

## Amniotic Membrane Transplantation for Exuberant Bleb Following Filtration Surgery

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The use of antimetabolites in filtration surgery, cystic, large, leaking blebs often lead to complications. We report a case of glaucoma that received amniotic membrane transplantation for repairing the exuberant bleb. This female patient had a history of several eye surgeries, including a scleral buckle and cyclocryotherapy for one eye and the other received filtering surgery. The latter had been revised once with autologous conjunctival advancement after an episode of bleb leakage. The large bleb, overlaying the cornea 3 mm from the limbus, had caused corneal erosion beneath the bleb and the patient suffered burning sensations. Further conjunctival advancement of the exuberant bleb is difficult to achieve, because it had been revised once with this treatment. Amniotic membrane was used for further reconstruction after the excision of the pre-existing bleb. A normal intraocular pressure was regained. The symptom of burning sensations subsequently subsided. A ten-month follow-up was conducted. Amniotic membrane transplantation is a feasible option for exuberant or late onset bleb leakage, to prevent further destruction of ocular surface tissue and to maintain the intraocular pressure. (*Chang Gung Med J* 2006;29(4 Suppl):85-9)

**Key words: leaking bleb, conjunctival advancement, amniotic membrane transplantation, intraocular pressure.**

To our knowledge, human amniotic membrane had been previously applied to ocular surface reconstruction in advanced ocular cicatricial pemphigoid, Steven-Johnson syndrome, and chemical burn.<sup>(1-3)</sup> The advantages of amniotic membrane including rapid epithelization,<sup>(4)</sup> antifibrosis,<sup>(5)</sup> antiangiogenesis,<sup>(6)</sup> and immune-privilege<sup>(7)</sup> had been serially investigated. Based on the above characteristics, amniotic membrane transplantation is a viable alternative for the repair of the leaking bleb in filtration surgeries.<sup>(8)</sup>

Since the advent of the use of antimetabolites agents to prevent scarring of filtration, frequency of thin, cystic, and avascular bleb with late-onset leakage has increased. Noninvasive management of bleb

leakage such as compression suturing, autologous blood injection, contact lens, or tissue adhesion had been advocated, but the long-term success of the procedure needs further evaluation.<sup>(9)</sup> When surgical intervention is required to reconstruct the leaking bleb, both advancement of adjacent conjunctiva or free conjunctival autograft are the standard surgeries.<sup>(10)</sup> Preserved human amniotic membrane transplantation, a new option for glaucoma surgeries, had been reported to repair leaking filtering bleb or exuberant bleb after conservative interventions.<sup>(8)</sup> In particular, for intractable bleb leakage or in cases where the eyes underwent previous surgeries, the further advancement of adjacent conjunctiva autograft are not unrestricted to proceed due to preexist-

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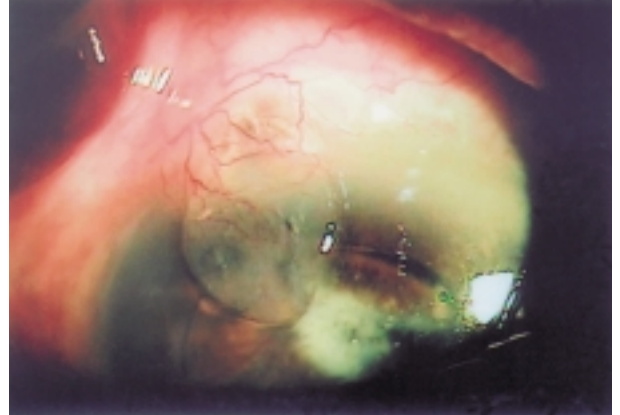
ing fibrosis of conjunctiva. For this reason, our purpose is to investigate the efficacy and safety of human amniotic membrane transplantation in cases of the exuberant bleb.

## CASE REPORT

A 73-year-old female underwent separate cataract surgery and filtering surgery for her left eye in 1999. A complete history of her case was first conducted by the hospital treating her at that time. In her first visit to our clinic in 2000, a superonasal elevated bleb and intraocular lens (IOL) capture of the left eye was impressed under a slit-lamp biomicroscopic examination. At the same time, the other eye was aphakic and total retinal detachment was complicated by secondary glaucoma. The best-corrected visual acuity (BCVA) was light sense negative in the right eye and 20/666 in the left eye. Cyclocryotherapy was performed for intractable glaucoma of the right eye, and consequently, intraocular pressure (IOP) was brought under control. In 2001, due to the late-onset leakage and resultant hypotony, the left eye that had undergone filtration surgery received a bleb revision with the advancement of adjacent conjunctiva in our hospital.

