SURGICAL ALTERNATIVES TO TRABECULOPLASTY

Julia Agapov DO, MD
Assistant Professor
University of Wisconsin, Madison
Canaloplasty and MIGS

- High rate of complications related to trabeculectomy and drainage devices prompted the glaucoma community to search for less invasive surgeries to treat glaucoma.
- During past decade the interest and frequency of use of procedures such as canaloplasty and micro-invasive glaucoma surgery (MIGS) has significantly increased.
Canaloplasty and MIGS

• These surgical procedures have less post surgical complications such as hypotony, choroidal hemorrhages, flat AC, cataract formation, suprachoroidal hemorrhages, and bleb related problems such as fibrosis, encapsulation, leaky blebs, and endophthalmitis
• There is no bleb formation, and less postoperative management.
Canaloplasty

• Restore natural trabeculocanalicular outflow by using an illuminated and flexible microcatheter to viscodilate Schlemm’s canal and place an intracanalicular tensioning suture.
• Good option for treatment OHT, mild to moderate glaucoma and advanced glaucoma in high risk patients
Canaloplasty cont.

- Contraindications:
  - Neovascular glaucoma
  - Chronic angle closure
  - Angle recession
  - PAS
Canaloplasty cont.

- Most of the studies showed IOP in mid teens
- Combined with cataract surgery lowers IOP more (10mmHg)
- Most common complications: hyphema and Descemet’s detachment
5 steps to canaloplasty success

- Creation of the outer flap
- Creation of the inner flap and Descemetic window
- Catheterization of Schlemm’s Canal
- Canal dilation, suture placement and tensioning
- Closure of the outer flap
Video
Anatomy of cut-down

1. Scleral-lake & Choroid
2. Scleral-spur
3. Trabecular Meshwork
4. Trabeculo-descemetic window
MIGS

- Group of surgical procedure that share 5 qualities:
- Ab interno microincisional approach
- Minimally traumatic to the target tissue
- Procedure’s efficacy, should be modest
- High safety profile
- Rapid recovery
MIGS cont.

- Includes three anatomical categories:
  - Schlemm’s canal (improves trabecular outflow)
  - Suprachoroidal space (improves uveoscleral outflow)
  - Subconjunctival space (creates alternative outflow pathway)
MIGS cont.

- Indication for MIGS - OHT, mild glaucoma, no need for low IOP
- It is not as efficacious as standard glaucoma procedures but given low risk profile there is definitely a role
- Combined with cataract surgery
- Inserted through clear cornea incision under gonioscopic control
Istent

- Glaukos micro-bypass trabecular stent (Glaukos Corporation, Laguna Hills, CA)
- Manufactured from heparin coated titanium
- 1 mm device
- Inserted into SC using preloaded inserter
Istent cont.

- Single and multiple Istents
- IOP reduction around 3 points and about 1-1.5 decrease in medication use in combined procedure with one stent and about 5 points and 2 medication decrease with multiple stents
• Adverse events:
• IOP increase, early, mostly resolve spontaneously
• Stent obstruction
• Stent malposition
Istent cont.

- First generation – implanted into SC
- Second generation – conical shaped – direct injection into SC through TM
- Third generation – made of heparin coated polyethersulfone and titanium sleeve – ab interno implantation into suprachoroidal space
Trabectome

- Ab interno trabeculectomy
- Trabectome (Neomedix, Inc., Tustin, CA)
- Removes strip of TM and inner wall of SC using high frequency electrocautery
Trabectome cont.

- 19.5 handpiece incorporates an insulated footplate that enters SC
- Irrigation port keeps AC formed and dissipates heat
- Aspiration port adjacent to cautery
- Controlled by foot pedal with stepwise activation of irrigation, aspiration, cautery
Hydrus Schlemm canal scaffold

- Ivantis, Inc., Irvine, CA
- Nitinol SC scaffold
- Opens posteriorly
- Contains three windows along 8 mm length
- Implanted through TM using manual inserter
Hydrus cont.

- Adverse events:
- Subconjunctival hemorrhages
- Hyphema
- PAS
CyPass

- Suprachoroidal microstent (Transcend Medical, Menio Park, CA)
- Made of polyamide material, 6.25 mm, has fenestrations
- Inserted ab interno into suprachoroidal space through manual inserter
CyPass cont.

- Adverse events:
  - Shallow AC
  - Transient hyphema
  - Inflammation
  - BRVO and exacerbation of diabetic macular edema
MIGS cont.

- The combination of Cypass and Hydrus with phaco-surgery may have a more significant IOP lowering effect but long term results are not yet published.
ELT

- Excimer laser trabeculotomy (Aida, Glaute AC, Nurnberg, Germany)
- Creates small holes in TM and inner wall of SC
- Enhances aqueous humor outflow into SC and its drainage against the episcleral vein pressure by creating channels from the AC through the TM and inner wall of Schlemm’s canal
- Using energy from quarts fiberoptic probe connected to xenon chloride pulsed excimer laser
- Pulsed laser with wavelength of 308nm, delivers mean energy of 1.2 mJ per pulse
ELT cont.

- Probe is mounted in stainless steel casing with external diameter of 500 microns
- Beveled at 65 degrees
- 8-10 laser punctures space over 90 degrees, 0.2 mm in diameter
- Whitening of TM and bubble formation are indicators of treatment
Conclusion

• Many of MIGS procedures may offer benefits to patients through IOP reduction, reduction in number of medications, and high safety profile
• Can offer modest cost saving versus cost of glaucoma medications
• The more precise role of MIGS procedures continues to be clarified and differs from the role of more invasive procedures
• Proof and effect of any surgical procedure can be addressed with well designed randomized clinical trail
References

- Ramesh S. Ayyala, MD, FRCS1, , , Amina L. Chaudhry, MD1, Carola B. Okogbaa, MD1, David Zurakowski, PhD2. Comparison of Surgical Outcomes Between Canaloplasty and Trabeculectomy at 12 Months' Follow-Up.
- www.glaucos.com/istent