TRABECULECTOMY
THE BEST AND WORST CANDIDATES

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ASCRS 2014

FINANCIAL DISCLOSURES
None

TRABECULECTOMY

- Performed for over 100 years
- Most commonly performed glaucoma procedure
- Greatest IOP lowering potential
- Requires no special equipment or instrumentation
- Within the realm of most ophthalmic surgeons
HISTORY

- 1856 Von Graefe - sector iridectomy
- 1961 Sugar, 1967 Coryllos - partial thickness procedure
- 1968 Cairns - describes procedure in AJO
- 1986 Savage and Simmons - argon laser suture lysis
- 1987 Kiazawa - 5-fluorouracil
- 1990 Chen - mitomycin c

OPTIONS

- Phacoemulsification
- Phaco with
  - I-stent™
  - EPC
- MIGS
  - I-Stent™
- Angle Based
  - Goniotomy
  - Trabectome™ (Not FDA Approved)
- Canaloplasty
- Trabeculectomy
  - Express Shunt™
  - Tube Shunt
    - +/- valve
- Cyclodestructive
  - Diode Laser
  - EPC

COMPLICATIONS

Intra Operative
- inadequate conjunctiva
  - button hole, retraction
- scarring
- thin sclera
- bleeding
COMPLICATIONS

Early Post Operative
- wound leak
- flat anterior chamber
  - over filtration, aqueous misdirection, decreased aqueous production
- hypotony
- maculopathy
- choroidal effusions, hemorrhage

COMPLICATIONS

Early Post Operative
- under filtration
- bleeding
- infection
- corneal decompensation

COMPLICATIONS

Late Post Operative
- under filtration
- bleb leak
- bleb Infection
- enlarged bleb
  - discomfort, dellen
- endophthalmitis
- cataract
SUCCESS

- Proper patient selection
- Meticulous surgical technique
- Aggressive post operative management

PATIENT SELECTION

- understands the need for the procedure
- goal of the procedure
- frequent post operative visits
- compliant with medical regimen
- possible subsequent surgical intervention

PATIENT SELECTION

- may experience a decrease in vision
- long term follow-up

- will patient be better managed with a different procedure
  - may require transfer of care
HISTORY

• Prior eye trauma
• Prior ocular surgery
• Uveitis
• Neovascular glaucoma
• Anticoagulation
• Target IOP

GENERAL CONSIDERATIONS

• Age
  • Young - greater scarring
• Race
  • Darker pigment - greater scarring

EXTERNAL DISEASE

• Eye Lid
  • Prior surgery
  • Blepharitis / meibomianitis
• Scarring
• Position
• Lagophthalmos
CONJUNCTIVA

- Quality of the tissue
- Scarring
- Inflammation
- Mobility

SCLERA

- Scarring
- Scleromalacia
- Prior surgery

CORNEA

- Hx of severe dry eye
- Intolerance to topical therapy
- Tolerate 5-FU injections
AXIAL LENGTH

• Short Eyes
  • Aqueous misdirection
• Long Eyes
  • Hypotensive maculopathy

LENS STATUS

• Phakic
  • cataract
• Aphakic
  • vitreous

SUCCESS RATE

• Lamping KA, Bellows AR, Hutchinson BT, Afran SI 10 1985
  • In Study of 252 eyes, 76% success at 4 years
• Yamashita h, et al 11 1986
  • 50 pts 61% success at 5 years in primary glaucoma, similar results after failed trab
• Jampel HD, et al 12 2012
  • 797 eyes 70% success rate for an IOP of 18mmHg or less at 4 years
RISK FACTORS FOR FAILURE
AGIS 11

• Younger age
• Higher pre-op IOP
• Diabetes
• Post operative complications
• Marked inflammation

TUBE VS TRABECULECTOMY (TVT) STUDY
5 YEAR RESULT

• 212 Pts with uncontrolled glaucoma with previous cataract and/or glaucoma surgery
• 107 350-mm² Baerveldt implant vs. 105 Trab with mitomycin C (0.4mg/ml for 4 minutes)

