Autologous whole blood patch in the repair of leaking filtering blebs: case report on initial experience

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Abstract

Aim: To show the value of autologous whole blood patch in the management of leaking filtering blebs in Nigerian eyes.

Methods: Two male patients who had trabeculectomy and adjunctive application of mitomycin C subsequently developed leaking blebs at the University of Benin Teaching Hospital, Benin City, Nigeria. A 27-gauge needle was used to inject 0.75-1.0ml of whole blood under the conjunctival buttonhole.

Result: The procedure succeeded in arresting the bleb leak but the trabeculectomy failed after 7 and 10 months respectively. Repeat trabeculectomy using another site remained successful after 2 years and 18 months respectively.

Conclusion: Autologous whole blood patch is successful in sealing leaking blebs complications following trabeculectomy.

Key words: Autologous, Whole blood, Leaking blebs, Trabeculectomy

Introduction

Bleb leak can occur early in the post-operative period or in months to years after trabeculectomy. The causes include wound leak at the conjunctival incision, inadvertent buttonhole during surgery or from tight conjunctival sutures at incision site. The increasing use of antimetabolites (AM) such as 5-fluorouracil (5 FU) and mitomycin C (MMC) in conjunction with trabeculectomies is leading to frequent spontaneous late bleb leaks from thin avascular blebs. Leakage of filtering blebs may predispose the eye to hypotony, flat anterior chamber, peripheral anterior synechia, corneal decompensation, macular oedema, blebitis, choroidal detachment and endophthalmitis. In 1995, the World Health Organization (WHO) study reported that about 6.7 million people were blind worldwide from complications due to glaucoma including complications following glaucoma operations.

Various treatment alternatives have been used to treat leaking blebs post trabeculectomy surgeries. Conservative methods include patching, aqueous suppression, therapeutic contact lens, collagen shield and tissue adhesives. Surgical alternatives include external conjunctival cryopexy, thermal coagulation by cautery or lasers direct suturing of the conjunctival hole, patching with corneal or scleral grafts and autologous whole blood patch in conjunction with trabeculectomies is leading to frequent spontaneous late bleb leaks from thin avascular blebs. Leakage of filtering blebs may predispose the eye to hypotony, flat anterior chamber, peripheral anterior synechia, corneal decompensation, macular oedema, blebitis, choroidal detachment and endophthalmitis. In 1995, the World Health Organization (WHO) study reported that about 6.7 million people were blind worldwide from complications due to glaucoma including complications following glaucoma operations.

In these case reports, autologous whole blood patch was used as a surgical alternative in 2 patients who presented with bleb leaks after trabeculectomy. The purpose of this case study is to report our initial experience at the University of Benin Teaching Hospital and DDS Eye Centre & Surgery Port Harcourt when we used autologous whole blood patch in treatment of bleb leaks following trabeculectomy.
Case Report

Case 1

This was 52-year-old man that had trabeculectomy and adjunctive application of mitomycin C in both eyes (BE) under retrobulbar anaesthesia.

Pre-operatively, the visual acuity (VA) of the right eye (RE) was 6/24 and the left eye (LE) was 6/18. Cup disc ratio (CDR) was about 0.9 in both eyes. The intraocular pressure (IOP) was 32 mm Hg for the RE and 33 mm Hg for the LE. The visual field (automated perimetry) was moderately constricted. The trabeculectomy involved a limbal-based conjunctival flap. Post-operatively the patient had delayed reformation of the anterior chamber (A/C) and hypotony in the RE. Seidel test was positive. Detailed examination showed leaking conjunctival button hole in the RE. Conservative effort of pressure patching and bandaging was not very helpful. The bleb leak was treated with autologous whole blood patch. A 1.0 ml syringe was used to obtain venous blood from the patient. A 27-gauge needle was used to inject the whole blood (0.75 ml) under the buttonhole and on the lateral and medial sides of the bleb, taking care that the entry point was some distance from the buttonhole. The procedure succeeded in arresting the bleb leak.

