A Modified Trabeculectomy After Scleral Buckle, Complicated Cataract Extraction, and DSAEK

BY ANURAG SHRIVASTAVA, MD

CASE PRESENTATION

A 79-year-old Hispanic man was referred to the Montefiore Medical Center Glaucoma Service in Bronx, New York, for uncontrolled IOP on maximal tolerated medical therapy bilaterally. Medical therapy included dorzolamide (Trusopt; Merck & Co., Inc), brimonidine 0.2%, pilocarpine 2%, and latanoprost (Xalatan; Pfizer, Inc). The patient had previously demonstrated an intolerance of oral carbonic anhydrase inhibitors, and he had severe reactive airway disease that precluded the use of β-blockers.

The patient's past surgical history was significant for routine planned extracapsular cataract extraction (ECCE) in his right eye approximately 8 years ago that had resulted in a BCVA of 20/40 despite severe cupping of his optic nerve and moderate IOP control in the midteens. In the left eye, he had undergone multiple surgical procedures, including a scleral buckle for retinal detachment approximately 10 years earlier and an ECCE with the placement of an IOL in the sulcus approximately 1 year prior to presentation. This surgery was complicated by vitreous loss and postoperative pseudophakic bullous keratopathy, resulting in IOPs in the mid- to high 20s, severe pain, and a BCVA of hand motions.

Approximately 9 months prior to the patient's presentation, the referring corneal specialist performed Descemet stripping automated endothelial keratoplasty (DSAEK) with a limited anterior vitrectomy in the left eye, and the patient's BCVA improved to 20/70+. His IOP, however,

Figure 1. The slit-lamp photograph of the left eye preoperatively demonstrates a clear DSAEK graft, surgical corectopia with a well-positioned sulcus lens prior to placement of the Ex-Press.

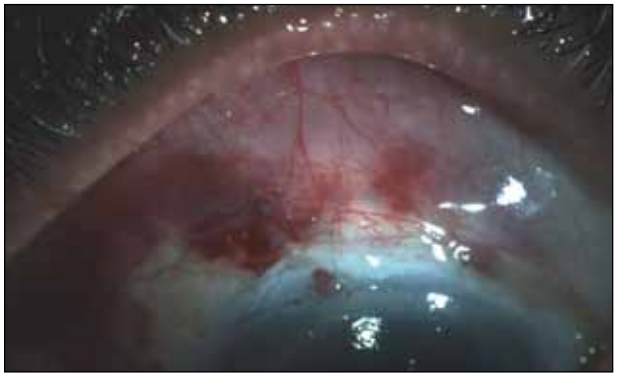

Figure 2. The left eye 1 week postoperatively. Low, diffuse bleb posterior to fornix-based conjunctival peritomy with residual subconjunctival hemorrhage. The DSAEK graft maintained central clarity throughout the postoperative course.

remained in the mid- to high 20s during the initial 3-month period after DSAEK. The patient's steroid regimen had been tapered, and the glaucoma medications he was taking preoperatively had been restarted with the exception of dorzolamide. Indirect ophthalmoloscopy had revealed a severely pale and cupped optic nerve. The 360º scleral buckle was well positioned without evidence of retinal detachment on B-scan ultrasonography. The IOL in the sulcus was also well positioned. The patient's BCVA had deteriorated to 20/200 OS by 3 months after DSAEK, however, without evidence of corneal decompensation or new retinal pathology. With an IOP of 28 mm Hg OS, the patient was referred for urgent glaucoma surgery with a presumed diagnosis of progressive optic neuropathy secondary to elevated IOP.

HOW WOULD YOU PROCEED?

- Would you consider a standard trabeculectomy with antimetabolite therapy?
- Would you perform a modified trabeculectomy with the Ex-Press Glaucoma Filtration Device (Alcon Laboratories, Inc.)?
- Would you implant a glaucoma drainage device in the superotemporal quadrant or elsewhere?
- Would you perform a canaloplasty or a microinvasive glaucoma surgery?

SURGICAL COURSE

Upon presentation, the patient had a functioning scleral buckling element and no prior exposure to antimetabolite therapy. A 360º conjunctival peritomy had been performed at the time of the scleral buckle's placement 10 years earlier. Furthermore, he had undergone ECCE complicated by vitreous loss, for which a limited anterior vitrectomy had been performed at the time of DSAEK (Figure 1). The conjunctiva was adequately mobile upon slit-lamp examination despite the prior procedures. After consulting with the cornea and retina services, I decided to proceed with a modified trabeculectomy using the Ex-Press.

