



Video

Glaucoma tube shunt surgery with repeat penetrating keratoplasty in an aphakic patient

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ABSTRACT

We present a complicated case of mixed mechanism glaucoma in the setting of failed corneal transplant and aphakia. The patient was a 54-year old male with HLA B27 uveitis and prior open globe injury. He was left aphakic after cataract extraction and had a subsequent corneal transplant for bullous keratopathy. Due to elevated intraocular pressure in the setting of a failed corneal graft, the decision was made to insert a pars plana tube shunt and perform repeat penetrating keratoplasty as a combined case with the glaucoma, cornea, and retina services. We illustrate the surgical steps and decision making in this complex case.

HD video in 1080p resolution can be found here: <https://www.dropbox.com/s/5irr9t9n0fdutwx/2024%2008%2001%20-%20AJOC%20Case%20Reports%20%28triple%20service%20tube%29.mp4?dl=0>

Hello, my name is Bryce Chiang, and I am a Glaucoma fellow at the Byers Eye Institute at Stanford. On behalf of all the authors, we present a complicated case of mixed mechanism glaucoma with failed corneal transplant.

This is a 54-year old male with HLA B27 uveitis with prior globe injury with aphakia after cataract extraction and subsequent corneal transplant for bullous keratopathy. At first presentation, his vision was light perception and eye pressure was 24 mmHg on timolol, dorzolamide, and brimonidine. His corneal transplant had failed, and he had a pupillary membrane and 360° of iridocorneal touch. His poor vision was likely multifactorial, including the above, but also possibly due to advanced glaucoma secondary to trauma, angle closure and uveitis. He was started on maximum medical therapy and scheduled for glaucoma surgery combined with the retina and cornea services. The patient also saw the uveitis service and was started on oral Prednisone before the surgery.

The glaucoma service began the surgery by opening the conjunctiva at 9 to 12 o'clock. Adhesions from the prior surgery were carefully dissected as the sub-Tenon's space was opened. Gentle cautery was used. The Ahmed FP7 was primed and inserted and sutured onto the sclera 8 mm from the limbus with 8-0 Vicryl. Surgical planning for this case required careful thinking. An anterior chamber tube was not possible due to 360° of iridocorneal touch and to minimize risk for repeat corneal transplant failure. Because the patient was aphakic, a sulcus tube could

not be done because it could still become clogged with vitreous. Thus, a pars plana tube with vitrectomy was needed.

Three 25-gauge trocars were inserted by the retina service. The glaucoma service indicated the location of the desired tube entry site, and the retina service inserted the superotemporal trocar perpendicularly, directly into the vitreous cavity without beveling at that location. This sclerotomy would be used later for the pars plana tube. A light pipe was used to ensure placement of the trocars into the vitreous. The infusion was inserted.

The cornea service measured the diameter of the temporary keratoprosthesis, the trephine, and the failed corneal transplant, and these were found to be 8.2 mm, 8.0 mm and 8.25 mm, respectively. Because the size of the temporary keratoprosthesis and the failed corneal transplant were very similar, the decision was made to remove the sutures and dissect the interface between the failed corneal graft and host cornea. The failed cornea was removed. A thick fibrous iris and pupillary membrane were also excised. Residual lens material was seen and also removed. The temporary prosthesis was sutured in place.

The retina service then took over. A pars plana vitrectomy was done with scleral depression, taking care to remove vitreous in the superior temporal quadrant.

The cornea service then removed the temporary keratoprosthesis. Additional residual lens material was removed, and the donor cornea was trephined to 8.75 mm. Care was taken when placing the first suture so as not to lose the corneal transplant into the eye as the eye was aphakic and there would be nothing to support the cornea. 16 interrupted sutures were placed to hold the corneal transplant in place.

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Attention was then turned back to the tube. After beveling the tube away from the iris, the superior temporal trocar was removed, and the tube was inserted through that sclerotomy. The tube was tied down with a double loop of 10-0 nylon, which is our usual technique to prevent tube migration. The failed corneal transplant was cut to size, and the epithelium and endothelium removed and used as a patch graft. The removal of epithelium was necessary to prevent cyst formation. Resorbable Vicryl sutures were used to secure the patch graft against the sclera. The conjunctiva was closed with two wing sutures at 9 and 12 o'clock that were run backwards along the relaxing incisions. The eye was Seidel negative at the end of the surgery.

On post-op day 1, the patient had an eye pressure of 6 mmHg, and on post-op week 1, the patient's vision remained light perception, but the eye pressure had improved to 13 mmHg. There was a clear red reflex and view to the retina, which showed a pallorous, nearly fully cupped optic nerve. At post-op month 4, the vision remained the same and the pressure was still well controlled at 12 mmHg on Cosopt.

We thank you for your attention and hope this video demonstrates key points in surgical planning in complicated cases of mixed mechanism glaucoma in the setting of failed corneal transplant.

Declaration of interests

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

CRediT authorship contribution statement

Bryce Chiang: Writing – review & editing, Visualization, Methodology. **Karen Wai:** Writing – review & editing, Visualization, Methodology. **Andrea Naranjo:** Writing – review & editing, Methodology. **Stephen Smith:** Writing – review & editing, Supervision. **Jennifer Rose-Nussbaumer:** Writing – review & editing, Supervision. **Wendy W. Liu:** Writing – review & editing, Supervision, Conceptualization.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.ajoc.2024.102145>.