Blue Sclera in Glaucoma

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Oregon Academy of Ophthalmology
March 9-10, 2018

Blue Sclera in Glaucoma Ain't Glaucoma Great?

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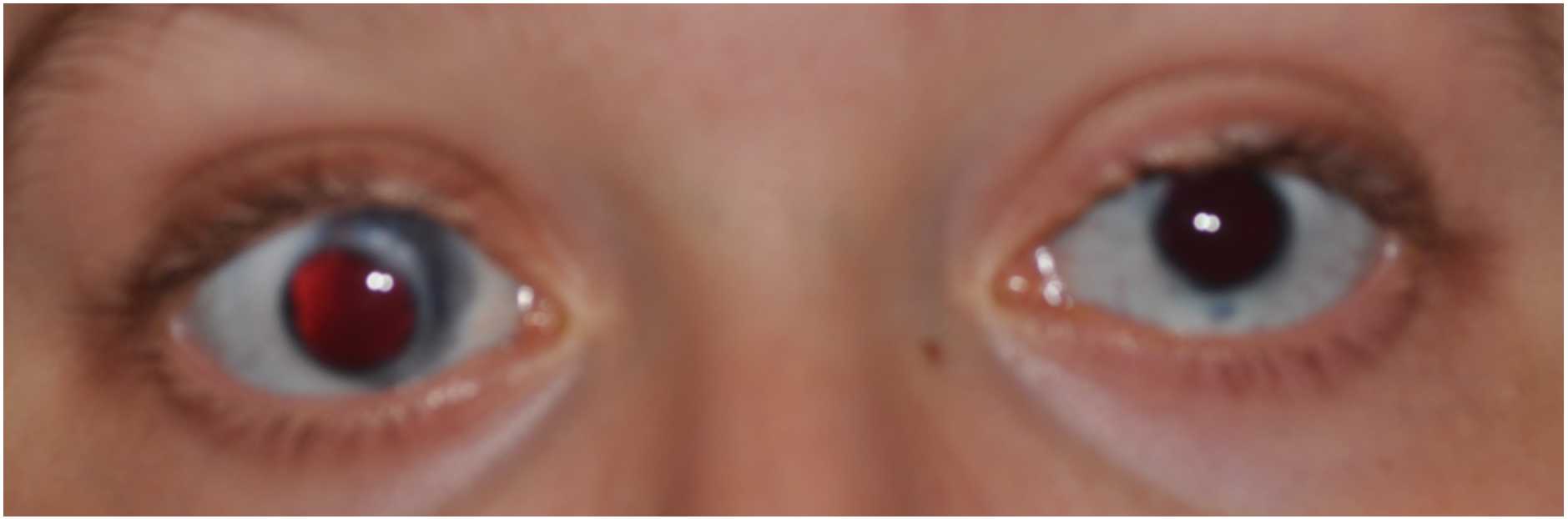
Case
13year old female

