Bleb Revision using Reversed Scleral Flap and Pedical Conjunctival Graft

¹Sourabh Sharma, ²Dhaval Patel, ³Reetika Sharma, ⁴Tanuj Dada

ABSTRACT

Bleb revision for hypotony maculopathy following trabeculectomy is an effective technique for raising intraocular pressure and limiting visual loss. The presence for scleral fistula causing over-filtration obviates the need for reinforcing materials, such as donor sclera or pericardium to cover the defect. However, if the surrounding scleral tissue is healthy, a partial thickness scleral flap can be upturned and sutured over the fistula. Moreover, a vascularized pedical conjunctival graft can also be used in cases where there is a large conjunctival defect.

Keywords: Bleb, Conjunctival graft, Hypotony, Trabeculectomy.

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INTRODUCTION

The overall success of trabeculectomy with regard to intraocular pressure (IOP) control has increased with the use of mitomycin C (MMC).¹ However, the associated complication of hypotony maculopathy has also risen with its use. The cause of hypotony after trabeculectomy can be associated with over filtration, wound leak or reduced aqueous production, which may be related to inflammation. In some patients, the hypotony is associated with a maculopathy, which classically consists of variable degrees of fine radiating foveal striae, choroidal folds, tortuous vessels and disk edema.

Many different techniques have been attempted in managing the hypotony resulting from overfiltering

blebs, including bandage contact lens^{2,3} Simmons shell, autologous blood injection⁴⁻⁶ trichloroacetic acid,⁷ argon^{8,9} or neodymium: YAG laser,^{10,11} compression sutures^{10,11} and cataract surgery.

We report a case of 27-year-old Asian Indian woman who underwent trabeculectomy with MMC for juvenile open angle glaucoma and postoperatively developed hypotonic maculopathy.

She presented with complaint of low vision and pain 6 months after the surgery. On examination, the bleb was localized superiorly, about 3 clock hours and was thin, avascular with cystic changes (Fig. 1). The IOP was 4 mm Hg. The fundus examination revealed foveal striae. The findings were confirmed with ASOCT anterior segment (AS)-OCT (Fig. 2) and macular OCT. The patient underwent bleb revision with conjunctival closure using pedicle conjunctival flap.

Technique

After prepping the patient, an inferior traction suture was placed. Anterior chamber was entered using micro vitrectomized blade (MVR) and air was injected to form the anterior chamber. The avascular bleb tissue was circumscribed using gentian violet dye and was excised with Vannas scissors, exposing the scleral flap. The underlying scleral tissue was found to be necrosed with fistula formation. A partial thickness sclera flap of about 8 × 4 mm posterior to the necrosed sclera using crescent blade was created. This newly created flap was then upturned and sutured over the necrosed sclera using 10/0 monofilament suture.

Fig. 1: Clinical picture

Fig. 2: Preoperative ASOCT

Fig. 3: Marking of bleb

Fig. 4: Excision of bleb

The conjunctival defect was then measured using calipers and an area of about 20% extra dimensions was marked on the adjoining healthy vascularized conjunctiva leaving 1 mm from the limbus to prevent stem cell deficiency. The conjunctiva was excised using Vannas scissors to create a pedicle flap. It was then rotated and sutured to the conjunctival defect with continuous absorbable vicryl sutures. The donor site was closed by apposition (Figs 3 to 10).

On the first postoperative day, the IOP was 6 mm Hg. The wound was healthy with a negative Seidel's test (Figs 11 and 12). On subsequent follow-ups, the IOP of the patient showed gradual increase to early teens with gain of vision.

DISCUSSION

With the increased use of the antimetabolite, MMC, as an adjunct to trabeculectomy, hypotony maculopathy has become an increasingly common and serious postoperative complication.¹²⁻¹⁴ Overfiltration is an important factor accounting for the hypotony maculopathy. It occurs when aqueous outflow exceeds aqueous production due to

Fig. 5: Sclera fistula

decreased resistance to outflow. Hypotony secondary to scleral fistula as created during trabeculectomy can result in a diffuse, extensive bleb and a low IOP without wound leak. The associated reduced vision can be permanent, if the hypotony is not corrected.

Fig. 6: Reversed sclera flap

Fig. 9: Rotation of flap

Fig. 7: Marking of pedicle flap

Fig. 10: Sutured flap

Fig. 8: Excision of pedicle flap

Fig. 11: Postoperative slit photograph showing a formed bleb and chamber

Many different techniques have been attempted in managing the hypotony from overfiltering blebs as well as for the surgical revision of an overfiltering bleb.¹⁵⁻¹⁸ Where there are obvious direct communications from the anterior chamber visible after conjunctival removal, the filtration site

can be reinforced with additional tissue. Donor sclera (split to half thickness), donor pericardium and Tenon's connective tissue are some of the reinforcing materials which have been used.¹⁸ In our case, though the scleral necrosis and fistula were seen, the surrounding sclera seemed to be healthy

Fig. 12: Postoperative ASOCT

and of adequate thickness. So, we decided to take a partial thickness scleral flap to cover the scleral defect which was the presumed cause of hypotony in our patient.

Closure of the exposed region in bleb repair has also been described by various methods. When the surrounding conjunctiva can be mobilized by blunt dissection, it is advanced to cover the defect. In some cases, the closure can be made by joining the sides of the cut edges.¹⁸ This however, was not possible in our case as the conjunctival defect was too large, which could have led to ptosis and severe contracture.

A different approach to closure in bleb repair is taken when the surrounding conjunctiva is too immobile to cover the defect. Here, an autologous conjunctival graft from different area of the same eye is used. However, it is seen that some free grafts become extremely thin over years after revision surgery. It may be noted that transplantation of all the subepithelial connective tissues can mitigate this thinning. Nonetheless, the lack of vascular ingrowth into free grafts may predispose to this thinning. For this reason, we preferred closure of the defect by mobilization or rotation of neighboring, vascularized conjunctiva.

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¹⁻⁵Glaucoma Services, Dr RP Centre for Ophthalmic Sciences, All India Institute of Medical Sciences, New Delhi, India

Corresponding Author: Tanuj Dada, Glaucoma Services, Dr RP Centre for Ophthalmic Sciences, All India Institute of Medical Sciences, New Delhi, India, e-mail: tanujdada@gmail.com