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Repair of Tube Erosion by Modifying the Tube Extender

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Abstract: We describe here a case report of a novel technique for tube erosion repair, which modifies and utilizes the commercially available tube extender (Model TE). The modification of the tube extender makes the commercially available tube extender more compact and is useful in cases where conjunctival mobility and space are limited. This debulking of the tube extender may reduce the risk of future tube exposure and dellen formation.

Key Words: tube erosion, tube extender, glaucoma drainage device repair

(*J Glaucoma* 2020;29:604–606)

Glaucoma tube erosion occurs as a late postoperative complication in 2% to 5% of eyes after glaucoma drainage device implantation.[1,2] Tube exposure can lead to serious complications such as hypotony, ocular inflammation, and endophthalmitis.[3,4] Many risk factors for tube exposure have been studied, although no single risk factor has been implicated to be significant repeatedly. Risk factors include tube location, Hispanic race, concomitant surgery, topical glaucoma medications, neovascular glaucoma, and young age.[5] Tube exposures can be repaired using several methods, which commonly involve using a patch graft of sclera, cornea, or pericardium and advancing conjunctiva over the graft. In some cases, the tube is repositioned.[6] A commercially available Model TE tube extender (New World Medical Inc., Ranco Cucamonga, CA) can be used when the tube requires lengthening[7] or when the exposed length of tubing is cut out due to possible contamination. However, placement of a tube extender can be challenging when the conjunctiva is friable or scarred in the presence of prior surgery or when space is limited. In this case report, we describe a case of tube exposure that was repaired using a novel technique that debulks the Model TE tube extender so that it could fit in the limited space anterior to the existing plate.

Received for publication December 28, 2019; accepted March 15, 2020.
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Disclosure: T.C.C. was supported by Massachusetts Lions Eye Research Fund; American Glaucoma Society Mid-Career Award; National Institutes of Health (UL1 RR 025758); Fidelity Charitable Fund; Department of Defense Small Business Innovation Research (DHP 15-01615-016). The remaining authors declare no conflict of interest.
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Supplemental Digital Content is available for this article. Direct URL citations appear in the printed text and are provided in the HTML and PDF versions of this article on the journal's website, www.glaucomajournal.com.

DOI: 10.1097/IJG.0000000000001505

CASE

An 83-year-old monocular woman with advanced open-angle glaucoma presented with an inferior temporal tube erosion of her left eye (OS), which had undergone Ahmed glaucoma valve surgery 7 years before presentation (New World Medical Inc.). The eye had previously undergone multiple glaucoma surgeries, including 2 prior trabeculectomies followed by an Ahmed glaucoma valve model FP7 placed in the inferotemporal position with corneal patch graft reinforcement because of friable superior conjunctiva. During these prior surgeries, she was noted to have thin conjunctiva that button-holed easily.

When the patient presented with a 2 mm inferior temporal tube erosion OS (Fig. 1A), she had been having eye redness and irritation for a few days. Her vision was 20/400 OS without correction (sc) (baseline 20/200 sc), and intraocular pressure (IOP) OS was 11 mm Hg on brimonidine tartrate, timolol maleate/dorzolamide, and latanoprost drops. There was no evidence of infection. She was taken urgently to the operating room for repair of her tube erosion. The steps for tube erosion repair were as follows (Supplemental Video 1, Supplemental Digital Content 1, http://links.lww.com/IJG/A378):

(1) Dissect the surrounding conjunctiva (Fig. 1B) and excise the exposed portion of the tube (Fig. 1C).
(2) Close the old tube track with an interrupted 9-0 nylon suture (Fig. 1D).
(3) Since the unmodified Model TE tube extender is too long and bulky to fit into the existing space, cut out the oval fixation plate from both the wider, posterior TE tubing (Fig. 1D) and narrower, anterior TE tubing (Fig. 1E), respectively.
(4) Slide the wider TE tubing over the original tube stump that is still connected to the plate, and insert the narrower TE tubing into the wider TE tubing (Fig. 1F).
(5) Suture the overlapping areas of tubing together with 10-0 nylon sutures (Fig. 1F).
(6) Create a new scleral track and insert the tube into the sulcus (Fig. 1G).
(7) Cover the new tubing with a corneal half-moon (Fig. 1H)
(8) Close the conjunctiva (Fig. 1I).

The patient was put on moxifloxacin and prednisolone drops 4 times per day postoperatively. At 1-week postoperative, visual acuity OS was 20/1000 sc, and her IOP was 5 mm Hg. Her glaucoma drops were stopped, and her prednisolone and antibiotic drops were tapered. At 3 months after surgery, visual acuity was back to her baseline of 20/200 sc, and her IOP was 21 mm Hg. She was restarted on latanoprost OS and sent back to her referring physician. The tube remains covered, and there has been no leak.