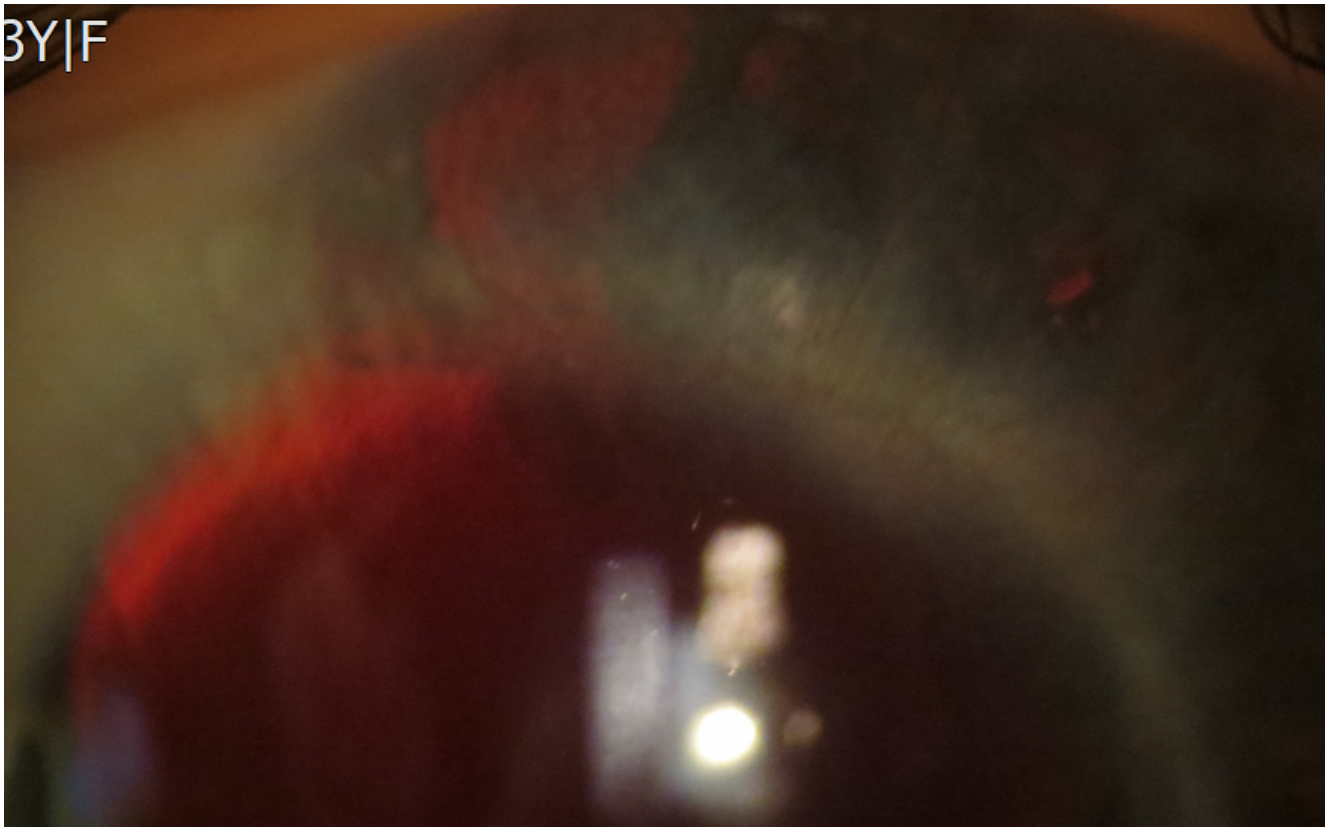
- Aniridia
- brimonidine tartrate/timolol maleate 0.2%/0.5%, dorzolamide 2%, and travoprost 0.004%

	Right Eye	Left Eye
Visual Acuity	20/200	20/40
Refraction	-10.00	-7.50
IOP (mm Hg)	31	40

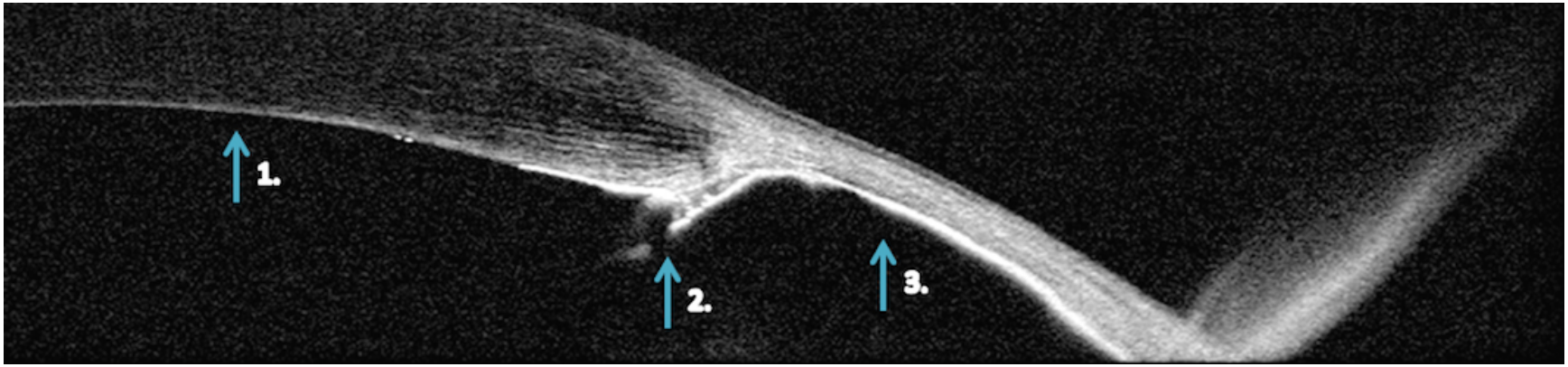
Examination

- Anterior segment ocular coherence tomography
  - synechial closure of the trabecular meshwork by an iris stump
  - staphylomatous thinned sclera
- Slit lamp biomicroscopy
  - aniridia with extensive bilateral thinning of the sclera superiorly and inferiorly more extensive OD than OS
  - right eye that underwent GDD implantation, all four quadrants of the sclera were thinned with the ectasia approaching the limbus supero-temporally
- optic nerves were small with extensive superior and inferior thinning, OD greater than OS.




