A Newer Technique for Glaucoma Tube Trimming

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Long silicone glaucoma tubes within the anterior chamber are frequently detrimental to the corneal endothelium and other anterior chamber structures. Tube shortening often involves extensive and potentially complicated surgery that requires tube removal and reinsertion. A new technique is described for trimming the silicone tube in situ. Besides permitting tube length modification within the anterior chamber, it also decreases operative time substantially. A representative case is described.

Aqueous tube shunts have been used for the treatment of complicated glaucoma for decades.1 Shunts are increasingly being used in children because of the low success rate of filtering procedures and to avoid complications.2,3 Despite their success, aqueous tube shunts may cause substantial complications, many of which occur in the anterior segment. In a substantial number of cases, the implant tube position has to be modified postoperatively.1,4,5 A long tube in the anterior chamber can be detrimental to the long-term health of the corneal endothelium, especially in eyes with shallow anterior chambers such as those with hypotony or corneal transplants. The rate of endothelial failure is 17% to 35%,6,7 in cases in which intermittent tube-corneal contact occurs. This situation results in a gradual onset of corneal edema that initially is localized and then becomes generalized. Long tubes can cause chronic iritis or cataract formation when there is contact with the iris or the lens. Furthermore, cataract surgery is technically more difficult in the presence of a long tube in the anterior chamber.

In some cases, tube length and placement are acceptable at the time of surgery, but the tube may lengthen or become redirected postoperatively. This change can be secondary to a variety of factors, such as movement of the implant, changes in intraocular pressure, or movement of the tube itself. The final tube position may not be desirable if it is in contact with certain intraocular structures. In these cases, the tube has to be shortened.

Trimming the tube has so far involved major surgery. This surgery typically involves dissection through a scarred conjunctiva, dissection underneath the scleral patch graft, removal of the tube from the anterior chamber, trimming of the tube, and subsequent tube reinsertion and suturing. This process can be lengthy and may be fraught with complications such as tube transection during scleral patch dissection, difficulty with tube reinsertion, and nonhealing of the wound with subsequent tube exposure and risk of epithelial downgrowth and postoperative hypotony.

PROCEDURE

To prevent complications that may occur with traditional methods of tube shortening, we describe a newer technique. After application of topical anesthesia with the usual sterile conditions in the operating room, 2 paracentesis sites are created by using a Beaver supersharpened blade (Becton, Dickinson and Co, Franklin Lakes, NJ). One is positioned directly across from the tube entry site into the anterior chamber 180° away and the other 90° away from the tube entry site (Figure 1). The anterior chamber is filled with a viscoelastic agent, and a 30-gauge needle on a 1-mL syringe
is advanced from the paracentesis site 180° away (Figure 2). The needle is advanced into the tube lumen to stent the tube. This procedure is followed by the insertion of a manual right-angled membrane peeling and cutting scissors (Alcon Grieshaber AG, Schaffhausen, Switzerland) from the other paracentesis site. The scissors is positioned over the tube beyond the stenting needle, and the tube is transected (Figure 3). The scissors is then withdrawn from the anterior chamber, and an end-gripping vitreoretinal forceps (Alcon Grieshaber AG) or an Utrata forceps is inserted through the same paracentesis site.

During this time, the tube’s distal end remains in the anterior chamber on the tip of the 30-gauge needle. The forceps then grasps the distal tube fragment at the cut end, and the fragment is removed from the anterior chamber by withdrawing the forceps (Figure 4). The pliable silicone tube fragment usually offers no resistance to removal through the paracentesis site. The needle is withdrawn simultaneously. The viscoelastic agent can be removed from the anterior chamber with the help of manual irrigation and aspiration with balanced salt solution with a syringe and cannula. This procedure is followed by stromal hydration of the paracentesis sites to ensure a watertight closure.

In the presence of a malpositioned tube in which cannulation with a needle is difficult, a slight modification of this procedure is used. Two paracentesis sites are created on either side of the tube, typically at the 3- and 9-o’clock positions. An end-gripping forceps is introduced through one paracentesis site to hold the tube, and a Sutherland scissors (Alcon Grieshaber AG) through the other site to transect the tube, which is then withdrawn from the anterior chamber with the forceps.

Possible complications include injury to intraocular structures during manipulation with various instruments. A small amount of viscoelastic agent, if left behind in the anterior chamber, does not result in a postoperative pressure spike because of the presence of a patent tube.

**REPRESENTATIVE CASE**

A 46-year-old man who underwent glaucoma tube surgery for uncontrolled intraocular pressure had an acceptable tube placement intraoperatively. Postoperatively, the tube
was touching the center of the lens. Within a few days, the patient developed a cataract necessitating removal. Because the long tube was in the visual axis in the anterior chamber, which would make cataract surgery difficult to perform, the tube was trimmed prior to the start of the cataract surgery. The tube was trimmed short in the manner described earlier, and cataract surgery proceeded in the usual manner. There were no complications after the procedure; intraocular pressure control was maintained.

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REFERENCES


Correction

Error in Figure. In the article titled “Peripheral Pigmented Corneal Ring: A New Finding in Hypercarotenemia,” in the March issue of the ARCHIVES (2003;121:403-407), on page 404, Figure 1 should have appeared as follows.