

Case Report

Recurrent scleral patch graft shrinkage and Ahmed valve tube exposure

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Abstract

Aim: To report a case of recurrent Ahmed glaucoma valve (AGV) tube exposure due to scleral patch graft (SPG) melt

Background : AGV is a useful modality in the management of medically refractory glaucoma. Human donor SPG has been employed to cover the external portion of the tube to prevent its exposure.

Case Description : A 23 year old male with Anterior chamber intraocular lens (ACIOL) had undergone retinal detachment (RD) surgery with silicone oil insertion (SOI) followed by SO removal (SOR), re- RD and SO re-injection, followed by implantation of Ahmed glaucoma valve (AGV) for uncontrolled glaucoma in the right eye. Three months after the AGV implantation, he presented with exposure of the subconjunctival portion of AGV tube with melted, displaced and shrunk donor sclera graft, which was managed by placing larger sized, full thickness, donor scleral patch graft (SPG) over the exposed tube. Six months later, he presented again with tube exposure and the donor SPG was found to be retracted nasally and shrunk to one fourth of its original size. The AC portion of the tube was blocked by the SO bubble and the emulsified SO could be seen inside the exposed tube. The patient underwent SOR with tube explantation and intraocular pressure was later controlled with transscleral cyclophotocoagulation and medical management.

Conclusion : SPG thinning and the overlying conjunctival erosion can occur after the AGV implantation. This can cause AGV tube exposure and hence, long - term patient follow up is essential to ensure timely identification of this possible complication and prompt treatment.

Key words: Silicone oil induced glaucoma, Ahmed Glaucoma Valve, Tube Exposure, Scleral patch graft melt

Introduction

Glaucoma drainage device (GDD) is a useful modality in the management of medically refractory glaucoma. Human donor sclera,

Fascia Lata, Dura mater, pericardium and cornea has been employed to cover the external portion of the tube. Prevalence of implant tube exposure through the overlying conjunctiva is reported in 2 % to 7 % of the adult cases (Chaku M, et al 2016 ; Huddleston SM, et al 2013). It requires immediate revision, as the exposed tube serves a nidus for infection and is a risk factor for the development of endophthalmitis (Gedde SJ, et al 2001).

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Case Report

A 23-year old male with anterior chamber intraocular lens (AC IOL, performed for subluxated lens)had undergone retinal detachment (RD) surgery with silicone oil insertion (SOI) followed by SO removal (SOR),SO re-injection for re- RD, followed by uncomplicated implantation of Ahmed glaucoma valve (AGV, model FP7, New World Medical, Rancho Cucamonga, LA) for uncontrolled glaucoma in the right eye (RE).Left eye (LE) showed subluxated lens and fundus examination was normal. He did not have any systemic illness. He was non-compliant with anti-glaucoma medications (AGM) and was noted to have a habit of eye rubbing.

Three months after the implantation of AGV, he came with complaints of watering and foreign body sensation in the RE. His best corrected visual acuity (BCVA) was 20/80 in the right eye and 20/20 in the LE. RE slit lamp examination showed diffuse posterior bleb over the superotemporal AGV plate, 1+ conjunctival congestion and retraction in the supero-temporal quadrant by about 4 mm, exposed sub-conjunctival portion of the tube at the limbus and the scleral patch graft (SPG) overlying the AGV tube was found to be shrunk and retracted nasally. (Figure 1)

Cornea showed fine pigments on endothelium, Van Herrick grade 3 anterior chamber depth (ACD), 1+ flare, AGV tube in situ, between the cornea and ACIOL at 10⁰ clock position, not touching corneal endothelium or ACIOL or iris, ACIOL was in place, pupil was mid-dilated, fixed, surgical peripheral iridectomy was patent at 10⁰ clock. Left eye (LE) showed inferotemporal subluxated clear crystalline lens. Intraocular pressure (IOP) was 16 mmHg in both the eyes, with the RE on combination of topical Dorzolamide Hydrochloride 2% and Timolol maleate 0.5% twice daily. Gonioscopy showed open angles till scleral

spur in BE and grade 2 + pigmentation in the RE and no evidence of emulsified SO in the angles. Fundus examination showed attached retina in the RE, small disc, 0.5 : 1 cup disc ratio (CDR), concentric rim thinning and 0.2 : 1 CDR, healthy neuroretinal rim and small disc in the LE. Humphrey visual fields 24-2 SITA standard (Carl Zeiss Meditec Inc., Dublin, CA) showed an unreliable visual fields in BE. Patient was asked to continue same AGM, Lubricating eye drop 6 times a day and topical Nepafenac 0.1% three in a day in the RE.

Patient underwent tube revision surgery under peribulbar anaesthesia in the RE. The conjunctiva was incised at the limbus and undermined posteriorly on either side of the exposed tube in the episcleral plane, to mobilise the conjunctiva. Intra-operatively it was noted that the AGV tube lay firmly against the sclera without any excessive movement. The original SPG was excised and a larger 6 × 6 mm full thickness human donor SPG was placed on the episcleral bed over the exposed segment of the tube, for a better coverage and sutured with 4 interrupted, 10-0 nylon suture to ensure its immobility The SPG was well integrated and adequately covered the AGV tube. The conjunctiva overlying the tube was friable but the SPG was adequately covered by the conjunctival advancement and closed with 8-0 Vicryl and 10-0 nylon suture, without excessive tension. (Figure 2) The wound was watertight at the end of the surgery. IOP in the RE was 18 mmHg till the 6 months postoperative follow up visit on AGM.

