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Case Report
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Reconstruction of a Leaking Filtering Bleb after Trabeculectomy Using Amniotic Membrane Transplantation and Contralateral Conjunctival Autograft: A Case Report

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Abstract

Purpose: To describe the successful reconstruction of a leaking filtering bleb with necrotic conjunctiva long after trabeculectomy, using a double-layer amniotic membrane transplantation (AMT) combined with a contralateral conjunctival autograft.

Methods: A 63-year-old woman developed a thin, avascular, leaking bleb ten years after trabeculectomy with mitomycin-C. After infection control with fortified antibiotics, reconstruction was performed using AMT over the scleral flap, a contralateral conjunctival–Tenon autograft, and an additional AM patch.

Results: The ocular surface healed uneventfully. At two months, the bleb was sealed with good filtration and stable intraocular pressure. Best-corrected visual acuity improved to 0.2 logMAR.

Conclusion: The combined use of amniotic membrane and contralateral conjunctival autograft offers an effective solution for late-onset bleb leaks when local conjunctiva is friable.

Keywords: Trabeculectomy; Filtering Bleb; Bleb Leak; Amniotic Membrane Transplantation; Conjunctival Autograft; Glaucoma Surgery; Late-Onset Complication; Ocular Surface Reconstruction

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Introduction

Trabeculectomy remains the gold standard filtering surgery for glaucoma uncontrolled by maximal medical therapy. The adjunctive use of antimetabolites such as mitomycin-C (MMC) enhances long-term success but increases the risk of thin-walled avascular blebs prone to leakage and infection. The lifetime risk of bleb-related infection ranges from 0.3% to 13.8%, rising with higher MMC dose and longer follow-up [1-3].

Management of late-onset bleb leakage is challenging. Conjunctival advancement is often the preferred approach; however, when the surrounding conjunctiva is friable or insufficient, alternative techniques are needed. Amniotic membrane transplantation (AMT) has been shown to promote epithelial healing, reduce inflammation, and modulate stromal fibrosis [4-5]. Combining AMT with a conjunctival autograft may provide durable structural integrity and maintain filtration.

We present a case of late-onset bleb leakage successfully reconstructed using AMT and contralateral conjunctival autograft, with favorable anatomical and functional results.

Case Report

A 63-year-old woman with hypertension and advanced open-angle glaucoma in both eyes had undergone combined cataract extraction and trabeculectomy with intraoperative MMC (0.5 mg/mL for 5 min) ten years earlier. She presented to the emergency department complaining of severe pain and sudden loss of vision in the right eye (RE).

Best-corrected visual acuity (BCVA) was light perception in the RE and 0.7 (20/100 Snellen) in the left eye (LE). Intraocular pressure (IOP) measured 4 mmHg (RE) and 17 mmHg (LE). Slit-lamp examination revealed a flat, avascular filtering bleb with extremely thin walls, necrotic overlying

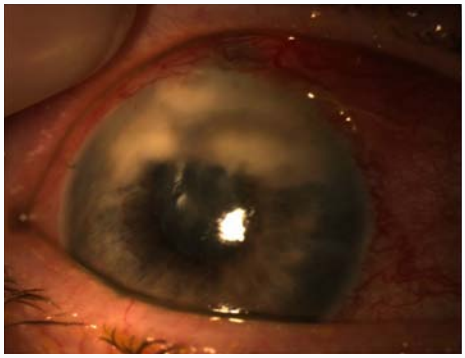

Figure 1:

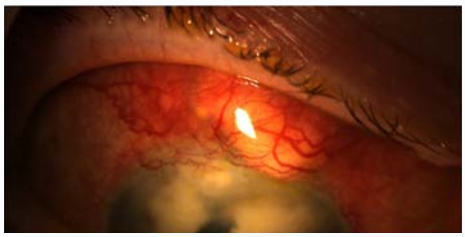

Figure 2:

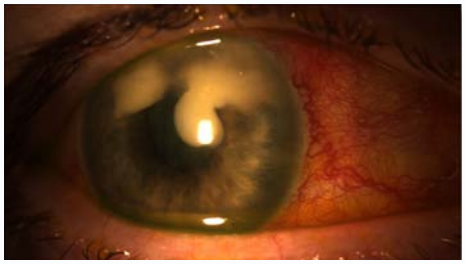

Figure 3:

conjunctiva, and a delayed central leak (positive late Seidel test) surrounded by marked hyperemia (Figure 1).