3Y|F

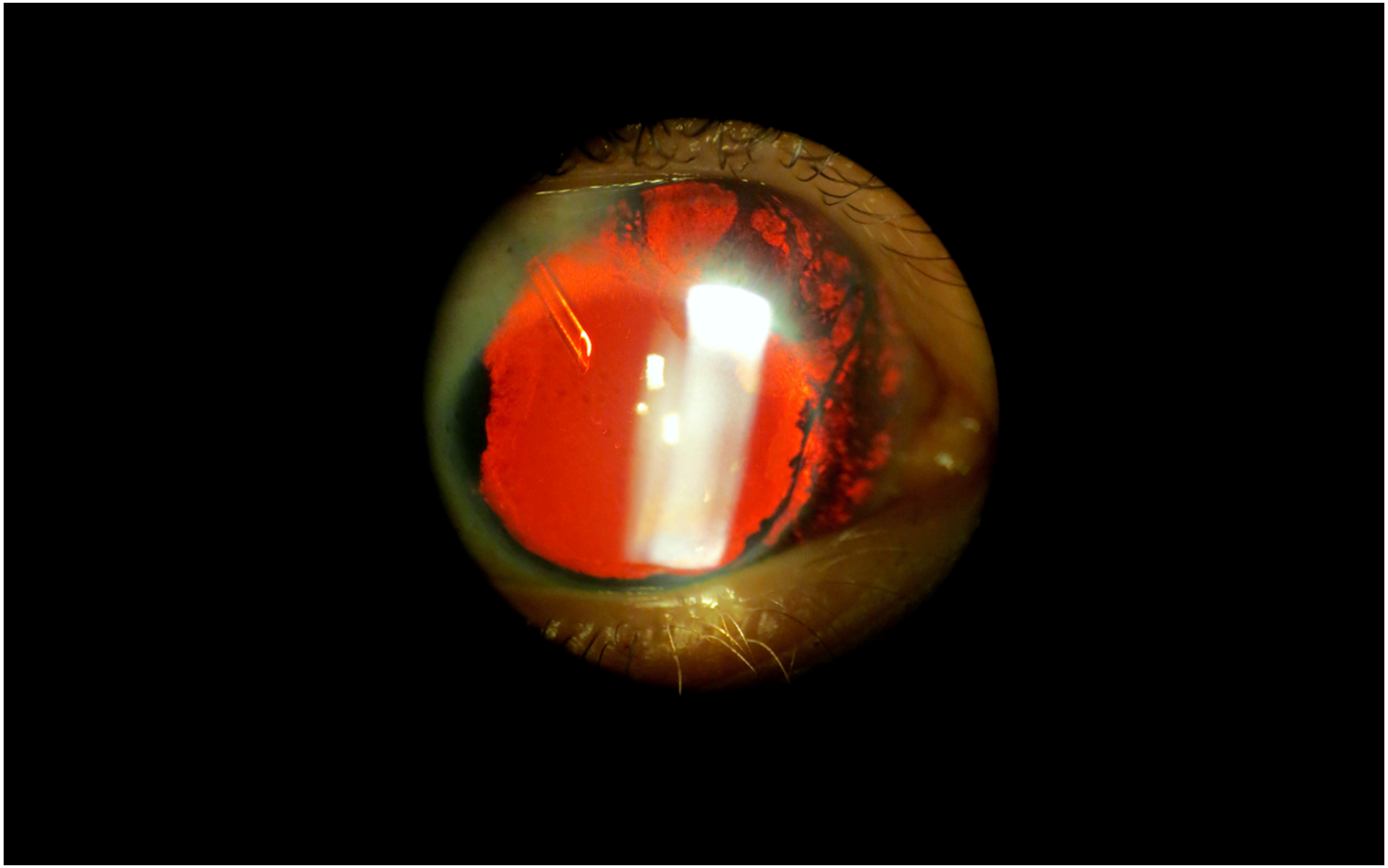
Anterior Segment OCT



Compare thickness of cornea (#1) to sclera (#3)

Operative

- Fornix-based conjunctival flap
- Ahmed Tube Shunt Model FP-7 reservoir ST 10 mm posterior to the limbus. Glued in place with Evicel Fibrin Sealant (Omrix Biopharmaceuticals Ltd., Kiryat Ono, Israel)
- Apply the components only to the reservoir bottom
- Tube tested with BSS to insure the valve was not occluded by glue.
- Tube inserted into the anterior chamber (23-g)- scleral thickness within 2 mm of the limbus appeared normal.
- The tube secured to the sclera with fibrin sealant.
- Split-thickness corneal patch graft (5x5mm) fixated with the fibrin sealant.
- Conjunctiva sutured to the limbal cornea with 8-0 polygalactan suture as the cornea was not substantially thinned



