I have no financial disclosures

Goals

How glaucoma surgery works
Who to refer/When to refer
Expected outcomes

Glaucoma Philosophy

Glaucoma can be a visually debilitating disease.
Cannot be reversed.
My role is to maintain quality of life by:
Minimizing disease with least cost, burden, and side effects
CIGTS

Outcomes:
Surgery = Medicine

Complications:
Surgery >>> Medicine

TABLE 3: Intraoperative and Post-operative Complications
After Trabeculectomy in 445 Eyes, n (%)  

<table>
<thead>
<tr>
<th>Complication</th>
<th>Intraoperative (n = 445)</th>
<th>Post-operative (n = 445)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conjunctival buttonholes</td>
<td>5 (1.1)</td>
<td>0</td>
</tr>
<tr>
<td>Scleral flap problems</td>
<td>3 (0.7)</td>
<td>0</td>
</tr>
<tr>
<td>Partial tearing of superior rectus</td>
<td>1 (0.2)</td>
<td>0</td>
</tr>
<tr>
<td>Tendon</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Orbital bleeding</td>
<td>2 (0.4)</td>
<td>0</td>
</tr>
<tr>
<td>Anesthetic or systemic complications</td>
<td>1 (0.2)</td>
<td>0</td>
</tr>
<tr>
<td>Wound leak</td>
<td>1 (0.2)</td>
<td>26 (5.8)</td>
</tr>
<tr>
<td>Iris prolapse</td>
<td>1 (0.2)</td>
<td>5 (1.1)</td>
</tr>
<tr>
<td>Subconjunctival hemorrhage</td>
<td>2 (0.4)</td>
<td>0</td>
</tr>
<tr>
<td>Anterior chamber bleeding</td>
<td>37 (8.3)</td>
<td>43 (9.7)</td>
</tr>
<tr>
<td>Suspensory chordoid detachment</td>
<td>2 (0.4)</td>
<td>52 (11.7)</td>
</tr>
<tr>
<td>Suprachoroidal hemorrhage</td>
<td>0</td>
<td>3 (0.7)</td>
</tr>
<tr>
<td>Hyptony</td>
<td>0</td>
<td>4 (0.9)</td>
</tr>
<tr>
<td>Corneal epithelial defect</td>
<td>0</td>
<td>4 (0.9)</td>
</tr>
<tr>
<td>Monocular diplopia</td>
<td>0</td>
<td>1 (0.2)</td>
</tr>
<tr>
<td>Cystoid macular scleira</td>
<td>0</td>
<td>1 (0.2)</td>
</tr>
<tr>
<td>Shallow or flat anterior chamber</td>
<td>0</td>
<td>62 (13.9)</td>
</tr>
<tr>
<td>Aqueous misdirection</td>
<td>0</td>
<td>2 (0.4)</td>
</tr>
<tr>
<td>New synechiae or adhesions</td>
<td>0</td>
<td>24 (5.4)</td>
</tr>
<tr>
<td>Encapsulated bleb</td>
<td>0</td>
<td>56 (12.5)</td>
</tr>
<tr>
<td>Dellen</td>
<td>0</td>
<td>18 (4.1)</td>
</tr>
<tr>
<td>Phthisis</td>
<td>0</td>
<td>55 (12.5)</td>
</tr>
</tbody>
</table>
Patient Selection

Progressive glaucoma despite medication
Cannot tolerate medication
Moderate/advanced disease

Surgeon's role

Lower IOP
Minimize risk

Patient Selection

Optometrist's role

Help maintain visual function
Co-manage

Surgery does NOT

Improve vision (not LASIK)
Cure glaucoma
Poor Candidates

Young
African American
Uveitic Glaucoma
Rubeotic Glaucoma
Prior failed glaucoma surgery

Define Success

IOP <18
IOP <21
No HVF or ONH progression
Additional Medication?

