CASE REPORT

Traumatic corneal perforation with exteriorisation of Ahmed glaucoma valve tube

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SUMMARY

We report a rare case of traumatic corneal perforation with Ahmed glaucoma valve (AGV) tube. A 5-year-old female child, diagnosed with refractory glaucoma, had undergone AGV implantation, presented with the posterior migration of AGV tube after trauma to the eye. The detailed ocular history, ophthalmic findings, clinical course and surgical management are discussed.

BACKGROUND

Glaucoma drainage devices are quickly becoming an indispensable part of the glaucoma specialist's toolkit.¹ Though their safety and efficacy has been shown across all population groups, several authors have reported routinely encountered complications like tube/plate exposure and endophthalmitis.^{2,3} We report a unique case of tube exteriorisation after injury to the eye in a paediatric patient and the subsequent course of management.

CASE PRESENTATION

A 5-year-old female child presented to our outpatient services with the progressive loss of vision in both eyes, associated with intolerance to bright light, particularly in the right eye. Presenting best-corrected visual acuity (BCVA) was 20/200 OU. She was the eldest of the three siblings from a non-consanguineous marriage, with full-term home delivery, the prenatal or postnatal course being uneventful. No similar complaints or features were noted in any of the siblings.

Her past treatment records revealed that an anti-fibrotic agent augmented trabeculectomy had been performed on her left eye twice at ages 4 years and 4.5 years, and on her right eye at age 4.5 years, elsewhere. She was instilling dorzolamide with timolol fixed-dose combination twice a day at the time of presentation at our centre. Evaluation under anaesthesia revealed an intraocular pressure (IOP) of 30 and 20 mm Hg (with Perkins tonometer) and a cup:disc ratio of 0.8 and 0.7, in the right and left eyes, respectively. At our centre, she underwent an Ahmed glaucoma valve (AGV; model: FP-8; New World Medical, Rancho Cucamonga, USA) implantation with an overlying scleral patch graft in her right eye. The plate of the implant was placed in the superotemporal quadrant and sutured to the sclera. Postoperatively, the IOP was controlled (mean 11 mm Hg), best-corrected visual acuity was 20/200, and the tube was well positioned and away from the corneal endothelium. The child was followed sequentially at weekly intervals for the first month after which a monthly evaluation was advised to the parents.

Three months post-AGV implantation, the patient returned complaining of marked foreign body sensation, watering, and ocular tenderness. On eliciting a detailed history, the child gave a history of trauma with a wooden stick while playing, one day before, and the symptoms were concurrent with the time of injury. On examination, visual acuity was hand motions close to face in the right eye. The adnexae were essentially normal. The tube had perforated the peripheral cornea at about 9 o'clock. Iris plugged the perforation and corneal infiltrates adjacent to the tube were also noted. The anterior chamber was flat (figure 1A, B)

TREATMENT

The patient was taken up for emergency surgery under general anaesthesia after an informed consent from the parents. Mild to moderate subconjunctival scarring was noted during the dissection. Due to the risk of scleral perforation during manipulation, the plate of the implant was left untouched while the exteriorised tube was excised.

A 4 mm diameter mini corneal patch prepared from a glycerine-preserved tectonic allograft was used to seal the corneal perforation, with eight interrupted bites of 10-0 nylon suture. Iris abscission was done followed by pupillary reconstruction and anterior chamber was formed. At the end of the surgery, prophylactic intravitreal vancomycin (1%) and ceftazidime (2.25%) were given.

OUTCOME AND FOLLOW-UP

Vitreous tap and the excised tube were sent for culture and came back sterile for any infectious flora. An ultrasound was performed postoperatively and mild to moderate intensity echoes were seen in vitreous cavity. A second intravitreal injection was repeated 24 hours after the ultrasound.

Postoperatively, a topical antibiotic-steroid eye drop combination was started along with a cycloplegic. Three months postoperatively (figure 2), the patient had a BCVA of counting fingers at 3 m, maintained lens transparency, had IOP of 14 mm Hg in her right eye with three drugs [brimonidine/brinzolamide (combination) and travoprost] and the vitreous cavity appeared clear on ultrasound.

