

## Amniotic Membrane Transplantation for Repair of a Large Intraoperative Conjunctival Defect during Trabeculectomy

Dear Editor,

In trabeculectomy, maintaining bleb integrity is essential for preventing hypotony, infection, and exposure of the sclera. An amniotic membrane (AM) is often used to manage bleb integrity-related problems such as intraoperative buttonholes [1] and late postoperative bleb leakage [2-4].

Herein we present a case in which a large conjunctival bleb defect ( $6 \times 3$  mm) occurred during trabeculectomy and was repaired using human AM transplantation. A 70-year-old woman who was diagnosed with normal-tension glaucoma of the left eye (OS) underwent trabeculectomy to achieve target intraocular pressure (IOP). Her diurnal IOP was 19 mmHg in both eyes without medication. Inferior arcuate scotoma breakthrough was found on the periphery of the OS using Humphrey C30-2 threshold perimetry (Carl Zeiss Meditec, Dublin, CA, USA).

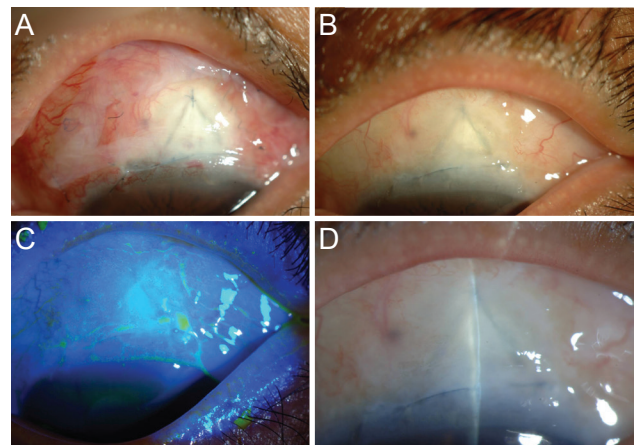
During trabeculectomy, the surgeon (DMK) noticed that the conjunctiva was very thin and transparent. In forming a fornix-based conjunctival flap, he was careful not to make a buttonhole. Conjunctival flap closure was attempted with 10-0 nylon using a vascular needle. Although the applied tractional force on the conjunctiva was minimal, the vascular needle tore a hole in the conjunctiva. After a few trial conjunctival flap sutures at both ends of flap, this conjunctival defect was large enough to expose the entire scleral flap. Advancement of the superior conjunctiva seemed insufficient to repair this large ( $6 \times 3$  mm) conjunctival defect. A cornea specialist (MKK) joined the operation to repair the conjunctival defect using permanent AM transplantation. Defrosted AM (Bioland, Cheonan, Korea) was tailored to  $7 \times 4$  mm to cover the conjunctival defect and placed *in situ* (epithelial side up). Permanent AM transplantation was performed with interrupted and continuous 10-0 nylon sutures. Two anchoring sutures were additionally placed just above the limbus to prevent leakage between the limbus and the AM. Temporary AM transplantation was applied epithelial side up to cover the entire permanently transplanted

AM using 10-0 nylon running sutures, in order to protect it during epithelization. After subconjunctival injection of triamcinolone (0.3 mL), the eye was dressed with a pressure patch and eye shield.

On postoperative day 1, all sutures and AMs remained *in situ*. The IOP of the OS was 6 mmHg with pneumatic tonometry. The anterior chamber depth was normal. On postoperative day 7, an AM bleb was formed with the intact permanent and overlaying AM *in situ* (Fig. 1A). The overlaying AM was removed on day 7 and autoserum instillation was discontinued on postoperative day 22. On postoperative day 43, all sutures in the AM bleb were removed except for the perilimbal anchoring sutures. The IOP of the OS was 12 mmHg. Wound dehiscence was not observed and the filtering bleb was well formed without leakage (Fig. 1B-D). Vigamox and Pred Forte instillation was continued four times a day for two months.

Human AM is a type IV collagen-based basement membrane, capable of accelerating epithelial healing. In addition, AM has multiple factors that promote epithelial cell proliferation, such as endothelial growth factors, and anti-inflammatory factors that advance wound healing [5]. These characteristics make it a suitable substrate for repairing persistent epithelial defects in the cornea and conjunctiva caused by various factors.

Unlike in previous reports, in the present case, AM was



**Fig. 1.** Anterior segment photographs on postoperative days 7 and 43 after amniotic membrane transplantation for repair of a large bleb defect. (A) An amniotic membrane bleb was formed with the intact permanent and overlaying amniotic membrane *in situ*. (B) The fully epithelialized bleb without vascularization on postoperative day 43. (C) Bleb integrity was maintained without leakage. (D) The diffusely elevated filtering bleb was confirmed by slit-beam examination.

used as a substitute not only for epithelial cell proliferation, but also as a substrate for epithelial cells to attach to, and was transplanted permanently to repair a large intraoperative conjunctival defect and to form a filtering bleb. Meanwhile, an additional temporary AM transplantation was used to protect the primary AM transplantation until epithelialization was complete. Although repair of conjunctival buttonholes with AM during trabeculectomy has previously been reported [1], the conjunctival area permanently replaced in this case was of exceptional size.

In conclusion, permanent AM transplantation accompanied by simultaneous temporary AM transplantation can form an AM bleb. Permanent AM transplantation may be an appropriate alternative treatment option for large conjunctival defects that occur during trabeculectomy.

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## Conflict of Interest

No potential conflict of interest relevant to this article was reported.

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## Successful Treatment with Combined PTK/PRK Guided by Intraoperative Skiascopy of Patients with Corneal Haze after Surface Ablation

Dear Editor,

Refractive surgeons have become interested in surface ablation because this procedure is free of flap complications, has less iatrogenic ectasia and yields better visual

quality. Dealing with corneal haze after surgery, a potential complication of surface ablation, is very challenging for refractive surgeons [1]. Phototherapeutic keratectomy (PTK) is one option that may help some patients. However, with this procedure, postoperative vision is unpredictable because of refractive changes, usually hyperopic shifts after PTK [2].

We report our experience with two patients who developed subepithelial haze after surface ablation; both were successfully treated with PTK coupled with photorefractive keratectomy (PRK) with pre-PRK planning using intraoperative skiascopy.

Case 1, a 22-year-old male patient was referred to an out-