Repositioning of Ahmed glaucoma valve tube in the anterior chamber with prolene sutures to manage tube-endothelial touch

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Abstract

Background: Corneal endothelial damage is a known complication of aqueous shunt surgery. Objective: To describe a new technique for repositioning the Ahmed glaucoma valve tube in a case of tube-endothelial touch. Case: A patient with advanced glaucoma, having undergone Ahmed glaucoma valve (AVG) implantation, developed localized corneal endothelial damage due to contact between the tube and superior corneal endothelium. Two 10-0 prolene anchor sutures were passed over the tube in the anterior chamber, repositioning it away from the endothelium, thus preventing further damage to the corneal endothelium. Resolution of corneal oedema was noted without affecting the tube drainage and intraocular pressure. Conclusion: Intracameral repositioning of the shunt tube using prolene sutures is a useful technique for correcting the tube malposition.

Keywords: Ahmed glaucoma valve, endothelial damage, prolene suture

Case report

A 60-year-old male glaucoma patient who had undergone AGV implantation 2 years ago presented with a complaint of progressive diminution of vision in his right eye. On examination, his BCVA was 20/
200 OD, PR accurate with pseudophakia and advanced glaucomatous optic neuropathy with near total cupping. The IOP was 14 mmHg without medication. The left eye had a BCVA of 20/20 with no ocular abnormality. Corneal bullae had formed in the supero-temporal quadrant, wherein the AGV tube was seen touching the endothelium (Figure 1a). The patient was scheduled for tube repositioning using prolene sutures in the anterior chamber. Limited peritomy was done in the nasal and temporal quadrant and a sclera groove was made. One double armed 10-0 prolene suture (straight long needles) was passed from the nasal to the temporal sclera (1 mm posterior to the limbus) and the knot was buried within the preplaced sceral groove (Figure 1b). A Sinskey hook was used to manipulate the tube such that it was placed under the suture and away from the corneal endothelium (Figure 1c, 1d). In the post-operative period, progressive improvement was noted in the corneal oedema and there was reversal of the localized bullous keratopathy. The IOP was 16 mmHg at 1 week and 14 mmHg at 4 weeks of follow up.

Discussion
An incorrectly positioned tube in the anterior chamber can occur in the early and late postoperative period. It may lead to corneal decompensation due to tube-corneal endothelial touch. The exact mechanism of damage to the corneal endothelium remains unclear, and many theories have been proposed. McDermott and associates proposed the jet flow around the tube end caused by the heart-beat, inflammation in the chamber, intermittent tube–corneal touch, tube–uveal touch, and a foreign body reaction to the silicone tube as possible mechanisms of corneal endothelial damage (McDermott et al, 1993). It has been suggested that high IOP and long duration of elevated IOP before surgery may affect the endothelium directly or may indirectly cause hypoxic damage (Setälä et al, 1979). Fiore and associates proposed that the mechanism of corneal endothelial damage may involve the toxicity of the preservatives in eye drops, the duration of surgery, shallowing of the anterior chamber during or after surgery, or changes in the composition of the aqueous humor attributable to the direct connection with the sub-Tenon space (Fiore et al, 1989). The cell loss can vary from 15.3% at 1 year to 18.6% at 2 years (Eun-Kyoung Lee et al 2009) and is accentuated in cases of tube-corneal touch. The reported frequency of tube-endothelium touch is variable, ranging from 8% to 20% (Hill et al, 1991; Lloyd et al, 1992). Repositioning of the AGV, cutting the tube, a change of the implantation site and insertion of the tube into the posterior chamber or into the posterior segment via pars plana (after vitrectomy) may be considered (De Guzmán et al, 2006). Explantation of the drainage device is often the last alternative. Trimming of a glaucoma shunt tube with Descemet membrane endothelial keratoplasty (DMEK) has also been reported (Bersudsky V et al 2011).

In this case, the position of the tube could be corrected by placing a transcameral suture from limbus to limbus. The other option was to remove the implant and put in a new implant. However, this
would constitute a major surgery and increase the risk of fibrosis and failure, and escalate the surgical cost. This procedure will allow tube repositioning while retaining its function. Since the sutures are away from the pupillary axis, glare and other annoying visual symptoms will not occur. Possible complications or side effects of our technique are the induction of astigmatism, erosion of the suture at the limbus, long-term degradation of Prolene and ocular infection. The risk of ocular infection is considered to be very small as the externalized suture is buried within a scleral groove covered by conjunctiva.

**Conclusion**

Thus, our technique of placing limbus to limbus anchor sutures to depress the tube away from the endothelium offers a quick and minimally invasive alternative to correct tube-endothelial touch in eyes with malpositioned glaucoma drainage devices.

**References**


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