DISCUSSION

Corneal perforation with exteriorisation of the tube from AGV is a rare complication.^{4,5} Mini patch graft is an effective and safe treatment modality for eccentric corneal perforation with iris prolapse.⁶ In

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Figure 1 (A) The anterior segment view showing the exteriorised Ahmed glaucoma valve (AGV) tube and the protruding iris tissue. (B) The side view showing the exteriorised AGV tube and the protruding iris tissue.

our case, we faced multiple challenges like management of the corneal perforation and risk of endophthalmitis. We decided to go ahead with a prophylactic intravitreal injection keeping in mind the chances of wound contamination due to trauma. Ahmed *et al*, in a review, concluded that though there are no clear-cut guidelines for prophylactic use of intravitreal injections after open globe injuries and more often than not it is up to the surgeon to take the call after assessing factors like the nature of wound, risk of contamination, mode of injury, and so on.⁷ Soheilian *et al*, in a large study to evaluate the effectiveness of prophylactic intravitreal injections, reported endophthalmitis in 8 (2.3%) of 167 eyes in the control group and only in 1 (0.3%) of 179 eyes in the case group ($p=0.04$).⁸ In addition to the risk of contamination due to the nature of injury, conjunctival dehiscence exposing the plate and tube of implant seems to represent a major risk factor for

endophthalmitis.^{3 9 10} Reasons for conjunctival erosion over patch grafts and tube are not totally clear and are possibly multifactorial due to inflammation and immune-mediated melting of graft materials used to cover the tube.⁹ Gedde *et al* recommend shunt removal at the time of treatment because of concerns the shunt might serve as a reservoir for the infectious organism.¹⁰ However, Sheets *et al* have reported a case of AGV tube extender migration into the anterior chamber after trauma. They go on to describe a technique to retain the implant and report adequate functioning of the implant without complications postoperatively. They did not use any prophylactic intravitreal injection despite the traumatic nature of injury.¹¹

In our case, we demonstrate that early patch graft with prophylactic intravitreal injections can effectively manage cases of traumatic exteriorisation of AGV tube without the need of complete implant removal. However, longer follow-up is needed to assess the long-term postoperative outcomes in such high-risk eyes.

Figure 2 The postoperative view at 3 months after the surgical excision of the exteriorised tube and application of a 4 mm diameter mini corneal patch.

Learning points

- An early patch graft with prophylactic intravitreal injections can effectively manage cases of traumatic exteriorisation of Ahmed glaucoma valve tube without the need of complete implant removal.
- It is always imperative to rule out postoperative endophthalmitis in children with the history of ocular trauma.
- Care providers have to be explained about the lifelong risk of complications that can arise from trauma in eyes with thin scleras.

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REFERENCES

- 1 Riva I, Roberti G, Katsanos A, *et al.* A review of the ahmed glaucoma valve implant and comparison with other surgical operations. *Adv Ther* 2017;34:834–47.
- 2 Thakur S, Ichhpujani P, Kumar S. Grafts in glaucoma surgery: a review of the literature. *Asia Pac J Ophthalmol* 2017;6:1–8.
- 3 Al-Torbak AA, Al-Shahwan S, Al-Jadaan I, *et al.* Endophthalmitis associated with the Ahmed glaucoma valve implant. *Br J Ophthalmol* 2005;89:454–8.
- 4 Al-Torbak A, Edward DP. Transcorneal tube erosion of an Ahmed valve implant in a child. *Arch Ophthalmol* 2001;119:1558–9.
- 5 Al-Shahwan S. Transcorneal tube erosion of an ahmed valve implant in an adult. *Middle East Afr J Ophthalmol* 2010;17:377–8.
- 6 Lavingia B. Patch graft for corneal perforations. *Indian J Ophthalmol* 1983;31:669–70.
- 7 Ahmed Y, Schimel AM, Pathengay A, *et al.* Endophthalmitis following open-globe injuries. *Eye* 2012;26:212–7.
- 8 Soheilian M, Rafati N, Mohebbi MR, *et al.* Prophylaxis of acute posttraumatic bacterial endophthalmitis: a multicenter, randomized clinical trial of intraocular antibiotic injection, report 2. *Arch Ophthalmol* 2007;125:460–5.
- 9 Heuer DK, Budenz D, Coleman A. Aqueous shunt tube erosion. *J Glaucoma* 2001;10:493–6.
- 10 Gedde SJ, Scott IU, Tabandeh H, *et al.* Late endophthalmitis associated with glaucoma drainage implants. *Ophthalmology* 2001;108:1323–7.
- 11 Sheets CW, Ramjattan TK, Smith MF, *et al.* Migration of glaucoma drainage device extender into anterior chamber after trauma. *J Glaucoma* 2006;15:559–61.

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