Postoperative Day #1

- Tube in good position
- Tube and Patch graft covered

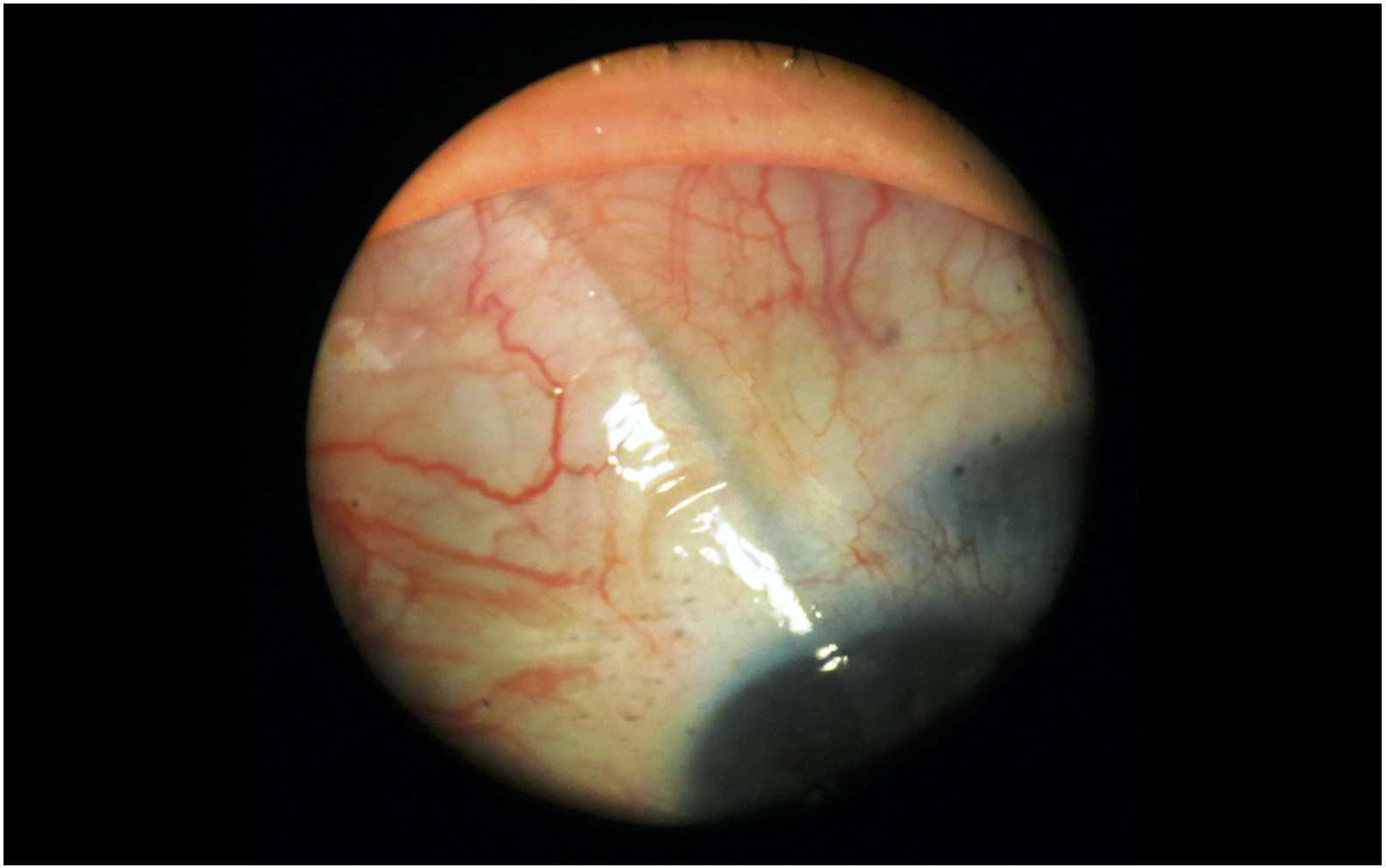
	Right Eye	Left Eye
Visual Acuity	20/400	20/40
Anterior Chamber	Normal Depth with OVD	Normal Depth
IOP (mm Hg)	4	20

Postoperative IOP (mm Hg)

