

Corneoscleral Patch Graft in the Management of Hyperfiltrating Bleb after Ex-PRESS Shunt

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Abstract

Introduction: We report an interesting case of persistent hypotony and hyperfiltrating bleb post Ex-PRESS shunt in an otherwise healthy patient. We describe a technique used to increase the intraocular pressure.

Case Report: A 28-year-old patient presented for a second opinion in our facility with a severe case of hypotony post Ex-PRESS shunt. This patient had several procedures and they were not useful in increasing the intraocular pressure. His vision was Log MAR 1.00 and the intraocular pressure was 2 mmHg. After several procedures to increase his intraocular pressure proved to be unsuccessful, we opted to explore the area with the plan to use a corneoscleral patch graft due to the large area of melted sclera. In this case report we describe our technique as it has not been mentioned before in the literature review.

Discussion: The use of mitomycin and other numerous procedures that the patient had prior to presentation could have been the aggravating factors to hypotony. The use of corneoscleral patch proved to solve the issue of hypotony and should be thought of in difficult cases of hypotony post Ex-PRESS shunt surgery.

Conclusion: The use of a corneoscleral patch graft to repair the bleb and the melted scleral bed was a useful technique in the management of hypotony and hyperfiltrating bleb post Ex-PRESS shunt.

Keywords: Corneoscleral Patch; Ex-PRESS Shunt

Introduction

In the past few years, the Ex-PRESS drainage device has become commonly used in patients with primary open angle glaucoma. The implant is a 3 mm long stainless-steel tube with a bevelled flange at the device proximal end and a spur-like projection that prevents its extrusion [1]. A study by Traverso, *et al.* summarises a 3 year follow up with the device and mentions its short-term complications such as conjunctival erosion and bleb fibrosis [2]. There has been reported cases of hypotony post Ex-PRESS shunt implant but none which have been managed with the use of a corneoscleral patch graft.

In this case report, we will describe the management of chronic hypotony post Ex-PRESS shunt. The intraocular pressure had been low for six months before his presentation to our department. Several procedures, such as scleral bed re-suturing and autologous serum injection into the bleb to increase the intraocular pressure, proved to be useless. Post-operatively, the Ex-PRESS shunt has been shown to cause bleb failure, suprachoroidal haemorrhage, endophthalmitis, erosion and extrusion of the device [2]. This included ocular hypotony

which we will discuss in the report. We present a technique that uses a corneoscleral graft left over from a donor cornea used for penetrating keratoplasty as a patch graft to repair the scleral tissue to treat ocular hypotony. This is a unique case report due to the new technique that has been used. The use of corneoscleral patch graft to increase the intraocular pressure has added a novel technique of managing hypotony post Ex-PRESS shunt implant.

Case Report

A 28-year-old male patient with a history of unilateral uveitic glaucoma had Ex-PRESS shunt glaucoma surgery due to uncontrolled intraocular pressure (IOP) with medication. He had no relevant past medical history and no documented allergies. In his old records which was before the Ex-PRESS shunt, his visual acuity was Log MAR 0.00. Before presenting to our facility, the patient had two procedures of suturing the scleral flap window, but this proved unsuccessful. As a result, he presented to our department for a second opinion six months post Ex-PRESS shunt surgery with chronic ocular hypotony and macular hypotony. On presentation, his IOP was 2 mmHg on presentation without medication and his visual acuity was Log MAR 1.0. On examination, the bleb was elevated, diffuse from 9 o'clock to 4 o'clock position on a clock, and over-filtering with mild cataract changes due to long standing hypotony. Fundus examination revealed macular folds. We tried to apply a compression suture to the conjunctival bleb using nylon 10-0 to reform the bleb twice but it only increased the IOP for a short period of time. Furthermore, we injected autologous blood into the bleb several times, but it was unsuccessful in managing the hypotony. These surgical treatments provided only a temporary rise in intraocular pressure.

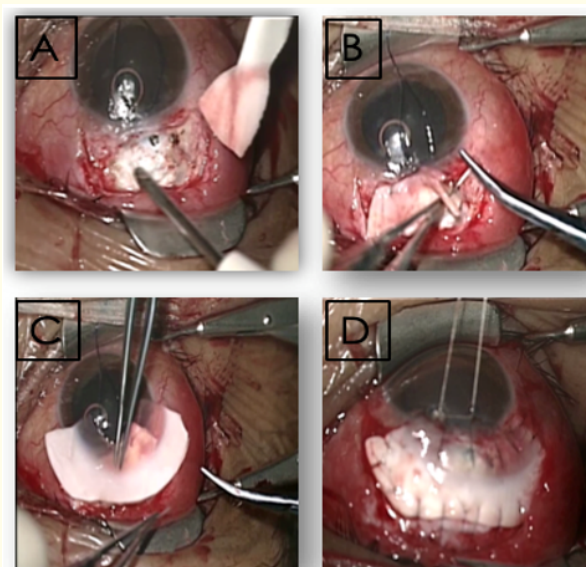


Figure 1: Anterior segment photographs of (A-D) intraoperatively. (A-B) Sizing of scleral patch. (C-D) Use of corneoscleral patch graft.

