Managing Tube Exposure in the Setting of Severe Conjunctival Scarring

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CASE PRESENTATION

A 52-year-old woman had a history of trauma to her right eye and face from a blast injury in the 1980s. The patient developed a traumatic cataract and underwent lensectomy and vitrectomy in 1984. She experienced corneal decompensation and underwent penetrating keratoplasty in 1985. Several years later, she had a retinal detachment in this eye that required a scleral buckling procedure. Postoperatively, she experienced bouts of elevated IOP and progressive optic atrophy. Over the course of 15 years, the patient underwent superonasal, superotemporal, and finally inferotemporal tube shunt implantation for uncontrolled pressure in the affected eye. The last implant was a Baerveldt 250 mm^2 device (Abbott Medical Optics) placed inferotemporally. Recently, her IOP has been stable in the low teens off medication.

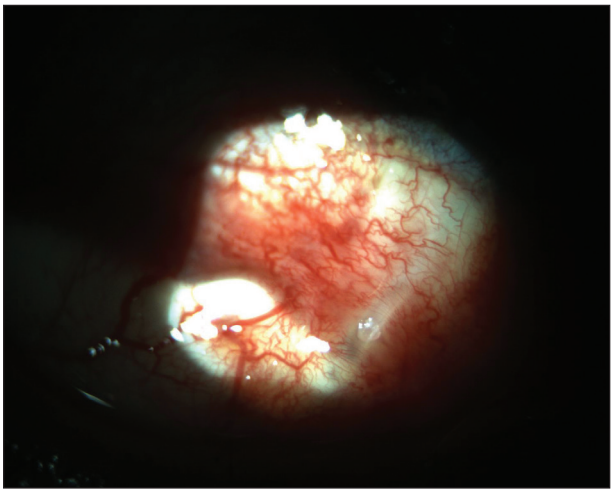

Figure 1. Conjunctival exposure 1 mm anterior to the tube-plate junction is noted at presentation.

The patient presented to the Wills Glaucoma Service in April 2014 after experiencing redness and irritation in her right eye for 3 days. Upon examination, her visual acuity was 20/400 OD with +11.00 D correction and 20/20 OS. Her medications included latanoprost in the left eye at bedtime and prednisolone acetate 1% in the right eye once a day. A slit-lamp examination revealed baseline eyelid scarring, 1+ injection, and severe baseline scarring of the conjunctiva. The corneal graft was clear and intact. The anterior chamber was deep without cell or flare, the eye was aphakic, and the vitreous was clear. Further examination of the inferotemporal quadrant revealed a 1-mm conjunctival defect, which was approximately 1 mm anterior to the junction of the tube and plate (Figure 1). Erythromycin ointment was prescribed three times per day along with a trial of doxycycline tablets, 50 mg twice per day. The patient was rechecked in 1 week, and the examination results were the same.

HOW WOULD YOU PROCEED?

- Would you continue medical management? If so, would you choose different medications?
- What would be your surgical approach? Would your goal be to close the conjunctiva over the tube or to remove/reposition the tube?
- What are your techniques for working with severely scarred conjunctiva?

SURGICAL COURSE

After 2 weeks of medical management, the conjunctival defect persisted. Given the risk of infection in the already compromised eye, we decided to take the patient to the OR for surgical management. We injected nonpreserved lidocaine hydrochloride 1% into

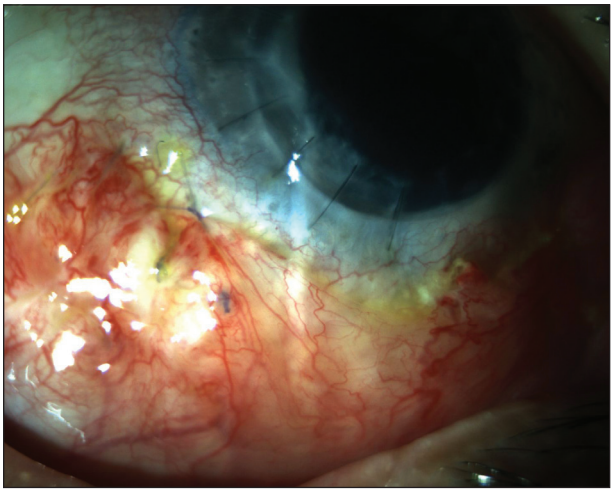

Figure 2. Postoperative day 1 after the tube's removal and replacement.

