Case report

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

Dada T, Gupta R, Tinwala SI, Sobti A, Panda A
Dr Rajendra Prasad Centre for Ophthalmic Sciences, All India Institute of Medical Sciences, New Delhi-11 00 29, India

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

Introduction

Glaucoma drainage devices (GDDs) create an alternate aqueous pathway from the anterior chamber (AC) by channeling aqueous out of the eye through a tube to a subconjunctival bleb or to the suprachoroidal space. This tube is usually connected to an equatorial plate under the conjunctiva. GDDs are used frequently in the treatment of refractory glaucoma to lower intraocular pressure (IOP) on a long-term basis (Hong et al, 2005). In certain conditions, such as neovascular glaucoma, iridocorneal endothelial (ICE) syndrome, penetrating keratoplasty (PKP) with glaucoma, and glaucoma following retinal detachment surgery, GDD implantation has become the preferred surgery. This procedure may be associated with a range of early and late complications deriving from the plate or the tube (Nguyen 2004; Al-Torbak et al, 2005; Marcet et al, 2005). One of the most severe complications is corneal endothelial cell loss and corneal edema, which seems to be associated with intermittent or persistent tube-cornea touch. This has been reported in up to 30% of patients with long-term follow up (Topouzis et al 1999). If tube-cornea touch is observed, the tube should be repositioned. We describe a new technique for repositioning the Ahmed glaucoma valve tube in a case of endothelial touch causing localized pseudophakic bullous keratopathy.

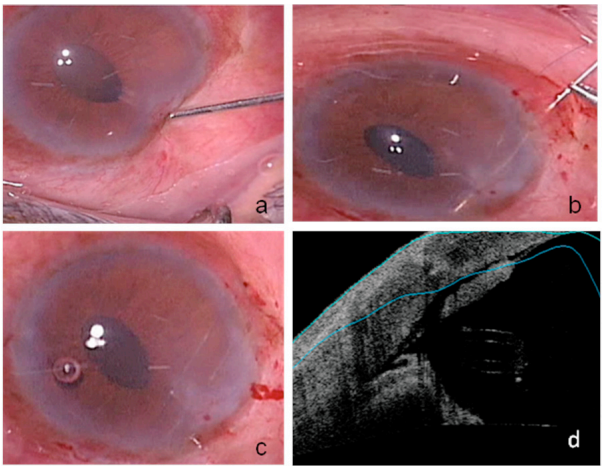
Received on: 30.01.2012 Accepted on: 12.04.2012
Address for correspondence: Dr Raghav Gupta, MD
Dr R P Centre for Ophthalmic Sciences,
AIIMS, New Delhi-110029, India
Tel: +91-9868477337
E-mail: raghav1311@gmail.com

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.

Figure 1



1a: Preoperative picture showing tube corneal touch

1b: Passage of limbus to limbus double armed prolene suture on a bent needle

1c: Depression of tube away from the cornea by means of double-armed suture

1d: Post-operative UBM showing tube away from the corneal endothelium

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 Guzmann 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 eûects 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 oûers a quick and minimally invasive alternative to correct tube-endothelial touch in eyes with malpositioned glaucoma drainage devices.

References

Al-Torbak AA, Al-Shahwan S, Al-Jadaan I, et al. (2005). Endophthalmitis associated with the Ahmed glaucoma valve implant. Br J Ophthalmol. 89:454–458.

Bersudsky V, Treviño A, Rumelt S. (2011).. Management of endothelial decompensation because of glaucoma shunt tube touch by Descemet membrane endothelial keratoplasty and tube revision. Cornea. Jun;30(6):709-11.

De Guzmann MH, Valencia A, Farinelli A. (2006). Pars Plana insertion of glaucoma drainage devices for refractory glaucoma. Clin Exp Ophthalmol.34:102–107.

Eun-Kyoung Lee, Yong-Jun Yun, Jong-Eun Lee, et al. (2009). Changes in corneal endothelial cells after Ahmed glaucoma valve implantation: 2-year follow-up. Am J Ophthalmol;. 148(3):361-367

Fiore PM, Richter CU, Arzeno G, et al. (1989). The effect of anterior chamber depth on endothelial cell count after filtration surgery. Arch Ophthalmol 1989;107:1609 –1611.

Hill RA, Heuer DK, Baerveldt G, et al. (1991). Molteno implantation for glaucoma in young patients. Ophthalmology;. 98:1042–1046.

Hong CH, Arosemena A, Zurakowski D, et al (2005). Glaucoma drainage devices: a systematic literature review and current controversies. Surv Ophthalmol;. 50:48–60.

LloydMA, Sedlak T, Heuer DK, et al (1999). Clinical experience with the single-plate Molteno implant in complicated glaucomas. Ophthalmology; 99:670–687.

Marcet MM, Woog JJ, Bellows AR, et al. (2005). Orbital complications after aqueous drainage device procedures. Ophthal Plast Reconstr Surg; 21:67–69.

McDermott ML, Swendris RP, Shin DH, Cowden JW (1993). Corneal endothelial cell counts after Molteno implantation.Am J Ophthalmol; 115:93–96.

Nguyen QH (2004). Avoiding and management complications of glaucoma drainage implants. Curr Opin Ophthalmol; 15:147–150.

Setälä K(1979). Corneal endothelial cell density after an attack of acute glaucoma. Acta Ophthalmol; 57:1004 –1013.

Topouzis F, Coleman AL, Choplin N, et al. (1999). Follow-up of the original cohort with the Ahmed glaucoma valve implant. Am J Ophthalmol; 128:198–204

Source of support: nil. Conflict of interest: none