Two years after the first bleb revision, she came to our emergency room because of progressive burning sensation, on and off, for several months. The bleb following advancement of adjacent conjunctiva was thin, large, and overlaying the cornea 3 mm from the limbus. (Fig. 1) The Seidel test revealed a negative result for active leakage. Under slit-lamp examination, scleromalacia and vascularization of the episclera around the filter were observed. With intensive posterior synechia, the anterior chamber (AC) was shallow and the captured posterior chamber IOL was entirely dislocated into the AC before the first bleb revision. Neither retinal detachment nor choroidal detachment was detected by the B-mode ultrasonography. The BCVA was deteriorated to merely a light sense positive. The IOP was 7 mmHg as measured by pneumatic tonometry.

Since cyclocryotherapy had been performed on the other eye and the lesion eye had undergone bleb revision with advancement of the conjunctiva, additional advancement or free conjunctiva autograft were presumed to be restricted due to pre-existing fibrosis of the surrounding conjunctiva. Con-

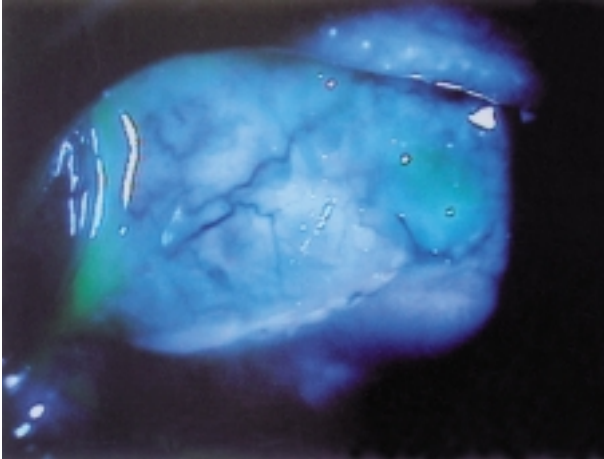


**Fig. 1** External eye photograph revealing shallow anterior chamber (AC) with seclusio pupillae and intraocular lens dislocated into AC. The exuberant bleb was extending over the cornea.

sequently, we adopted amniotic membrane transplantation for reconstruction of the large bleb. After peribulbar anesthesia, we pushed aside the redundant bleb and used fluorescein strip to stain the cornea. Corneal erosion was demonstrated beneath the bleb area. Due to tight adhesion of the conjunctiva, we dissected the conjunctiva and Tenon's tissue to a limited extent and excised the thin wall of the bleb 6 x 6 mm posterior from the limbus. Subsequently, the peripheral cornea was debrided for further adhesion of the graft. Preserved human amniotic membrane (Biotissue; Miami; Florida) was cut into a 7 x 7 mm square piece. The membrane was buried in the adjacent healthy conjunctiva by approximately 1mm and sutured with 8-0 vicryl interruptedly posterior from the limbus and running sutured with 10-0 nylon along the limbus. The Seidel test was re-administered to confirm no leakage after the amniotic membrane transplantation. Antibiotics and steroids were administered after the operation. On the first day postoperatively, BCVA was hand motion at 0.2 meters and the IOP was 16 mmHg. Epithelization of amniotic membrane graft was completed within two weeks and the IOP decreased to 10 mmHg. (Fig. 2) The suffering of this patient was resolved. After a 10-month follow-up, vision and IOP had remained stable.