Good Candidates

Virgin eyes
Older
POAG
White
Trabeculectomy

Conjunctival flap
Make scleral flap
Remove section of TM
Create Iridectomy*
Suture

Goal
Create a non-healing fistula
Allow direct access from AC to subconj
Bypass TM and Schlemm’s canal

http://www.ngsglaucoma.com/images/trab.jpg
Bleb

Functional Bleb
Cystic
Diffuse
Good IOP
Non painful

Trabeculectomy

Improvements
Guarded/Partial Thickness
Anti-metabolites
Suture Manipulation

Guarded

Antimetabolites

Mitomycin C
5 Fluorouracil (5 FU)

Suture Manipulation

http://www.glaucoma-surgery.org/trab_closing_one.html

Bleb Complications

Hypotony
Leak
Flat A/C
Infection
Pain

https://es.slideshare.net/mobile/namratagupta96780/trabeculectomy-trabeculotomy-goniotomy-and-their-complications
Wound Leak

Blebitis

https://www.reviewofophthalmology.com/article/filtering-surgery-late-complications

Complications

20 Year Follow Up
Complete Success
13% failure first year
1.6% per year after

Ophthalmology 2012;119:694-702

Complications

20 Year Follow Up
Qualified Success
7% failure first year
0.3% per year after
Complications

At 20 years 15% were blind

Other complications

- Expulsive Hemorrhage
- Phthisis
- Endophthalmitis

Tube vs Trab

TVT study

Similar IOP post-op

Similar number post-op meds

Failure Trab (47%)**

Failure Tube (30%)

Ahmed vs Baerveldt

Mean IOP

Ahmed - 16 mmHg
Baerveldt - 14 mmHg

Am J Ophthalmol. 2017 Apr;176:118-126
Ahmed vs Baerveldt

Failure
Ahmed - 51%
Baerveldt - 34%

Complications
Ahmed - 52%
Baerveldt - 62%

ExPRESS Mini-Shunt

**ExPRESS Mini-Shunt**

**Advantage**
- Lower rate of Hypotony
- No Iridectomy
- Standard trabecular opening

**ExPRESS Mini-Shunt**

**Define "success"**
- 3 Trials
- No complications (i.e. Hypotony)
- IOP 6-18 mmHg
- IOP <21 mmHg with or without med

**ExPRESS Mini-Shunt**

**Complications**
- Hypotonous maculopathy
  - ExPRESS - 4%
  - Trabeculectomy - 6%

**Success**
- IOP 6-18 mmHg
- (Qualified success) - 54%
**ExPRESS Mini-Shunt**

Success

IOP <21 mmHg with or without meds

ExPRESS - 94%

1/4 were on meds

*J Ophthalmol. 2015;2015;720109*

---

**MIGS**

Microinvasive Glaucoma Surgery

iStent

Trabectome

Cypass

Xen Gel Stent

Only FDA approved MIGS surgeries

---

**iStent**

http://www.drdylanjoseph.com/istent-exciting-technology-for-the-treatment-of-your-glaucoma/

---

**iStent**

glaukos.com
Advantages

- Minimally invasive
- No cutting conjunctiva
- Less risk (infection, hypotony)
- Can perform trab or tube later

Disadvantages

- Has to be combined with CE
- Not for Advanced Glaucoma
- Not for Secondary Glaucomas

Success

- Reduce medication (1.6 to 0.4)
- Reduce IOP (range 22% - 40%)

Complication

- Hyphema (transient) - 3-70%
- Malposition - up to 16%

iStent Inject

Trabectome

Advantages
- Minimally invasive
- No cutting conjunctiva
- Less risk (infection, hypotony)

Disadvantages
- Not for Advanced Glaucoma
- Not for Secondary Glaucomas
- Less effective if IOP is already low

http://gusgazzard.com/trabectome/trabectome-ab-interno-surgery-condon/
Success

Reduce medication (1.2 to 0.4)
Reduce IOP (range 18% - 40%)


Complication

Hyphema (transient) - 60-78%
PAS - up to 25%

CyPass Micro-Stent


CyPass

CyPass - COMPASS Trial

Success

IOP reduction 20% at 2 years

- 77% CyPass
- 60% CE

Ophthalmology 2016;123:2103-2112
Success

Average number of meds

CyPass 1.4 pre-op -> 0.2
CE 1.3 pre-op -> 0.7

Complication

Iritis - 9%
Hyphema (transient) - 3%
(IOP < 6%) - 3%

XEN 45 Gel Stent (Ab-Interno)

XEN 45 Gel Stent
XEN - 12 month Trial

65 patients
75% had ≥ 20% reduction in IOP
Avg reduction 9 mmHg
Meds decreased from 3.5 to 1.7

Ophthalmology 2016;123:2103-2112

MIGS

Pros
Minimally invasive
Good results

Cons
Currently combined with CE
Select group benefits
anthony.dewilde@va.gov