- Tube in good position
- Tube and Patch graft covered

	Right Eye	Medications
1 week	10	PA1%
1 month	31	PA1%, Cosopt
6 months	17	Cosopt

6 months postoperatively



Fibrin Glue

Human **Fibrin Glue** is made of two components contained in separate vials:

- a freeze dried concentrate of clotting proteins, mainly fibrinogen, Factor XIII and fibronectin (the **sealant**)
- freeze dried thrombin (the **catalyst**)

Placed one on sclera, one on bottom of reservoir

Fibrin Glue

- Fibrin glue was first used in ophthalmology in the 1940s to fixate corneal grafts in rabbits.
- Advantages to using fibrin glue include decreasing:
  - operation time
  - likelihood of infection
  - post-op irritation
  - inflammation.
- Used in conjunctival, pterygium, strabismus, corneal, refractive, lens, vitreo-retinal, lid and adnexal, reconstructive, and glaucoma surgeries

Fibrin Glue Indications

Particularly if suturing may put at risk for surgical complications such as globe perforation or infection.

- Sternberg et al. successfully demonstrated the use of fibrin adhesive to secure a scleral buckle in a patient with a scleral thinning to reduce risk of subsequent globe perforation.
- Tube Shunt
  - preventing postoperative hypotony after GDD surgery by sutureless closure of a leaking scleral flap
  - securing the tube, scleral patch graft, and conjunctiva in both the adult and pediatric populations

Fibrin Glue Concerns

- hypersensitivity, anaphylaxis, urticaria, edema and pyrexia
- fibrin sealants contain human blood products
  - theoretical risk of transmitting infectious agents such as viruses and Creutzfeldt-Jakob disease
  - per the manufacturer
  - none have been reported.

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Five-Year Pooled Data Analysis of the Ahmed Baerveldt Comparison Study and the Ahmed Versus Baerveldt Study

PANOS G. CHRISTAKIS, DONGYU ZHANG, DONALD L. BUDENZ, KEITH BARTON, JAMES C. TSAI, AND IQBAL I.K. AHMED, FOR THE ABC-AVB STUDY GROUPS

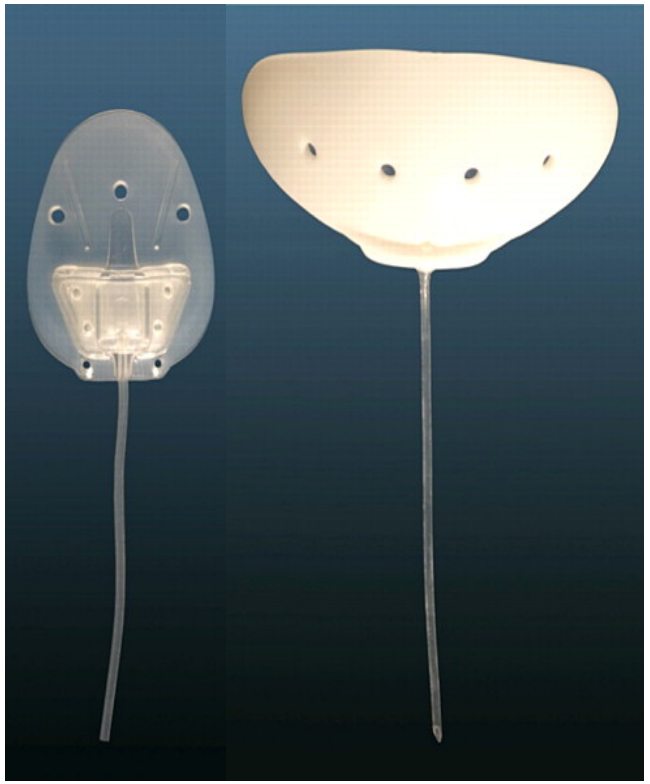
- Ahmed Versus Baerveldt Comparison (ABC) Study

Budenz DL, Barton K, Gedde SJ, et al. Five-year treatment outcomes in the Ahmed Baerveldt comparison study. Ophthalmology 2015;122(2):308–316.

- Ahmed Versus Baerveldt (AVB) Study

Christakis PG, Kalenak JW, Tsai JC, et al. The AhmedVersus Baerveldt Study: five-year treatment outcomes.Ophthalmology 2016;123(10):2093–2102.

