

A novel simplified method for managing inadvertent tube cut during aurolab aqueous drainage implant surgery for refractory glaucoma

Sachin Mungale, Paaraj Dave¹

We report a novel simplified method for managing inadvertent tube cut in a patient undergoing the Aurolab aqueous drainage implant (AADI) surgery for refractory neovascular glaucoma. Tube cut occurred while applying the polyglactin ligature suture used to avoid early postoperative hypotony. The short end of the cut tube was removed and the long end reinserted into the base plate of AADI. The surgery was then completed as usual. Following the surgery, the intraocular pressure reduced to 20 mmHg which stabilized and was maintained at 10 mmHg till the last follow-up at 12 months without any glaucoma medication.

Key words: Aurolab aqueous drainage implant, management, tube cut

The Aurolab aqueous drainage implant or AADI 350 (Aurolab, Madurai, Tamil Nadu, India) is a nonvalved glaucoma shunt. It consists of a 13 mm radius base plate made of silicone with a surface area of 350 mm² along with a straight silicone tube measuring 35 mm in length for easy insertion into the anterior chamber.^[1] Like all nonvalved implants, a temporary tube ligature is essential to prevent hypotony in the early postoperative period.^[2] Typically, this is done by using an absorbable polyglactin suture. Tying the suture too tight may result in inadvertent tube cut. The aim of our report is to discuss a novel simplified method of managing this rare complication.

Case Report

The patient was a 55-year-old male with pseudophakia in both eyes who had developed neovascular glaucoma following a central retinal vein occlusion in his right eye. His presenting visual acuity was counting fingers close to face in the right eye

and 20/20 in the left eye. His medical history was remarkable for uncontrolled hypertension. Slit-lamp examination of the right eye revealed diffuse stromal and microcystic corneal edema with neovascularization of the iris. Intraocular pressure (IOP) was 40 and 16 mmHg in the right and left eye, respectively. Gonioscopy showed 360-degree closed angles in the right eye and open angles in the left eye. The left eye was otherwise unremarkable. Patient was started on brimonidine tartrate 0.2% and timolol 0.5% eye drop combination twice a day, dorzolamide 2% eye drops thrice a day, and oral tablet acetazolamide 250 mg four times a day. Intravitreal bevacizumab was injected and panretinal photocoagulation was performed in the right eye. Subsequently, his IOP continued to remain high at 30 mmHg despite regression of the iris neovascularization. Hence, a decision to implant the AADI for his intractable glaucoma was taken. A standard surgical method was followed.^[3] Fornix based conjunctival opening was made. The AADI tube was primed and the base plate was positioned 8–10 mm posterior to the limbus, with its wings under the superior and lateral rectus muscles. The plate was secured by two interrupted 10-0 prolene suture (monofilament polypropylene blue; Ethicon, Johnson and Johnson, Himachal Pradesh, India). While ligating the tube with absorbable 6-0 vicryl suture (braided coated polyglactin 910 violet; Ethicon, Johnson and Johnson) for prevention of hypotony in the early postoperative period, we encountered an inadvertent tube cut [Fig. 1]. Due to the unavailability of a spare valve and other materials for tube extension, the operating surgeon removed the short end which was attached to the implant and reinserted the long end into the back plate of the implant [Figs. 2 and 3]. The long end of the tube near the plate was again ligated taking care not to apply too much force and the tube occlusion was checked. Venting incisions were made anterior to the ligation (four pairs) and tested for patency. The tube was shortened with a bevel up opening made so that 2–3 mm length would remain in the anterior chamber. A 23-gauge needle was used to create a track 1.5 to 2 mm behind the limbus through which the tube was inserted into the anterior chamber parallel to the iris. The tube was secured to the sclera with 10-0 nylon suture (monofilament polyamide black, Ethicon; Ethicon, Johnson and Johnson, Himachal Pradesh, India) and subsequently covered with a partial thickness scleral patch graft. The Tenon's capsule and conjunctiva were sutured with 8-0 vicryl (Braided coated polyglactin 910 violet) [Fig. 4]. On postoperative day 1, the cornea became clear with IOP of 20 mmHg which stabilized and was maintained at 10 mmHg till the last follow-up at 12 months without any glaucoma medication. He was given tapering doses of topical steroid, antibiotic, and cycloplegic eye drops in the postoperative period. His final visual acuity improved to 20/200.

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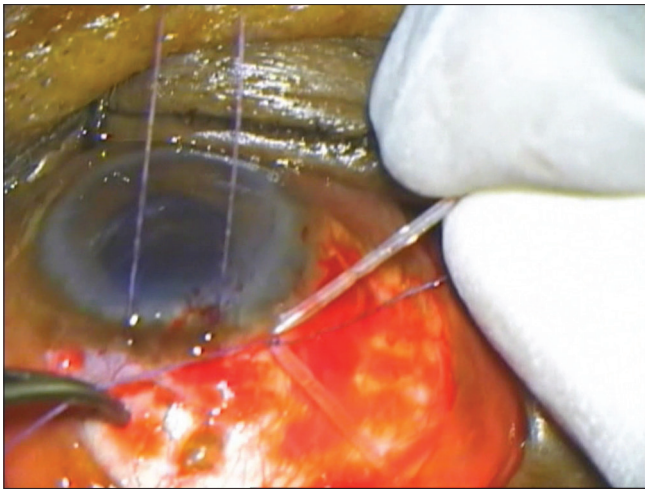


