

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 Graefe¹ - sector iridectomy
- 1961 Sugar¹, 1967 Coryllos² - partial thickness procedure
- 1968 Cairns³ - describes procedure in AJO
- 1986 Savage and Simmons⁴ - argon laser suture lysis
- 1987 Kiazawa⁵ - 5-fluorouracil
- 1990 Chen⁶ – 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 ^{7,8}
- Phaco with
 - I-stent™
 - EPC
- MIGS
 - I-Stent™
- Angle Based
 - Goniotomy
 - Trabectome™ (Off Label)
- Canaloplasty
 - Trabectulectomy
 - 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
- 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 SI¹⁰ 1985
 - In Study of 252 eyes, 76% success at 4 years
- Yamashita h, et al¹¹ 1986
 - 50 pts 61% success at 5 years in primary glaucoma, similar results after failed trab
- Jampel HD, et al¹² 2012
 - 797 eyes 70% success rate for an IOP of 18mmHg or less at 4 years

RISK FACTORS FOR FAILURE

AGIS 11⁹

- Younger age
 - Higher pre-op IOP
 - Diabetes
 - Post operative complications
 - Marked inflammation
- AGIS Investigators, The Advanced Glaucoma Interventional Study (AGIS): 11. Risk factors for failure of trabeculectomy and argon laser trabeculoplasty, Am J Ophthalmol 2002 Oct; 134(4):481-98

TUBE VS TRABECULECTOMY (TVT) STUDY

5 YEAR RESULT¹³

- 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)
- Gedde SJ et al, Treatment Outcomes in the Tube Versus Trabeculectomy (TVT) Study after five years of follow-up, Am J Ophthalmology 2012; 153(5):789-803

Complication	Tube Group (n = 107), n (%)	Trabeculectomy Group (n = 105), n (%)
Choroidal effusion	17 (16)	20 (19)
Shallow or flat anterior chamber	12 (11)	10 (10)
Wound leak	1 (1)	12 (11)
Hypohemia	2 (2)	8 (8)
Persistent corneal edema	7 (7)	3 (3)
Encapsulated bleb	2 (2)	6 (6)
Dysesthesia	1 (1)	7 (7)
Cystoid macular edema	3 (3)	2 (2)
Suprachoroidal hemorrhage	2 (2)	3 (3)
Persistent diplopia	5 (5)	0 (0)
Aqueous misdirection	3 (3)	1 (1)
Hypotony maculopathy	1 (1)	3 (3)
Endophthalmitis or blebitis	1 (1)	3 (3)
Chronic or recurrent iritis	2 (2)	1 (1)
Bleb leak	0 (0)	2 (2)
Vitreous hemorrhage	1 (1)	1 (1)
Tube obstruction	2 (2)	—
Decompression retinopathy	0 (0)	1 (1)
Corneal ulcer	0 (0)	1 (1)
Retinal detachment	1 (1)	0 (0)
Total number of patients with postoperative complications	36 (34)	60 (57)

RE-OPERATIONS FOR COMPLICATIONS¹⁴

	Tube Group (n = 107)	Trabeculectomy Group (n=105)
Penetrating keratoplasty	6	5
Pars plane vitrectomy	6	0
Tube shunt revision with patch graft	5	5
Bleb revision	0	1
Drainage choroidal effusion	2	1
DSAEK	2	1
Vitreous Tap with intravitreal antibiotics	0	2
Penetrating keratoplasty with tube repositioning	1	-
Tube repositioning	1	-
Drainage of suprachoroidal hemorrhage	0	1
Lysis of iris adhesion to tube and cataract extraction	1	-
Tube revision with patch graft and cataract extraction	1	-
Removal of tube shunt	1	-
Trabeculectomy revision and tube shunt	0	1
Total number of patients (cumulative percentage) with reoperations for complications	20 (22)	15 (18)

SERIOUS COMPLICATIONS ASSOCIATED WITH REOPERATION AND/OR VISION LOSS¹⁴

	Tube Group (n = 107)	Trabeculectomy Group (n = 105)
Reoperations for complications, n (%)	20 (19)	15 (14)
Persistent corneal edema	9	6
Tube erosion	5	-
Bleb leak	0	4
Choroidal effusions	2	1
Endophthalmitis	1	2
Tube obstruction	3	-
Aqueous misdirection	2	0
Hypotony maculopathy	0	1
Suprachoroidal hemorrhage	0	1
Retinal detachment	1	0
Vision loss of > 2 Snellen lines of vision, n (%)	15 (14)	13 (12)
Persistent corneal edema	13	7
Suprachoroidal hemorrhage	1	2
Endophthalmitis	1	1
Hypotony maculopathy	0	2
Retinal detachment	1	1
Cystoid macular edema	0	1
Total number(%) of patients with serious complications	24 (22)	21 (20)

TUBE VS. TRAB (TVT) STUDY 5 YEAR OUTCOME

	Tube(107)	Trab(105)	P
IOP (mmHg)	14.4 ± 6.9	12.6 ± 5.9	.12
Meds	1.4 ± 1.3	1.2 ± 1.5	.23
Failure*	29.8%	46.9%	.002
Reop	9%	29%	.025

- * 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 intra ocular pressure
- There is a significant incidence in post operative complications
- There is considered 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

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