- 22 Clinical Centers
- 514 Patients



Am J Ophthalmol 2017;176:118–126

Five-Year Pooled Data Analysis of the Ahmed Baerveldt Comparison Study and the Ahmed Versus Baerveldt Study

	Baseline	5 years	
		Baerveldt	*Ahmed*
IOP (mm Hg)	31.5 ± 11.3	13.2 ± 4.7	15.8 ± 5.2
Meds	3.3 ± 1.1	1.5 ± 1.4	1.9 ± 1.5
Failure Rate		37%	49%
Additional Surgery		8%	16%
Hypotony		4.5%	0.4%
Uncontrolled IOP		23%	42%
Visual Acuity(logMAR)		1.5 ± 1.3	1.5 ± 1.2

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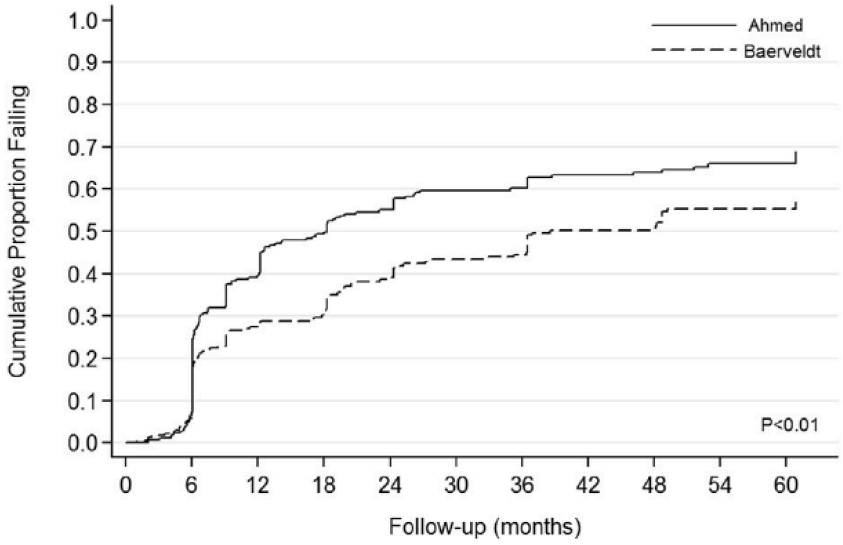

FIGURE 3. Ahmed and Baerveldt cumulative failure rat (6 mm Hg ≤ intraocular pressure criteria ≤ 15 mm Hg) Kaplan-Meier analysis using the log-rank test.

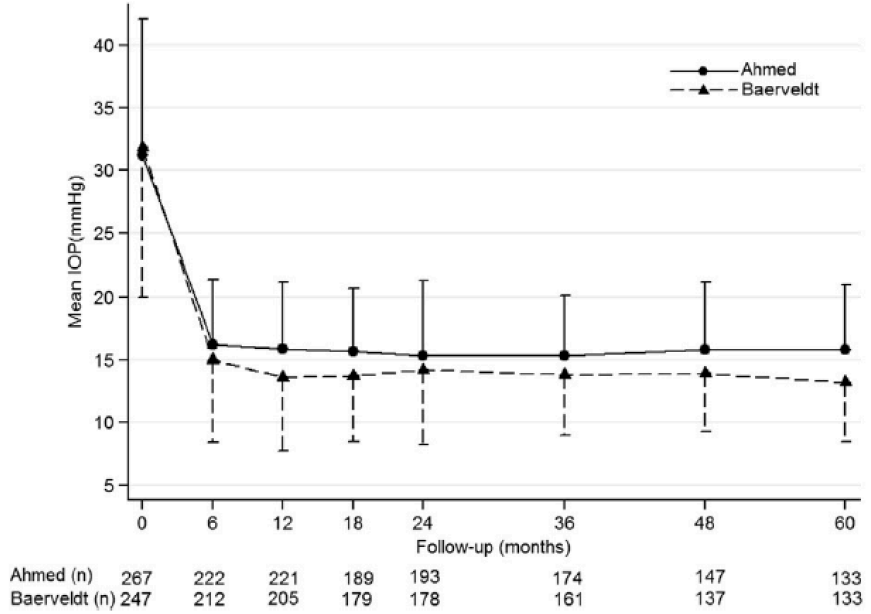

FIGURE 5. Mean intraocular pressure (IOP) over 5 years of follow-up. Error bars represent standard deviation.