Figure 1: Inadvertent tube cut while applying the polyglactin ligature suture

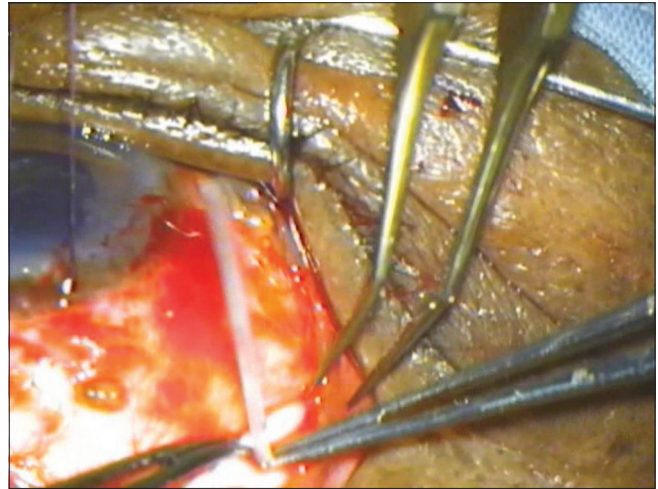


Figure 2: Inserting the long end into the back plate of the implant after the short end was removed

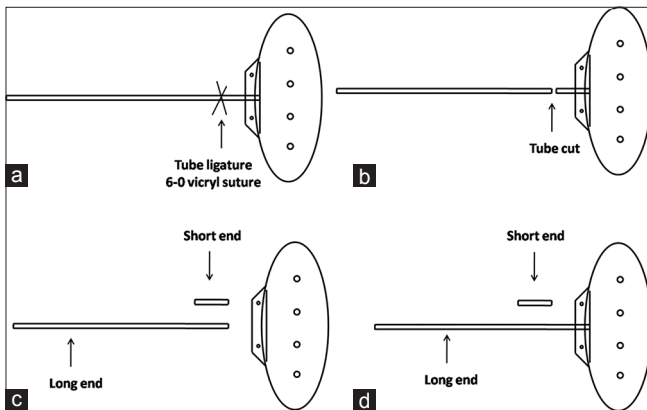


Figure 3: Schematic representation of the technique (a) Tube ligature with 6-0 vicryl to prevent postoperative hypotony (b) Inadvertent tube cut (c) Short end of the tube pulled and removed from its attachment with the episcleral plate. (d) Long end of the tube re-inserted in its place to the episcleral plate

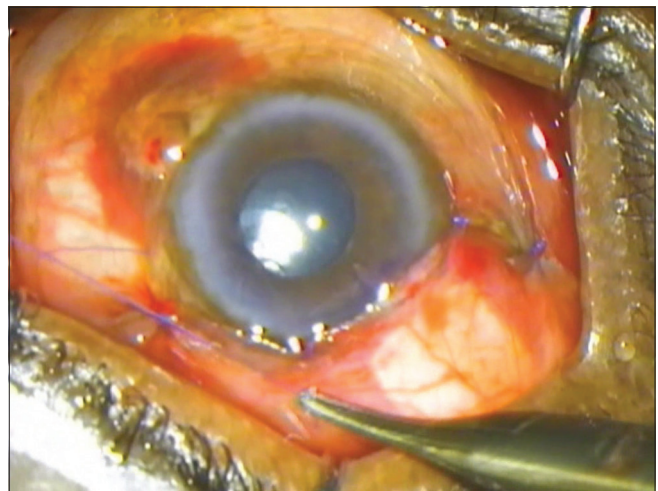


Figure 4: Final appearance of the eye at the completion of the surgery

Discussion

The AADI is a relatively new cost-effective implant used in the management of refractory glaucoma. Its one year safety and efficacy has been published.^[4,5] A rare complication like tube cut has been reported before with the Baerveldt implant which was managed with the help of a Tube Extender (New World Medical, Inc, Rancho Cucamonga, CA).^[6] The use of an angiocatheter segment or a 22-G intravenous catheter for retracted tube has also been reported.^[7,8] These methods could have been used; however, their nonavailability was a major limitation in our case. Fortunately, the small stump of the tube attached to the base plate of the valve could be easily removed and the larger end reinserted in its place without much difficulty. Despite tube ligation, a relatively low post operative IOP of 20 mmHg in our case could have resulted because of peritubular leak and the venting incisions. We do not know if this method can be used for other nonvalved implants as they are currently not available in this region. This method may not work with valved implants like the Ahmed valve where the tube snugly fits into the base plate and any forceful pulling may damage the valve mechanics present near

the tube insertion. In such cases, the conventional methods for tube extension should be used. A 12-month follow-up of our patient managed with this novel method for inadvertent tube cut proves that it works for the AADI implant in dire situations where a spare implant or other alternatives are not available.

Conclusion

We report a novel simplified method for managing inadvertent tube cut in a patient undergoing AADI surgery.

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The manuscript, or parts of it, have not been and will not be submitted elsewhere for publication. All co-authors have read the final manuscript within their respective areas of expertise and participated sufficiently in the study to take responsibility for it and accept its conclusion.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients

understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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