DISCUSSION

To prevent tube erosion recurrence, the tube may need to be redirected more posteriorly or to a different location where the surrounding conjunctiva is less friable or scarred. Also, when the exposed portion of the tube is excised, there may be insufficient tube length to reinsert the tube stump into the eye. In these cases, the commercially available Model TE tube extender can be used to be keep the original plate.[8] However,

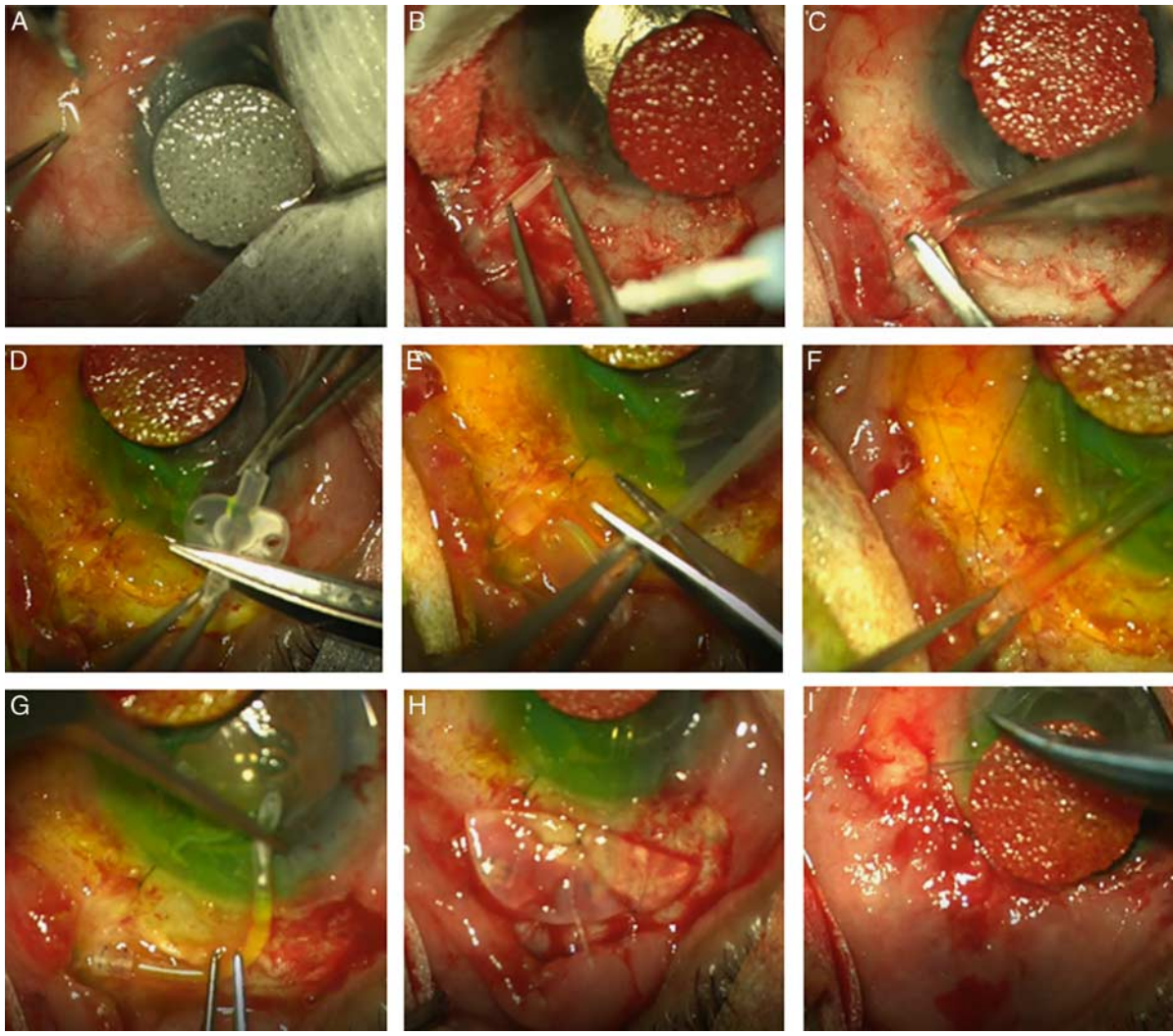

FIGURE 1. Clinical photographs showing the surgical technique of tube exposure repair and how the Model TE tube extender was modified. A, Exposed inferotemporal tube before the procedure. B, Open the surrounding conjunctiva. C, Cut and remove the exposed portion of the tube and leave the tube stump with the plate. D, Cutoff the TE oval fixation plate from the wider tubing. E, Cutoff the narrower TE tubing, which is destined for the anterior chamber, from the oval fixation plate. F, Slide the wider TE tubing over the original tube stump. Slide the long narrower TE tubing into that wider tubing and suture together the areas of overlapping tubing. G, Create new scleral entry track and insert new TE tubing into the sulcus. H, Cover tubing with a corneal half-moon. I, Close conjunctiva.

in some cases, such as the one reported here, the unmodified tube extender is too long and the eyelets are too bulky to be placed in the eye. We report here a novel technique to modify the Model TE tube extender such that the new tubing is smaller and less bulky, which makes new tube placement in a small space and a long intrascleral tunnel possible. The long intrascleral tunnel as well as the lower height of the overlying conjunctival would theoretically decrease the chance of future tube erosion and dellen formation.

Other reported techniques of extending the tube involve attaching the old tube stump to silicone lacrimal intubation tubing or to an angiocatheter. The 2 tube segments are sutured together with the joint between the 2 tubes covered with a piece of angiocatheter to prevent fibrous ingrowth into the joint.[9] The technique reported here is arguably easier and more accessible, as it uses the commercially available Model TE tube extender that is designed to fit over both Ahmed and Baerveldt (Abbott Medical Optics, Abbott Park, IL) tubing, which have the same diameter.

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