Finally, because of the history of re-suturing twice and the use of mitomycin-C in a young patient we decided to explore the surgical area with the provision of a scleral patch and a corneo-scleral graft available. Intraoperatively, we noted that the flap was necrotic and the scleral bed was melting. The size of the scleral flap was not large enough to cover the necrotic area and the Ex-PRESS shunt would remain exposed. As a result, it was decided to use the corneo-scleral patch graft to repair the bleb and the melted scleral bed. The use of a scleral patch would have been insufficient to cover the scleral defect. The size of corneo-scleral graft used was about 6mm in length and 4 mm

in width. An adjusted suture 10.0 nylon was used to maintain sufficient flow via the scleral flap. The corneoscleral graft was from a graft that was used in the previous surgical case within our operating theatre which was penetrating keratoplasty. It was saved to be used in our patient.

Post-operatively, the IOP increased to 12 mm Hg and after two months the visual acuity improved to Log MAR 0.0 with the resolution of the macular folds. Furthermore, after two years the patient has maintained his normal visual field and visual acuity as well as controlled IOP without medication. His IOP was maintained at 12 - 14 mm Hg throughout his follow up visits within our department.

Discussion

Marriott, *et al.* supports the use of Ex-PRESS shunt because unlike in trabeculectomy, age and glaucoma type were not found to be statistically significant risk factor for failure [1,2]. Although the express shunt had fewer pre-operative complications and needs less pre-operative interventions but our case presents a complicated presented that has not been previously discussed within the existing literature.

This procedure proved to be successful in treating the hypotony and even during the follow up periods of at least 16 months, no recurrences of a bleb leak or hypotony was observed. Our case is unique in presentation because there are no papers discussing the use of corneoscleral patch graft to treat hypotony post Ex-PRESS shunt implant [1,2]. Although, there has been a case series by F Bochmann, *et al.* which discusses the successful use of corneal patch graft for the repair of late onset hypotony or filtering bleb leak after trabeculectomy [3]. They used a lamellar corneal donor tissue to restore the scleral outflow resistance to treat severe hypotony after mitomycin C-assisted trabeculectomy with or without filtering bleb leaks. This was to replace the weakened sclera near the bleb site [3]. In our patient, the scleral flap was melting and necrotic. Due to the large necrotic area it was decided to use a corneoscleral patch graft from a donor tissue instead of a scleral patch because it was too small and therefore would not cover the weakened scleral area. The chronic maculopathy was resolved and the intraocular pressure was maintained postoperatively at 12 mmHg. There were no further bleb leaks or hypotony. This technique proved to be a successful procedure and we recommend it in cases where several procedures to increase the intraocular pressure have not been beneficial.

Due to the hyper-filtrating bleb with the Ex-PRESS shunt and chronic hypotony, the patient had chronic macular hypotony. It has been reported that the risk factors for hypotony maculopathy are myopia, young age, primary filtering surgery, systemic illnesses and elevated preoperative IOP [4,5]. It has been shown that about 20% of cases with macular hypotony occurs post glaucoma filtering surgery and has become more common after the use of anti-metabolites such as mitomycin-C and 5-FU [4]. Hypotony usually occurs when the outflow exceeds aqueous humour production [5]. This may occur due to a wound leak, an over-filtering bleb similar to our case or cyclodialysis cleft. Hypotony maculopathy can be reversed with procedures that elevate IOP. In our patient the chronic maculopathy due to the persistent hypotony resolved after the corneo-scleral patch graft.

The strength of mitomycin C used is a risk factor to scleral melt and according to several studies the use of mitomycin C is still controversial [6]. In addition, our patient had several procedures such as re-suturing of the scleral flap and autologous serum injection into the bleb which could have further aggravated inflammation and scleral melting leading to failure of these procedure to maintain the intraocular pressure within a controlled range [7-11].

Conclusion

In conclusion, repair of hyper-filtrating blebs after Ex-PRESS shunt is a surgical challenge especially when the patient presents with persistent hypotony. Conjunctival bleb reconstruction often fails to repair the hypotony because deeper tissue structures do not provide sufficient outflow resistance. The use of corneo-scleral donor graft tissue to restore scleral outflow resistance is an effective treatment for severe hypotony after Ex-PRESS shunt and should be considered in our opinion to treat the persistent hypotony especially after repeated failed treatments. It is important to consider other techniques when previous methods have been useless.

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