TRABECULECTOMY

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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

RECENT DEVELOPMENTS

- Small incision procedures
- Decrease in the dose of MMC
- Change in the application of MMC
- Application of VEGF for bleb vascularity

OPTIONS

- Phacoemulsification
- Phaco with
  - I-stent™
  - EPC
- MIGS
  - I-Stent™
- Angle Based
  - Goniotomy
  - Trabeculectomy™ (Off Label)
- Canaloplasty
- Trabeculectomy
  - Express Shunt™
  - Tube Shunt
  - +/- valve
- Cyclodestuctive
  - 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
corneal decompensation

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 and need for eye drops
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

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 1985
  - In Study of 252 eyes, 76% success at 4 years
  - 50 pts 61% success at 5 years in primary glaucoma, similar results after failed trab
  - 797 eyes 70% success rate for an IOP of 18mmHg or less at 4 years
RISK FACTORS FOR FAILURE
AGIS 11,9

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


TUBE VS TRABECULECTOMY (TVT) STUDY
5 YEAR RESULT 13

• 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>Malignant or flat anterior chamber</td>
<td>10 (10)</td>
<td>10 (10)</td>
</tr>
<tr>
<td>Wound leak</td>
<td>1 (1)</td>
<td>1 (1)</td>
</tr>
<tr>
<td>Hypotony</td>
<td>8 (8)</td>
<td>9 (9)</td>
</tr>
<tr>
<td>Persistent central edema</td>
<td>3 (3)</td>
<td>3 (3)</td>
</tr>
<tr>
<td>Endophthalmitis</td>
<td>2 (2)</td>
<td>2 (2)</td>
</tr>
<tr>
<td>Cystoid macular edema</td>
<td>4 (4)</td>
<td>2 (2)</td>
</tr>
<tr>
<td>Suprachoroidal hemorrhage</td>
<td>3 (3)</td>
<td>2 (2)</td>
</tr>
<tr>
<td>Perforated diaphragm</td>
<td>3 (3)</td>
<td>3 (3)</td>
</tr>
<tr>
<td>Aquous misdirection</td>
<td>3 (3)</td>
<td>3 (3)</td>
</tr>
<tr>
<td>Hypotony maculopathy</td>
<td>1 (1)</td>
<td>1 (1)</td>
</tr>
<tr>
<td>Endophthalmitis or blebitis</td>
<td>6 (6)</td>
<td>6 (6)</td>
</tr>
<tr>
<td>Chronic or recurrent uveitis</td>
<td>4 (4)</td>
<td>2 (2)</td>
</tr>
<tr>
<td>Bleb leak</td>
<td>2 (2)</td>
<td>2 (2)</td>
</tr>
<tr>
<td>Tube obstruction</td>
<td>3 (3)</td>
<td>3 (3)</td>
</tr>
<tr>
<td>Tube leak</td>
<td>1 (1)</td>
<td>1 (1)</td>
</tr>
<tr>
<td>Persistent hypotony</td>
<td>3 (3)</td>
<td>3 (3)</td>
</tr>
<tr>
<td>Corneal ulcer</td>
<td>0 (0)</td>
<td>1 (1)</td>
</tr>
<tr>
<td>Retinal detachment</td>
<td>0 (0)</td>
<td>1 (1)</td>
</tr>
<tr>
<td>Total number of patients with postoperative complications</td>
<td>49 (46)</td>
<td>52 (50)</td>
</tr>
</tbody>
</table>
RE-OPERATIONS FOR COMPLICATIONS

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Tube Group (n = 107)</th>
<th>Trabeculectomy Group (n=105)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Penetrating keratoplasty</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Pars plana vitrectomy</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Tube shunt revision with patch graft</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Mesh revision</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Drainage choroidal effusion</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Drainage choroidal effusion with patch</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Vitreous Tap with intravitreal antibiotics</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Reoperations for complications</td>
<td>20 (19)</td>
<td>15 (14)</td>
</tr>
</tbody>
</table>

Total number of patients (cumulative percentage) with reoperations for complications: 20 (19) 15 (14)

SERIOUS COMPLICATIONS ASSOCIATED WITH REOPERATION AND/OR VISION LOSS

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Tube Group (n = 107)</th>
<th>Trabeculectomy Group (n = 105)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Persistent corneal edema</td>
<td>9</td>
<td>6</td>
</tr>
<tr>
<td>Tube erosion</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>Bleb leak</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>Choroidal effusions</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Endophthalmitis</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Tube obstruction</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Aqueous misdirection</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Hypotony maculopathy</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Retinal detachment</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Vision loss ≥ 2 Snellen lines</td>
<td>15 (14)</td>
<td>13 (12)</td>
</tr>
<tr>
<td>Persistent corneal edema</td>
<td>13</td>
<td>7</td>
</tr>
<tr>
<td>Suprachoroidal hemorrhage</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Endophthalmitis</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Hypotony maculopathy</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Retinal detachment</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Cystoid macular edema</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

Total number (%) of patients with serious complications: 24 (22) 21 (20)

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>

* Failure
- IOP > 21 mm Hg or not reduced by 20%
- IOP < 5 mm Hg
- reoperation for glaucoma
- loss of light perception
PRIMARY TUBE VS. TRABECULECTOMY STUDY (PTVT)

- Similar study protocol looking at Baerveldt shunt vs Trab with MMC 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

AVOID

- Hx of noncompliance with visits or medical Tx
- Has significant field loss and poor understanding of disease process
- High myopia on Coumadin for mechanical artificial heart valve
- Floppy eye lid syndrome, chronic eye rubbing with injected conjunctiva, chronic blepharitis and has Hx of chronic/recurrent conjunctivitis
CONCLUSIONS

- Trabeculectomy is a viable surgical method for the control of intraocular pressure.
- There is a significant incidence in post-operative complications.
- There is considered a failure rate of approximately 10% per year.
- The TVT study has demonstrated the superior success rate for the Baerveldt shunt over trabeculectomy with MMC in patients who have undergone previous glaucoma or cataract surgery.
- It is an evolving procedure in an evolving matrix of surgical approaches to glaucoma.

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
BIBLIOGRAPHY


Thank You