## DISCUSSION

In regard to the increasingly popular use of



**Fig. 2** Negative staining of fluorescein demonstrating epithelization of the amniotic membrane graft 14 days postoperatively.

antimetabolites in filtering surgery to attenuate wound healing, exuberant, late-onset leaking bleb, bleb migration, or hypotony are possible complications. Leakage of the dynamic bleb produces corneal erosion and an irritating sensation causing discomfort and suffering for patients. Vision is threatened due to hypotony maculopathy or shallow AC with choroidal detachment.<sup>(11-12)</sup> Conservative managements such as administration of antibiotics, aqueous suppressants, pressure patch, or soft bandage contact lens<sup>(9)</sup> are effective for small bleb leakage. As we know, to achieve long-term success for intractable conditions surgical intervention is indicated. Conventionally, advancement of adjacent conjunctiva and free conjunctival autograft are considered.<sup>(13-17)</sup> Wadhvani et al. had characterized three methods: pedicle flap technique without excision for small-to-moderate blebs that extend more than 5 mm posterior to the limbus, partial excision and advancement for moderate-to-large blebs that extend less than 5 mm from the limbus and extend over the cornea, and free conjunctival autologous graft for large blebs.<sup>(18)</sup> However, failure of filtration due to extensive scarring, ptosis, and diplopia due to damage of the levator superioris or superior rectus muscle complex are the drawbacks of these methods. Eighteen percent of these cases need two or more bleb revisions.

Preserved human amniotic membrane transplantation is an effective strategy widely used in ocular surface construction.<sup>(1-3)</sup> For persistent corneal epithe-

lial defects, amniotic membrane transplantation was reported to facilitate the epithelization.<sup>(4)</sup> The antifibrotic effect was substantiated in cultured human corneal and limbal fibroblasts through the suppression of TGF- isoforms, TGF-receptor type II and myofibroblast differentiation.<sup>(5)</sup> Additionally, amniotic membranes contain some immunoregulatory factors, such as HLA-G and Fas ligand by using experimental xenotransplantation.<sup>(7)</sup> Resembling corneal epithelial basement membrane, human amniotic membrane manifests the  $\alpha 5$  chain of type IV collagen.<sup>(19)</sup> Due to the virtues of amniotic membrane, including rapid epithelization, antifibrosis, antiangiogenesis, and immune-privilege, it was considered for use in the repair of the leaking bleb or exuberant bleb.<sup>(20-21)</sup>

To summarize, strategies to use amniotic membranes for leaking or exuberant blebs involve coverage of the entire bleb for a small leakage without excision of the prior bleb<sup>(21)</sup> and transplantation following excision the bleb wall.<sup>(8)</sup> Budenz et al. had identified a lower cumulative survival rate of the amniotic membrane than conjunctival advancement for leaking filtering bleb.<sup>(8)</sup> Although amniotic membranes had been used in glaucoma surgery, the advanced mechanism and the dynamic change of the filtration require further investigations.

Regardless, for this uncontrollable case that had received treatment with conjunctival advancement once and had undergone retinal surgery on the other eye, further conjunctival advancement or a free conjunctival graft from the contralateral eye was no longer the optimal course of action. Therefore, amniotic membrane was used to repair the thinning and exuberant bleb. After limited excision of the thin wall of the bleb, epithelization was completed within two weeks with a watertight seal to sustain the function of filtration. Following amniotic membrane transplantation the symptoms were dissolved. Vision and IOP were stable during the period of the follow-up. This result supports the view that amniotic membrane transplantation is an alternative to exuberant bleb without further ocular surface destruction and is effective in maintaining the function of filtration.

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## 青光眼術後過大濾泡進行羊膜移植

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因抗新陳代謝藥物使用於青光眼手術中，所形成囊腫形、大範圍、甚至滲漏的濾泡經常會引起併發症。我們報告一個以羊膜移植修復過大濾泡之案例。一位 73 歲女性抱怨左眼灼熱感。回溯其病史她曾接受幾次眼科手術，包括一眼進行鞏膜扣環術及睫狀體冷凍治療，另一眼為青光眼手術。後者因一次濾泡滲漏進行自體結膜修補。此次，在細隙燈檢查呈現一過大濾泡，覆蓋角膜上離輪狀部 3 毫米，造成濾泡下角膜糜爛，因而產生灼熱感。對此過大濾泡，尤其曾以附近結膜修補過，再次以附近結膜進行修補有其困難。在切除先前濾泡後，我們改以羊膜來完成修復。最後她的眼壓達到正常值。之前灼熱感已獲得緩解。此病人追蹤了 10 個月。對於過大或後期濾泡滲漏，羊膜移植是一項可行的選擇，可避免進一步對眼表層組織之破壞且維持正常的眼壓。(長庚醫誌 2006;29(4 Suppl):85-9)

**關鍵字：**滲漏的濾泡，結膜修補，羊膜移植，眼壓。

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