However, the trabeculectomy failed after 7 months in the RE and the pressure rose again. The patient had a repeat trabeculectomy using another site 13 months after the first surgery. The repeat surgery has remained successful for about 2 years and pressure-averaged 20mmHg in the RE. The initial trabeculectomy in the LE was uneventful and has remained successful for about 3 years with IOP averaging 21 mmHg.

Case 2

This was a 36-year-old male who had trabeculectomy and adjunctive MMC application under retrobulbar anaesthesia. The pre-operative VA was 6/9 for the RE and 6/9 for the LE. The CDR was 0.6 for the RE and 0.65 for the LE. The IOP was 28mmHg for the RE and 26mmHg for the LE. Visual fields in both eyes were minimally constricted. The patient opted to have trabeculectomy done in the LE first. The trabeculectomy in the LE, which was a limbal-based conjunctival flap, was carried out successfully and MMC was used adjunctively.

The patient had some appreciable tenons tissue, which had to be abscissed. The immediate post-operative period was uneventful and intraocular pressure was controlled at 18mmHg in the LE. Eighteen weeks later, the patient developed a spontaneous bleb leak from a thinned bleb. We opted to use autologous whole blood to patch the leak after 7 days of conservative effort of pressure patching and bandaging was not very helpful. The autologous blood was injected in similar manner as in case 1 and was successful in arresting the bleb leak. The bleb however failed after 10 months of this intervention. A repeat trabeculectomy was done for the patient using another site and it has remained successful for the past 18 months.

Discussion

Antimetabolites such as 5-FU and MMC inhibit fibroblast activities which are unwanted for the success of trabeculectomies. They however predispose to thin walled blebs and conjunctival epithelial and stromal breakdown and degenerations. These, in turn, predispose to inadvertent suture button holing or spontaneous rupture and bleb leaks. Previously, conservative measures such as pressure bandaging and aqueous suppression and prophylactic antibiotics were fairly successful in managing bleb leaks but the adjunctive use of antimetabolites, which devitalize the conjunctival epithelium and stroma have rendered these conservative measures less successful. This partly explains post-operative hypotony and its associated complication being higher with use of antimetabolites and especially MMC.

Intervention in bleb leaks is necessary when conservative measures do not produce the desired results because of the serious consequence of hypotony such as infection, corneal decompensation, peripheral anterior synechiae and endophthalmitis. Autologous whole blood when injected under leaking blebs, patches leaking blebs by coagulating under the buttonhole and finally sealing the hole by inducing local fibrosis generally
undesired in trabeculectomy but wanted in sealing a hole or a ruptured thinned bleb.

Leen et al.\textsuperscript{12} showed that blebs with autologous blood injection had more mitotic and fibroblast activities leading to higher IOP when compared to control. In these two case reports, the whole blood induced severe fibroblast activities and caused bleb failure after sealing the leaks. This observation is supported by the fact that the LE of the first patient has continued to have a successful trabeculectomy and the repeat trabeculectomy in the RE was also successful. In the second patient the repeat trabeculectomy has also been successful. The common factor in the failed blebs was the injected autologous whole blood used to seal the leaking blebs. This observed experience in the two Nigerian eyes in which autologous whole blood is suspected to have precipitated severe fibrosis and eventually caused bleb failure is supported by the finding that African eyes including Nigerian eyes elicit much higher fibroblast and other inflammatory response than Caucasian eyes\textsuperscript{14,15}.

Thus while autologous whole blood patch is a recognized and recommended intervention in sealing leaking blebs\textsuperscript{11,12}, our initial experience at UBTH and DDS Eye surgery in Nigerian eyes suggests that although it was very successful in sealing bleb leaks in both eyes, the fibrosis it elicits progresses to cause bleb failure. Though we had only two cases, the bleb failure in both cases make us to advice that further study is needed if autologous whole blood patch is to be recommended for wide use in treating leaking blebs in Nigerians and Africans

References