# Recurrent Conjunctival Erosion After Glaucoma Tube Implantation

BY ANURAG SHRIVASTAVA, MD, AND JEFFREY S. SCHULTZ, MD

## CASE PRESENTATION

A 27-year-old Hispanic man with long-standing, poorly controlled type 1 diabetes mellitus was referred to the Montefiore Medical Center Glaucoma Service in Bronx, New York, for an evaluation of elevated IOP in his right eye. He complained of severe pain with dimming vision in this, his only seeing eye.

The patient's past ocular history in his right eye was significant for severe proliferative diabetic retinopathy, with a history of multiple sessions of intravitreal antivascular endothelial growth factor therapy and panretinal photocoagulation (Figure 1). At the time of presentation, his visual acuity was 20/400 OD and no light perception OS. His IOP was 34 mm Hg OD and 12 mm Hg OS. In addition to taking generic acetazolamide 500 mg by mouth b.i.d., the patient was instilling travoprost 0.004% qhs (Travatan Z; Alcon Laboratories, Inc.), brimonidine 0.1% b.i.d. (Alphagan P; Allergan, Inc.), and a fixed combination of dorzolamide HCL 2% and timolol maleate 0.5% b.i.d. (Cosopt; Merck & Co., Inc.) in his right eye.

A slit-lamp examination of the patient's right eye revealed no rubeosis but mild changes to the posterior subcapsular lens. The angle was synechially closed on gonioscopy, but there was no active neovascularization. A dilated examination revealed an old vitreous hemorrhage, an extremely ischemic fundus with regressing neovascularization, and extensive scarring from panretinal photocoagulation in the retina. The optic nerve showed severe pallor, and confrontational visual fields demonstrated peripheral constriction of the visual field to approximately 20º centrally.

The patient was diagnosed with chronic angle closure secondary to neovascular glaucoma, with quiescent proliferative diabetic retinopathy in his right eye.

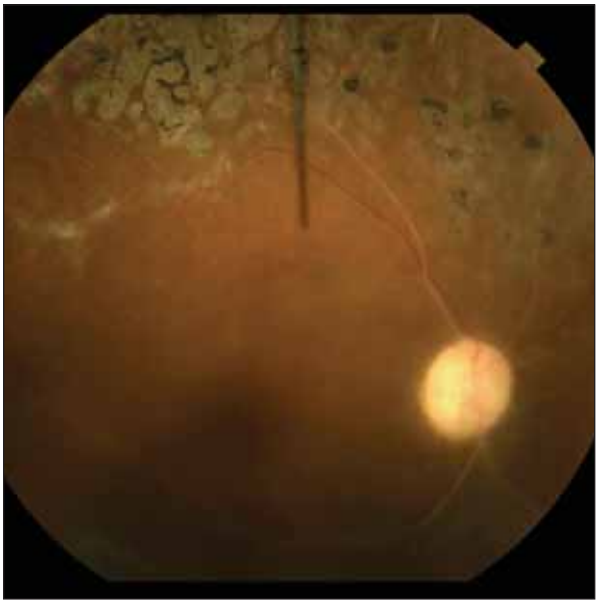

**Figure 1. A fundus photograph of the right eye shows an ischemic appearance and panretinal photocoagulation scars.**

## HOW WOULD YOU PROCEED?

- Would you continue to treat the patient medically or opt for a surgical procedure? If you chose the latter, what procedure would you perform?
- What clinical findings would guide your choice of surgical intervention?
- Would the patient's young age and monocular status affect your choice and/or the urgency of intervention?

## SURGICAL COURSE

Given this monocular patient's IOP of 34 mm Hg on maximum tolerated medical therapy and clinical presen-

tation with neovascular glaucoma, we decided to implant a glaucoma drainage device. We implanted an Ahmed Glaucoma Valve (New World Medical, Inc., Rancho Cucamonga, CA) and placed a Tutoplast pericardium patch graft (IOP, Inc., Costa Mesa, CA) in the superotemporal quadrant. We secured the patch graft to the sclera at the limbus with a 7–0 Vicryl suture (Ethicon, Inc., Somerville, NJ). Intraoperatively, the conjunctival tissue was noted to be quite friable. The tube's placement in the anterior chamber was deemed to be appropriate, and the conjunctiva was closed without excessive tension. No antimetabolite or cryotherapy was used during the surgery.