<table>
<thead>
<tr>
<th>Complication</th>
<th>Tube Group (n = 107), n (%)</th>
<th>Trabeculectomy Group (n = 105), n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Choroidal effusion</td>
<td>17 (16)</td>
<td>20 (19)</td>
</tr>
<tr>
<td>Mallet or flat anterior</td>
<td>12 (11)</td>
<td>12 (11)</td>
</tr>
<tr>
<td>Chamber</td>
<td>3 (3)</td>
<td>8 (8)</td>
</tr>
<tr>
<td>Hyphema</td>
<td>2 (2)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Persistent corneal edema</td>
<td>7 (7)</td>
<td>8 (8)</td>
</tr>
<tr>
<td>Enucleated/tumor</td>
<td>2 (2)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Endophthalmitis</td>
<td>1 (1)</td>
<td>6 (6)</td>
</tr>
<tr>
<td>Cystoid macular edema</td>
<td>2 (2)</td>
<td>1 (1)</td>
</tr>
<tr>
<td>Suprachoroidal hemorrhage</td>
<td>3 (3)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Persistent diafiltration</td>
<td>6 (6)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Aquous misdirection</td>
<td>0 (0)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Hypopyon/endothelitis</td>
<td>1 (1)</td>
<td>1 (1)</td>
</tr>
<tr>
<td>Endophthalmitis</td>
<td>2 (2)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Chronic or recurrent uveitis</td>
<td>2 (2)</td>
<td>1 (1)</td>
</tr>
<tr>
<td>Clefts</td>
<td>3 (3)</td>
<td>2 (2)</td>
</tr>
<tr>
<td>Intracranial hemorrhage</td>
<td>2 (2)</td>
<td>1 (1)</td>
</tr>
<tr>
<td>Tube obstruction</td>
<td>2 (2)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Decompression or retinal</td>
<td>6 (6)</td>
<td>1 (1)</td>
</tr>
<tr>
<td>Cystoid macular edema</td>
<td>4 (4)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Corneal ulcer</td>
<td>0 (0)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Retinal detachment</td>
<td>0 (0)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Total number of patients with postoperative complications</td>
<td>46 (44)</td>
<td>40 (38)</td>
</tr>
</tbody>
</table>

4/10/2014
### RE-OPERATIONS FOR COMPLICATIONS

<table>
<thead>
<tr>
<th>Complication</th>
<th>Tube Group (n = 107), n (%)</th>
<th>Trabeculectomy Group (n = 105), n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pars plana vitrectomy</td>
<td>4 (4)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Penetrating keratoplasty</td>
<td>1 (1)</td>
<td>2 (2)</td>
</tr>
<tr>
<td>Drainage of choroidal effusion</td>
<td>1 (1)</td>
<td>3 (3)</td>
</tr>
<tr>
<td>Drainage of suprachoroidal hemorrhage</td>
<td>1 (1)</td>
<td>1 (1)</td>
</tr>
<tr>
<td>Drainage of choroidal effusion and pars plana</td>
<td>1 (1)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Lysis of iris adhesions to tube and cataract extraction</td>
<td>5 (5)</td>
<td>—</td>
</tr>
<tr>
<td>Vitreous tap with injection of intravitreal antibiotics</td>
<td>8 (8)</td>
<td>3 (3)</td>
</tr>
<tr>
<td>Total number of patients with reoperations for complications</td>
<td>8 (7)</td>
<td>5 (5)</td>
</tr>
</tbody>
</table>

### TUBE VS. TRAB (TVT) STUDY
5 YEAR OUTCOME

<table>
<thead>
<tr>
<th></th>
<th>Tube(107)</th>
<th>Trab(105)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>IOP (mmHg)</td>
<td>14.4 ± 6.9</td>
<td>12.6 ± 5.9</td>
<td>.12</td>
</tr>
<tr>
<td>Meds</td>
<td>1.4 ± 1.3</td>
<td>1.2 ± 1.5</td>
<td>.23</td>
</tr>
<tr>
<td>Failure*</td>
<td>29.8%</td>
<td>46.9%</td>
<td>.002</td>
</tr>
<tr>
<td>Reop</td>
<td>9%</td>
<td>29%</td>
<td>.025</td>
</tr>
</tbody>
</table>

### PRIMARY TUBE VS. TRABECULECTOMY STUDY (PTVT)

- Similar study protocol looking at Baerveldt shunt vs Trab with Mito C for primary surgery for glaucoma
- Start date April 2008, 5 year Study
- Completion date April 2016 (final data collection date)
- Compare: IOP, complication rates, VA, FV, Reop rates, medical Tx
PERFECT PATIENT

• Good long term relationship
• Understanding
• Available
• POAG, PXG, Pigmentary
• No anticoagulation
• Healthy eye lid margins
• Pseudophakic from prior clear corneal phaco
• Healthy mobile conjunctiva
• Average axial length
• No other pervious ocular surgery
• Good vision other eye

WORST CASE

• Hx of noncompliance
• Missed many appts in past, has trouble with transportation
• Has significant field loss and doesn't understand why his glasses cannot be improved
• High myopia on Coumadin for mechanical artificial heart valve
• Floppy eye lid syndrome from chronic eye rubbing with injected conjunctiva, chronic blepharitis and has been treated for conjunctivitis on numerous occasions

BIBLIOGRAPHY

• 4. Savage JA, Simmons RJ, Staged glaucoma filtration surgery with planned early conversion from scleral flap to full thickness operation using argon laser, Ophthalmic Laser The 1:201, 1986
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