have available
  - MST microinstruments: sometimes useful to help reposition iStents

Patient Experience After MIGS

- Often very similar to cataract surgery
- Small incisions, fast visual recovery
- Moderate activity restrictions
- Minimal discomfort (if any)
- Be tuned in to changes in glaucoma meds - highly variable among glaucoma surgeons!
Thank You!
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