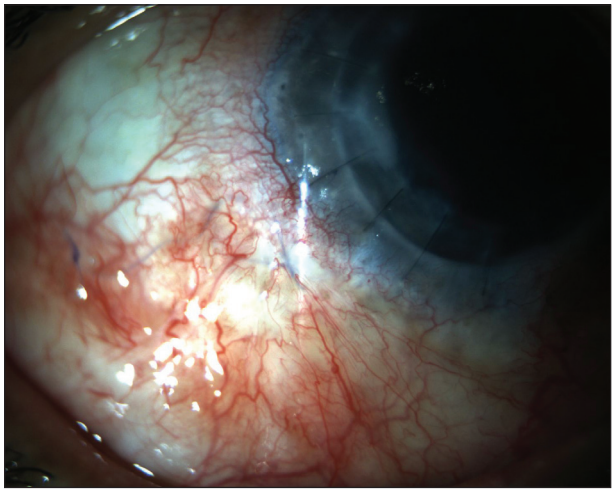

Figure 3. One month after the tube's removal and replacement, the conjunctiva remained intact, and the IOP was stable.

the inferotemporal quadrant in the subconjunctival space. We gently performed conjunctival dissection with Westcott scissors in an attempt to free the conjunctiva around the area of the exposure. The tissue exhibited significant friability due to the history of multiple surgeries. Given the high likelihood of erosion in the future, we decided to remove the entire tube and plate complex. We then carefully closed the anterior chamber as well as the sclerostomy with a single 8–0 nylon suture. Next, we meticulously dissected the capsule surrounding the plate of the Baerveldt implant. The bridging fibrous tissue was cut with Westcott scissors, and the implant was removed.

Further conjunctival dissection was carried out inferonasally. Because this quadrant was the least scarred, we decided to implant an Ahmed Glaucoma Valve (FP7; New World Medical), which was primed with balanced salt solution. We placed the device under conjunctiva and Tenon capsule in the inferonasal quadrant, with the anterior edge of the implant located more than 8 mm from the limbus. The plate was sutured to the sclera with 8–0 nylon sutures, and the tube was trimmed and beveled to the appropriate length with Westcott scissors. We used a 23-gauge needle to create an entrance track into the anterior chamber; it began approximately 3.5 mm posterior to the limbus. The tube was inserted through this track and noted to be well positioned. We used VisionGraft gamma-irradiated cornea (Tissue Banks International) to cover the tube at its insertion and secured the material with a 8–0 polyglactin suture. We chose gamma-irradiated cornea as a patch material owing to its excellent cosmetic results, especially in the readily visible inferonasal quadrant. We then closed the entire 180° of inferior conjunctiva with 8–0 polyglactin sutures.

OUTCOME

On the first postoperative day, the visual acuity was hand motion in the patient's right eye, and the IOP measured 17 mm Hg. The conjunctiva was closed, and the anterior chamber was deep (Figure 2). Corneal edema was noted. We prescribed ofloxacin 0.3% and prednisolone acetate 1%, both agents four times daily. The patient returned 1 week later and remained stable. One month postoperatively, her IOP was 13 mm Hg with some residual corneal edema that her corneal specialist is continuing to evaluate. The conjunctiva remained closed and was healing nicely (Figure 3).

DISCUSSION

Tube shunts, or glaucoma drainage devices, have been shown to be safe and effective for the surgical management of high IOP. The Tube Versus Trabeculectomy (TVT) study reported excellent long-term IOP control with both procedures, but each predisposes patients to certain adverse events. Complications of tube shunts include hypotony and IOP spikes, corneal endothelial damage, diplopia and motility disturbance, and conjunctival erosion. In the TVT study, the rate of tube erosion was 5% at 5 years.[1,2] In a retrospective review of patients who underwent repair of exposed tubes, 45% required a second operation, and 13% eventually required removal of the tube altogether.[3]

One significant risk factor for tube erosion that was identified retrospectively is a history of concomitant ocular surgery. Such procedures may include cataract

extraction with IOL implantation or pars plana vitrectomy at the time of the tube's placement. Other factors that may predispose a patient to tube exposure include a history of smoking, dry eye disease, or pseudoexfoliation.[4] The ocular surface of the patient in this case exhibited irregularities and dryness owing to her history of penetrating keratoplasty. Although her surgeries were all performed on separate occasions, the initial trauma as well as repeated surgery likely caused a long-term disruption of tissue integrity.

Numerous techniques for managing eroded tubes have been described. Most commonly, patch graft material such as processed pericardium or partial-thickness cornea is used to cover the tube, followed by primary conjunctival closure. Other techniques include the use of amniotic membrane tissue,[5] a pedicled conjunctival flap,[6] and buccal mucosal membrane.[7,8] These methods are useful when primary conjunctival closure is precluded by significant scarring or melting.

In this case, we removed the entire implant and placed a new drainage device. The conjunctiva was adequate for closure in this instance, and IOP control was maintained in the short term. Other options, in such difficult cases, include removal of the implant and the application of either transscleral or endoscopic cyclophotocoagulation. This may be a safe and effective next step if the patient's IOP becomes refractory to additional medications. ■

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