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Five-Year Pooled Data Analysis of the Ahmed Baerveldt Comparison Study and the Ahmed Versus Baerveldt Study

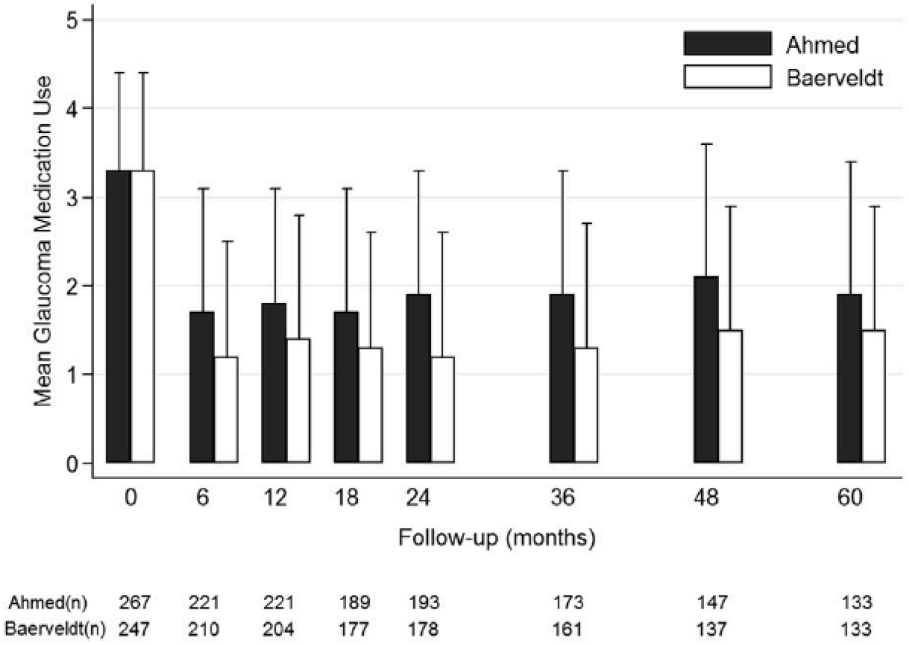

FIGURE 6. Mean glaucoma medication use over 5 years of follow-up. Error bars represent standard deviation.

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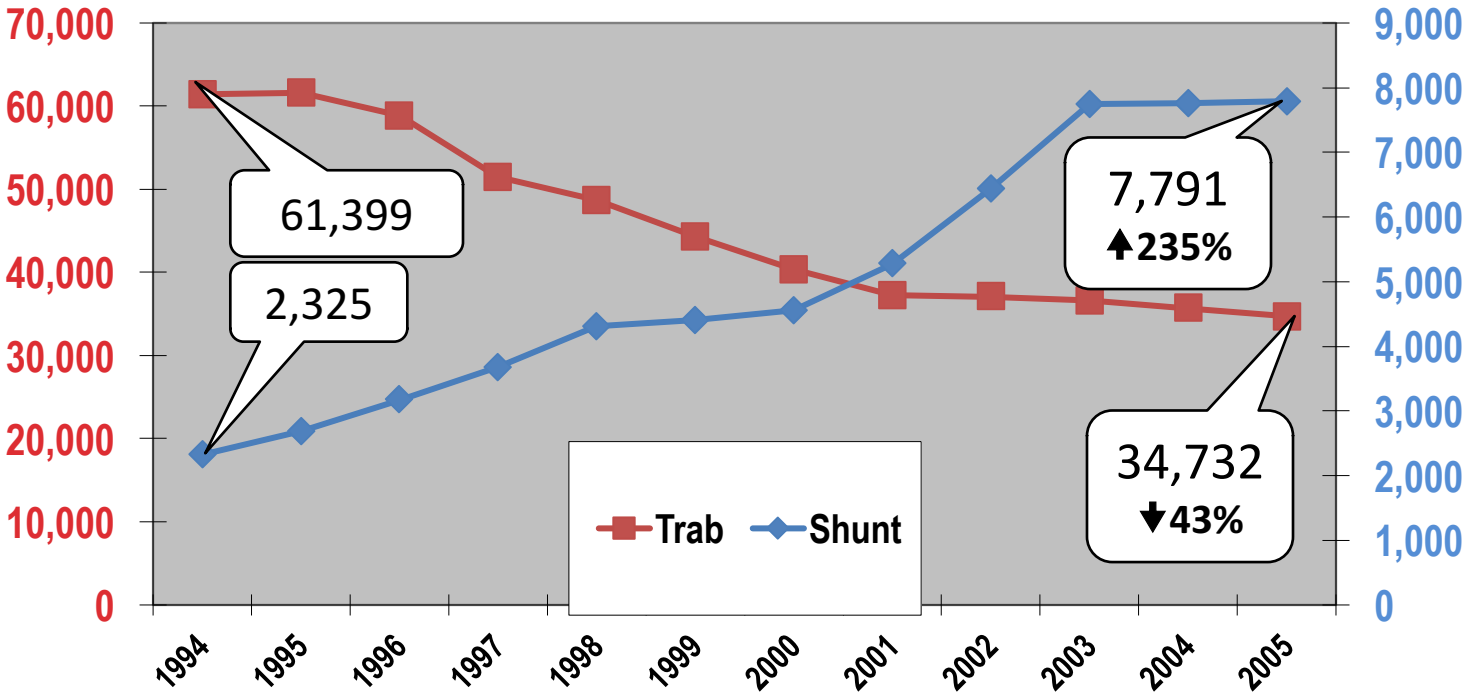
Tube versus Trabeculectomy (TVT) Study