Empirical therapy was initiated: hourly fortified topical vancomycin (50 mg/mL) and ceftazidime (50 mg/mL), intravenous ciprofloxacin (400 mg b.i.d.) and vancomycin (1 g b.i.d.), and supportive treatment.

After infection control and resolution of pain and discharge, surgical bleb reconstruction was scheduled. Under peribulbar anesthesia, the necrotic conjunctiva and the avascular bleb area were excised. A cryopreserved amniotic membrane was placed epithelial side up over the exposed scleral flap and secured with 10-0 nylon sutures (Figure 2). A conjunctival–Tenon autograft harvested from the superotemporal quadrant of the LE was positioned over the AM and sutured to the surrounding healthy conjunctiva (Figure 3). Finally, an additional AM patch was applied to protect the surface (Figure 4).

Postoperative treatment included topical antibiotics and corticosteroids tapered over six weeks. The ocular surface healed progressively with no leakage or bleb flattening. At two months, BCVA improved to 0.2 logMAR, and IOP was 16 mmHg (RE) and 22

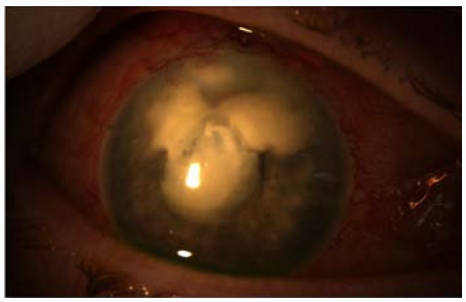

Figure 4:

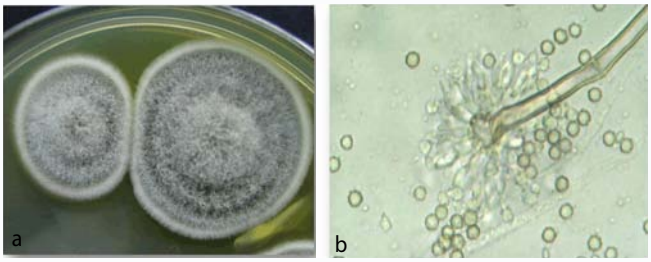

Figure 5:

mmHg (LE) without antiglaucoma medications. The bleb remained functional and well-formed.

Discussion

Late-onset bleb leakage is a serious complication of trabeculectomy, particularly when MMC is used. MMC inhibits fibroblast proliferation, promoting a long-lasting bleb but predisposing to avascular, thin-walled structures prone to leakage and infection [1, 3].

The risk is greater when trabeculectomy is performed alone rather than combined with cataract surgery, as combined procedures may create thicker, more stable blebs1. Other predisposing factors include bleb manipulation, prolonged topical antibiotics or corticosteroids, and recurrent blepharitis [2, 3].

When leakage develops long after surgery, microbial virulence is often high, and conservative measures may fail, requiring surgical revision [2]. In our case, the surrounding conjunctiva was too fragile for advancement; therefore, a contralateral conjunctival autograft was used. The autologous tissue provided a viable, vascularized cover, while the amniotic membrane served as a biological scaffold, enhancing epithelial migration and reducing inflammation [4, 5].

This dual-layer technique provided a thicker, more resilient wall over the filtration site, successfully restoring ocular integrity and maintaining bleb function. The result supports AMT combined with conjunctival autograft as a practical and effective surgical option for complex late-onset bleb leaks.

Conclusion

Amniotic membrane transplantation combined with contralateral conjunctival autograft is a safe and effective technique for reconstructing leaking filtering blebs when the local conjunctiva is fragile or deficient. This approach restores ocular surface integrity, maintains bleb function, and prevents recurrence or infection.

Statements

Ethics Statement

Ethical approval was not required for this single-patient case report in accordance with local and national guidelines. This study protocol was reviewed, and the need for approval was waived by the Comité de Ética de la Investigación de la Comunidad Autónoma de Aragón (CEICA). Written informed consent to publish this case, including clinical images, was obtained from the patient.

Conflict of Interest Statement

The authors declare no conflicts of interest.

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Author Contributions

All authors contributed substantially to the conception, data acquisition, analysis, and drafting of the manuscript.

- Pablo Tejada González: Primary surgeon and main author.
- Diana Pérez García, Javier Ramos Duarte: Clinical data collection, patient follow-up, and manuscript review.
- Francisco Javier Ascaso Puyuelo, Juan Ibáñez Alperte: Critical revision, supervision, and final approval of the manuscript.

All authors approved the final version and agree to be accountable for all aspects of the work.

Data Availability Statement

All data supporting the findings of this report are available within the article. Additional data are available upon reasonable request from the corresponding author.

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