The patient's IOP was 5 mm Hg OD on the first postoperative day and never exceeded 14 mm Hg over the course of the next 1 to 2 months. Three months after the surgery, the patient presented to the Emergency Department with a complaint of severe pain, foreign body sensation, and photophobia in his right eye. The BCVA was 20/400, and the IOP measured 13 mm Hg OD. On slit-lamp examination, the pericardial patch graft was not visible, and approximately 5 mm of the tube was exposed. The exposure started 3 mm from the limbus and extended posteriorly 1 to 2 mm anterior to the plate. The tube was well positioned in the anterior chamber, with no anterior chamber reaction or hypopyon. The bleb was elevated over the plate in the superotemporal quadrant without ischemia or injection.

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Given the risk of endophthalmitis, the patient was started immediately on topical moxifloxacin 0.5% q2h (Vigamox; Alcon Laboratories, Inc.) and taken to the OR the following morning for a revision of the Ahmed Glaucoma Valve. We resected the conjunctival tissue around the site of erosion and placed amniotic membrane (Amniograft-G; Bio-Tissue, Inc., Miami, FL) over the tube. Conjunctival/Tenon's advancement was performed to cover the membrane and tube adequately, but the conjunctiva was noted to be under greater tension than after the primary surgery.

The patient's postoperative course was uneventful until approximately 3 months later, when extensive exposure of the tube in the same location was observed at a routine follow-up visit. The patient restarted Vigamox therapy q2h in his right eye and was taken back to the OR on the following day. After again resecting the conjunctival tissue, we placed a Tutoplast scleral patch graft (IOP, Inc.) over the tube. The conjunctival tissue was extremely friable, and we could not adequately cover the tube with a scleral patch graft using standard techniques. Given the patient's young age and potential need for future tube shunt surgery, we decided to leave as much intrinsic conjunctival tissue intact as possible in his right eye. A large 10 X 10-mm conjunctival graft was harvested from his blind left eye and transplanted to cover the tube in his right eye (Figure 2). The conjunctival graft was sutured in place with minimal tension over the scleral patch graft with a 10–0 Vicryl suture.

**Figure 2. Postoperative external photograph of the left eye demonstrates staining of the inferior conjunctival harvest site.**

Fifteen months after the last revision, the patient's BCVA remains 20/400 OD, with the IOP ranging from 12 to 16 mm Hg off all glaucoma medications. During this period, he has received three intravitreal injections of antivascular endothelial growth factor and fill-in panretinal photocoagulation for his proliferative diabetic retinopathy. The tube remains covered with the contralateral eye conjunctival autologous graft, but the scleral patch graft has melted significantly during the past year (Figure 3).

## DISCUSSION

As reported in retrospective reviews of glaucoma drainage device implantation, the incidence of tubal erosion ranges from 0% to 16%, with no association with implant model.[1-5] In a retrospective comparative series of patients undergoing drainage device surgery that compared single-thickness to double-thickness pericardium grafts, Lankaranian et al showed a significantly lower rate of erosion at 9 months, which was 16% (5/31) versus 0% (0/59) in the double-thickness group. In a recent meta-analysis by Stewart et al of more than 3,000 eyes receiving


**Figure 3. External photographs of the right eye demonstrate the tube's placement in the anterior chamber (A), the patch graft melt, and the conjunctival autologous graft covering the tube (B).**

drainage devices, the incidence of conjunctival erosion was 2.0% at an average of 26 months' follow-up.[2] Further subgroup analysis is warranted to determine the relative risk of erosion for each particular type of glaucoma, because it is likely that eyes that are more prone to chronic inflammation and tissue friability are at higher risk of this type of complication.

Our patient suffered multiple erosions, and his long-term prognosis remains guarded at best given his young age, monocular status, and advanced proliferative disease. His options included an interpolated pedicle graft from the superonasal or temporal conjunctiva,[6] a free conjunctival graft, buccal mucosal graft,[7] fascia lata graft,[8] amniotic membrane, hinged scleral graft,[9] scleral tunnel,[10] or tubal extension with rerouting of the tube to a more superior location. Removal of the primary tube and inferonasal placement of a new implant will always remain an option for this patient. Godfrey et al advocated interpolated pedicle flaps in a case review of four patients with recurrent tubal erosions.[6] The advantage of this technique is it maintains the vascular supply to the conjunctival graft. Our technique of a free conjunctival autograft from the contralateral eye in this case had the advantage of sparing conjunctival tissue in the patient's remaining seeing eye; this is of particular importance when future glaucoma drainage implant surgery is likely. Given the amount of prior surgical manipulation superotemporally, future interventions in this quadrant will likely be at higher risk of failure. Extension and repositioning of the tube to a more superior location will likely be our next step if further erosion occurs, assuming that the IOP remains controlled with the primary implant. ❑

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