Intraoperatively, I performed a fornix-based superior conjunctival peritomy and posterior dissection up to the scleral buckle. The conjunctiva and Tenon capsule adhered to the buckling element, so I did not attempt to dissect this tissue posteriorly. I constructed a 3- to 4-mm limbal scleral flap at approximately 75% depth. This flap was initiated and ultimately dissected anteriorly into clear cornea such that it incorporated the previous scleral tunnel incision located 1 to 2 mm posterior to the limbus. I administered antimetabolites followed by preplaced scleral flap sutures. To further limit the possibility of vitreous incarceration of the shunt, I performed a repeat anterior vitrectomy at the 12-o'clock position. I inserted the Ex-Press (model P-50) under the scleral flap through a 25-gauge needle track, which resulted in an adequate flow of aqueous. I sutured the flap and conjunctiva; the eye was Seidel negative after closure. An air bubble was placed in the eye to prevent early postoperative hypotony and potential dislocation of the DSAEK graft.

OUTCOME

During the first 2 months postoperatively, the patient maintained IOPs ranging from 9 to 14 mm Hg OS without glaucoma medications. His BCVA was 20/100+1 OS. I presumed that the Ex-Press was well placed, although I was unable to visualize it without gonioscopy secondary to a dense corneal pannus.

The patient had a low, diffuse bleb until the 2-month postoperative visit, when the IOP rose to 23 mm Hg (Figure 2). At this visit, I performed laser suture lysis and bleb needling with 5-fluorouracil. The IOP decreased to the initial postoperative levels, where it has remained for the past 3.5 months. The patient's BCVA 6 months postoperatively remains 20/100+ with an IOP of 13 mm Hg without medications. His IOP OD is 16 mm Hg on maximal tolerated medications, and his BCVA measures 20/40+ in that eye. The patient is currently deferring surgery on his right eye given his functionally monocular status, and he remains in guarded condition.

DISCUSSION

The Ex-Press device has been an invaluable addition to my surgical armamentarium for a variety of situations, but its implantation in "routine" cases remains controversial. In a prospective, randomized trial, De Jong[1] demonstrated qualified success rates (defined as an IOP ≥ 4 mm Hg and ≤ 15mm Hg) of 81.8% for Ex-Press cases compared with 47.5% for standard trabeculectomy cases 1 year postoperatively. They did not find significant differences in postoperative complication rates between the two groups. In contrast, Marzette and Herndon,[2] in a recent retrospective analysis of 76 consecutive Ex-Press cases compared to 77 trabeculectomies, demonstrated a statistically significantly reduced rate of postoperative hypotony with the device (4% vs 16%, respectively).

Hypotony in my patient might have had devastating consequences from both retinal and corneal perspectives. In a retrospective analysis of 854 eyes undergoing DSAEK (67 of which had previously undergone glaucoma surgery), Goshe et al[3] found that 83% of dislocated grafts occurred in eyes that experienced postoperative hypotony secondary to prior glaucoma surgery relative to controls.

Standard trabeculectomy surgery was an option for my patient. The presence of vitreous along with prior surgical manipulation of the superior iris, however, might have resulted in both technical challenges and functional deficits.

The risk of vitreous or iris incarceration into the Ex-Press was a concern as well. It is likely, however, that the properties and positioning of the device within the anterior chamber may at least partially mitigate the likelihood of these complications. Intraoperative confirmation of aqueous flow through the device was imperative to rule out possible occlusion of its lumen. Conversion to standard trabeculectomy is an option in any Ex-Press case, but it was unnecessary in this particular situation after adequate flow was demonstrated through the properly positioned device.

A primary glaucoma drainage implant would have been a very reasonable choice for this patient as well, but technical considerations and modifications would have been imperative to ensure a successful outcome. Although the presence of a posterior scleral buckle complicates routine implantation, a variety of techniques can modify the currently available devices for this situation. Anteriorly, the presence of a corneal endothelial graft necessitates precise placement and sizing of the tube within the anterior chamber. Given its small physical dimensions, the Ex-Press is extremely unlikely to cause direct corneal decompensation of a DSAEK graft when properly placed. In 15 patients who had undergone penetrating keratoplasty and subsequent placement of an Ex-Press, Ates et al[4] demonstrated average reductions in IOP from 41.46 to 12.06 mm Hg without any worsening of the corneal graft's clarity. Lastly, the placement of the IOL in the sulcus potentially complicated options for inserting posterior chamber tubes.

As in any case, careful surgical planning was critical to the successful outcome in this patient. Although much of the nerve damage resulting his loss of vision is obviously irreversible, I hope that improved IOP control and the decreased need for topical glaucoma medications will slow the rate of structural and functional progression and help maintain the clarity of his DSAEK graft. A glaucoma drainage implant still remains a viable option for this patient if IOP control is lost in the late postoperative period. ■

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