Background

Trend toward greater use of aqueous shunts



Medicare data, courtesy of Bill Rich, MD; graph modified from Greg Skuta, MD, Dale Heuer, MD

Tube versus Trabeculectomy (TVT) Study

5-year Data

- Gedde SJ, Schiffman JC, Feuer WJ, et al. Treatment outcomes in the Tube Versus Trabeculectomy (TVT) Study after five years of follow-up. Am J Ophthalmol 2011.
- Gedde SJ, Schiffman JC, Feuer WJ, et al. Postoperative complications in the Tube Versus Trabeculectomy (TVT) Study after five years of follow-up. Am J Ophthalmol 2011.

Tube versus Trabeculectomy (TVT) Study

5-year Data

Conclusions

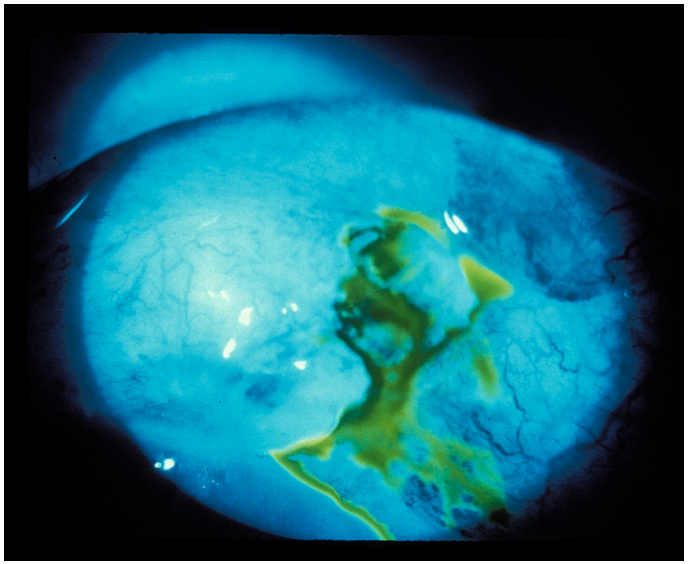
- Higher Success Rate with Tube than Trab
- Higher Reoperation Rate with Trab
- No difference in vision loss between groups
- No difference in medication between groups
  - Change from 1 & 3 year data

Tube versus Trabeculectomy (TVT) Study

5-year Data

Complications- Predictable

- Early Complications- more common in trab
  - Mostly transient and self-limited (wound leaks, hyphema)
- Late Complications- no difference in
  - Frequency
  - Reoperation for Complication
  - Cataract Extraction



Tube versus Trabeculectomy (TVT) Study

5-year Data

Concerns

- MMC dose and technique
  - Lower dose, less duration, larger area
  - Likely would reduce leaks and hypotony
- Definition of Failure
  - Reoperation- more likely with trab (tube)[18] than tube (2^{nd} tube) [8]
- IOP- no statistically significant difference
  - Trab- 2.2 mm Hg greater reduction from baseline, 1.8 mm Hg greater IOP reduction than tube

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The Primary Tube Versus Trabeculectomy Study

Methodology of a Multicenter Randomized Clinical Trial Comparing Tube Shunt Surgery and Trabeculectomy with Mitomycin C

Steven J. Gedde, MD,[1] Philip P. Chen, MD,[2] Dale K. Heuer, MD,[3] Kuldev Singh, MD, MPH,[4] Martha M. Wright, MD,[5] William J. Feuer, MS,[1] Joyce C. Schiffman, MS,[1] Wei Shi, MS,[1] for the Primary Tube Versus Trabeculectomy Study Group

Primary TVT
Baseline Characteristics

- Average Age 62 years
- 2/3 male
- 50% African Ancestry
- Mean IOP 23 mm Hg
- 3 medications
- POAG
- Mean Deviation -14 dB

Primary TVT
One Year Results

	TUBE	TRAB
Patients	117	108
IOP (mm Hg)	13.8	12.4 (P=.012)
Meds	2.1	0.9 (P<.001)
Failure	17.3%	7.7% (P=.012)
Complete Success	59%	14% (P<.001)
Complications	20%	33%