Combined Baerveldt glaucoma drainage implant surgery and surgical bleb revision for preventing a postoperative hypertensive phase

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Background: In patients with severe optic nerve damage, it is crucial to prevent the hypertensive phase that can develop after Baerveldt glaucoma drainage implant (BGI) surgery. We describe the combination of BGI surgery with surgical bleb revision to prevent the postoperative hypertensive phase.

Case reports: We report two patients who underwent BGI surgery combined with surgical bleb revision. The combined surgery was performed in a 62-year-old man with open-angle glaucoma (patient 1) and a 37-year-old man with neovascular glaucoma (patient 2) at Asahikawa Medical University in 2013. Each patient had undergone a previous failed trabeculectomy and another trabeculectomy was expected to be unsuccessful. In patient 1, the early postoperative intraocular pressure (IOP) was well controlled due to a well-functioning bleb, despite development of a small amount of hyphema. In contrast, in patient 2 the postoperative IOP was higher with poor bleb formation; however, after bleb needling, the IOP was well controlled. Thus, the usual techniques used after trabeculectomy were also applicable in this combined surgery. For comparison, we also report the case of a 54-year-old woman with secondary glaucoma who underwent BGI surgery alone (patient 3). The postoperative IOP remained relatively high compared to patients 1 and 2.

Conclusion: Combining BGI surgery with surgical bleb revision might be effective to prevent the hypertensive phase that can occur after BGI surgery.

Keywords: Baerveldt glaucoma drainage implant, surgical bleb revision, intraocular pressure

Introduction

Transient intraocular pressure (IOP) elevation in the early postoperative period (ie, the hypertensive phase) can occur after Baerveldt glaucoma drainage implant (BGI) surgery. This complication occurs due to the temporary occlusion of the tube lumen, which completely inhibits aqueous drainage to the plate. Because a nonvalved BGI cannot adjust the amount of aqueous that drains (in contrast to other devices such as the Ahmed [New World Medical, Rancho Cucamonga, CA, USA] glaucoma valve), occluding the tube tightly with an absorbable ligature before inserting it into the anterior chamber¹ is important to avoid overfiltration and subsequent hypotony, which are other major potential complications of BGI surgery.²

In Japan, most patients who undergo BGI surgery already have severe optic nerve damage due to prolonged glaucoma, because the surgery is currently limited to a subset of patients with refractory glaucoma, eg, patients who previously underwent repeated ocular surgeries, and those with no good prospect for a successful future.
testing
Baerveldt implant surgery combined with surgical bleb revision

A B

Figure 1 Fundus photographs of patient 1 (A) and patient 2 (B).
Notes: Severe optic nerve damage is observed in both patients. The cup-to-disc ratios are 0.8 to 0.9 and 0.9 in patients 1 and 2, respectively. In patient 2, scars from panretinal photocoagulation and closure of retinal vessels also are observed.

For comparison, we present a representative case treated with BGI surgery alone. Patient 3 was a 54-year-old woman with secondary glaucoma caused by ocular sarcoidosis. The IOP increased to 30 mmHg in her right eye. The BCVA was 20/25. She had previously undergone repeated trabeculectomies. Because of the severity of the conjunctival scarring in the superior quadrants, BGI surgery was performed in the inferior quadrant.

No signs of tubal obstruction were observed in any of the patients postoperatively. The changes in the postoperative IOP levels of the three patients are shown in Figure 3. The postoperative IOP was controlled by postoperative bleb management in patients 1 and 2. In patient 3, the postoperative IOP remained relatively high compared to patients 1 and 2.

Discussion
We described BGI surgery combined with surgical bleb revision. The hypertensive phase was prevented postoperatively in our patients. Surgical bleb revision may also prevent the hypertensive phase due to tubal obstruction caused by fibrin, blood, or the iris. In a recent tube versus trabeculectomy study, the plate was positioned in the superotemporal quadrant, whereas we placed it in the inferior quadrants because the superior conjunctiva was cicatrizied due to previous glaucoma surgeries. Because the surgical sites of each procedure do not overlap, the combined surgery can be adapted to any case.

One study reported that a hypertensive phase developed postoperatively in 82% of patients who were implanted with an Ahmed valve. Although combining tube implantation with a trabeculectomy might prevent the hypertensive phase, it was difficult to perform further trabeculectomies in our patients because the conjunctiva in the upper quadrants was cicatrizied. If favorable outcomes of future trabeculectomies are expected, BGI surgery is not required. Although it was reported that transient IOP elevations after BGI surgery are well controlled by laser suture lysis, its effect may be uncertain because of the potential for hypotony when laser suture lysis is performed before sufficient capsular fibrosis develops around the external plate.

In patient 1, the early postoperative IOP was well controlled due to the well-functioning bleb. The bleb promptly elevated in response to ocular massage during that period. The IOP slightly increased to 15 mmHg on postoperative day 49 and then decreased. Given the changes in the postoperative IOP levels, we speculated that the ligature around the tube dissolved and aqueous drainage began at about that time.

In patient 2, the postoperative IOP was higher, and varied with poor bleb formation compared to patient 1. Because the bleb was failing, bleb needling was performed on postoperative day 6 to restore bleb function. After that, the IOP was controlled, indicating that this technique, commonly used after trabeculectomy, was also applicable in this combined surgery. Considering the changes in IOP, which peaked on postoperative day 91, we speculated that the ligature around the tube dissolved and aqueous drainage began at about that time. The slight increase in IOP in the late follow-up period might reflect the onset of

Figure 2 Patient 1 surgical procedure.
Notes: (A) A clear corneal traction suture is created with a 6-0 polyglycolic acid (PGA) absorbable violet braided suture (Mani Inc, Tochigi, Japan). (B) The scleral flap is dissected until the aqueous humor egresses. (C) The fornix-based conjunctival flap is closed with 10-0 nylon sutures. (D) A 350-mm² Baerveldt glaucoma implant is positioned. The tube is tightly occluded using an 8-0 PGA absorbable violet braided suture (Mani Inc) ligature (arrow). (E) The tube is inserted into the anterior chamber. (F) Tube fenestrations are created. (G) A scleral graft is used to cover the tube. (H) *bleb formation is observed at the end of the surgery.
The authors declare no conflicts of interest in this paper.

Disclosure
The authors declare no conflicts of interest in this paper.

Abbreviation: IOP, intraocular pressure.

References

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