During follow up period at 2 months, the SPG was noted to be retracted from the limbus, and was found to be shrinking from temporal part of the underlying tube. (Figure 3)

Six months later, at the follow up visit, patient complained of foreign body sensation in the RE. His BCVA was 20/80 in the RE and slit lamp examination showed, posterior bleb over the AGV plate, retracted and congested

conjunctiva superotemporally by about 5 mm with exposed tube implant and anchored to the sclera. The SPG overlying the AGV tube was found to be shrunk to about one-fourth of its original size and retracted nasally. (Figure 4)

The distal end of the tube was well positioned in the AC, blocked by bubble of SO and emulsified SO was seen inside the exposed tube. Cornea showed fine pigments on the endothelium, Van Herrick grade 3 ACD, emulsified SO in the

AC, 1 + flare, AGV tube in situ, not touching corneal endothelium or ACIOL or iris and ACIOL in place. Pupil was mid-dilated and fixed. IOP was 32 mmHg in the RE on topical Dorzolamide Hydrochloride 2 % and Timolol maleate 0.5 % twice daily. Gonioscopy showed emulsified SO in the superior, nasal and temporal iridocorneal angles. The patient underwent SOR with tube explantation and transscleral cyclophotocoagulation

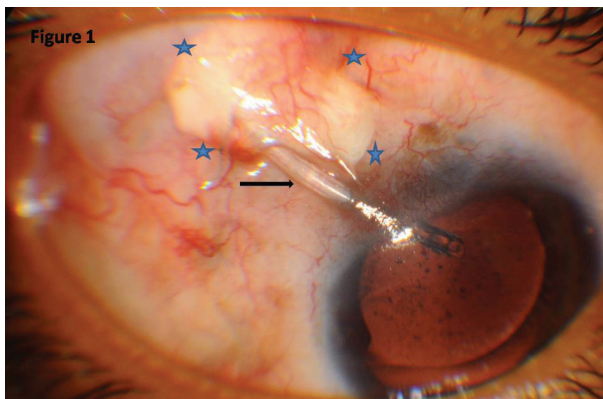


Figure 1: Slit lamp photograph of the right eye shows conjunctival erosion, shrunk scleral patch graft,(stars) which is displaced nasally and an exposed tube (arrow) in the superotemporal quadrant.

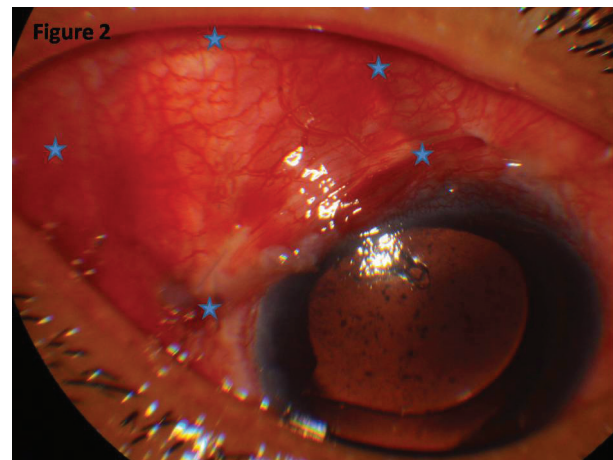


Figure 2: Clinical photograph taken on third postoperative day, shows the Ahmed glaucoma valve tube to be well covered by the scleral patch graft (outline - stars) and adequately covered by well apposed conjunctiva.

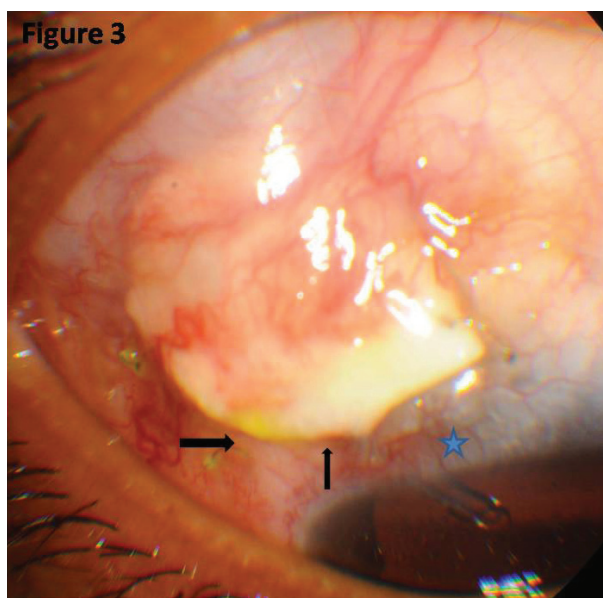


Figure 3: Clinical photograph taken at 2 months after the revision surgery, shows that the scleral patch graft is covered by conjunctiva without significant inflammation, but the graft has shrunk and retracted from the limbus (arrow) in the right eye. The tube at the limbus is well covered by the conjunctiva.

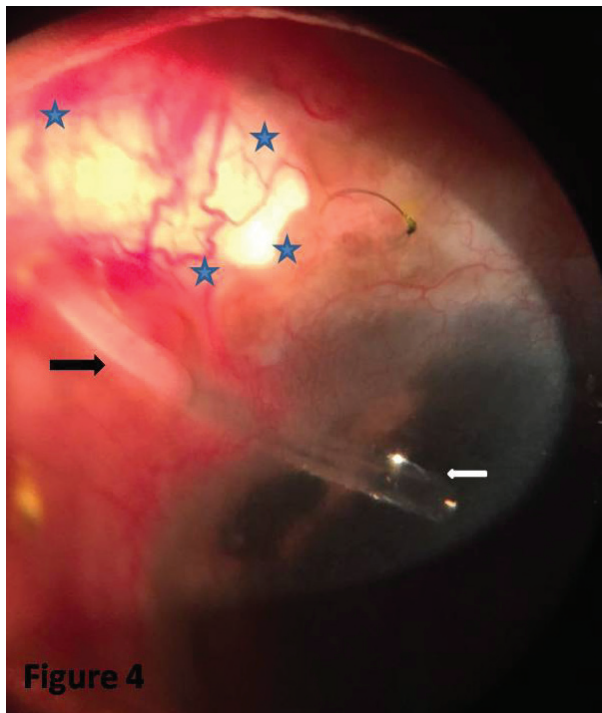


Figure 4: Slit lamp photograph taken at 6 months after the revision surgery, shows retracted conjunctiva, exposed tube with emulsified silicone oil inside (black arrow) and the overlying scleral patch graft (stars) is shrunk and displaced nasally. The distal end of the tube in the anterior chamber is blocked by silicone oil bubble.(white arrow)

Discussion

Tube exposure can occur in patients with GDD despite the use of patch grafts. The risk factors include younger age, presence of inflammation, previous ocular trauma, use of topical steroids, excessive tissue tension overlying tube shunt, immune mediated inflammatory process, repeated mechanical trauma by eyelid blinking, graft melt, number of preoperative AGM, diabetes, type of glaucoma, and concomitant surgical procedures (Chaku M et al 2016; Geffen N et al 2014; Trubnik V et al 2015; Kalenak JW 2010; Heuer DK et al 2001)

To decrease the risk of tube exposure, the tube is covered with a patch graft (Budenz DL, et

al 2016). A case has been reported in which a low-grade iridocyclitis was associated with a gradual melting of the SPG, which was then replaced with commercially available, dehydrated human dura mater (Brandt JD, 1993).

A study compared donor SPG, pericardium, and dura mater as materials for GDD tube coverage and none of the materials were found to be associated with a reduced rate of tube exposure. (Smith MF et al, 2002). Slow melting process, thinning due to loss of thickness and surface area of SPG over time, poses a risk for tube exposure and conjunctival erosion. Ocular surface disease with associated tear hyperosmolarity stresses the ocular surfaces and leads to release of inflammatory mediators which may cause to conjunctival thinning and SPG melt. (Morales J et al, 2002).

Donor SPG can induce an immunological reaction in the recipient, which can contribute to the graft melt, shrinkage, necrosis, and absorption (Brandt JD,1993).

In our case, as there was no SO bubble or emulsified SO in the AC or the angles on gonioscopy,the AGV was implanted in the superotemporal quadrant. It is recommended to place tube in the inferior location to minimize chances of SO obstructing the tube. However, SO obstructing the tube has been observed in cases with inferiorly positioned AGV tube also (Morales J et al, 2002).

In our case, the SPG had retracted and started melting over the tube as noted over the months, during follow up. It is possible that the young age, chronic habit of eye rubbing, chronic low grade inflammation (Stevenson W et al, 2012) due to SO, poor conjunctival status due to the long-term use of AGM, conjunctival scarring and retraction due to previous multiple ocular surgeries could have contributed to the SPG melt at the tube site. Repeated micro trauma from eye rubbing may also compromise

conjunctival integrity and increase the risk of conjunctival erosion. Also, immune mediated melting of the SPG and mechanical breakdown of the overlying conjunctiva appears to be a prominent mechanism responsible for the retraction of the SPG, and exposure of the tube.

Currently, most of the surgeons prefer to cover the external portion of the tube with a preserved human donor SPG obtained from an eye bank due to its easy availability and affordability. In our case, during the revision of the tube exposure, SPG was used as it was the only available patch graft material available. We had used larger size SPG for a better coverage of the tube and lateral relaxing incisions were given to allow tension-free conjunctival apposition to the limbus. Second time tube exposure was associated with the emulsified SO migrating into the tube and impairing its function hence the tube explantation along with SOR was done.

To conclude, as SPG thinning and the overlying conjunctival erosion can occur after the AGV implantation, long-term patient follow up is essential to ensure timely identification of this possible complication and prompt treatment.

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