Repair of a leaking bleb filtration with conjunctival and amniotic membrane transplantation

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\textbf{Abstract}

Clinical case: A 71-year-old woman presented with a leaking bleb after a combined phaco- trabeculectomy performed 13 years ago. To construct a new filtering bleb, the necrotic area was fully excised. The amniotic membrane was inserted over the scleral flap underneath healthy conjunctival edges. A conjunctiva- Tenon autograft from the contralateral eye was sutured and was sealed with fibrin adhesive.

Discussion: We propose a new surgical technique to repair late leak failures after trabeculectomy with mitomycin C in blebs with a large avascular area. Transplantation of amniotic membrane and conjunctival autograft may be used to repair late leak failures with inadequate conjunctiva to advance.

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\textbf{Resumen}

Caso clínico: Mujer de 71 años que presenta punto de fuga en la ampolla de una facotrabeculectomía realizada 13 años antes. Se reseca área necrótica y se sutura trasplante de membrana amniótica sobre el tapete escleral hiperfiltrante. Sobre esta se sutura injerto de conjuntiva y Tenon del ojo contralateral.

Discusión: Se propone nueva técnica quirúrgica para el tratamiento de fístula de filtración tardía tras trabeculectomía con mitomicina C y área avascular extensa. Se aplica adhesivo de fibrina para el sellado de incisiones. El doble trasplante de membrana amniótica y conjuntiva contralateral puede utilizarse para reparar puntos de fuga tardíos postrabeculectomía con conjuntiva insuficiente.

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Introduction

In trabeculectomies performed with mitomycin C it is not rare to encounter delayed leak points. The cause seems to lie in an aberrant regeneration of the filtration bleb with attenuated conjunctival epithelium and a relaxed and acellular stroma. The fibroblasts affected by mitomycin C are too reduced or injured to produce a consistent collagen tissue capable of closing the filtration bleb.

It is necessary to seal the leak of aqueous humor to avoid the loss of visual acuity (VA). The permanent leak of aqueous humor gives rise to severe complications such as chronic hypotony, athalamia, corneal decompensation, hypotonic maculopathy or endophthalmitis due to direct approach of germs from the fistula.

Surgical technique

Female, 71, with advanced chronic glaucoma in both eyes is considered a subject. In 1994 she underwent combined cataract and trabeculectomy surgery in her left eye with mitomycin C (0.5 mg/ml 5 min).

In 2007, the patient visited the emergency section exhibiting delayed leak points in the filtration bleb. It was attempted to stop the leak with autologous blood in the filtration bleb with no success. The patient VA was of light perception in the right eye (RE) and 0.1 in the left eye (LE). The biomicroscopy assessment of the LE revealed a flat, avascular filtration bleb covered by necrotic conjunctiva with blood clot inside and leak point at 3–4 mm of the limbus with Seydel (+). Intraocular pressure was 20 mmHg in RE and 6 mmHg in LE.

With a large avascular bleb and a leak point on its surface, it was decided to extract the damaged tissue and replace it with healthy conjunctival tissue from the other eye. The dual layer technique performed was as follows:

1. Resection of the 8 mm × 8 mm necrotic bleb (Fig. 1).
2. Implant of amniotic membrane (AM) to cover the scleral trabeculectomy flap (1st layer), with 4 points of polyglactin 8-0 and stitching to the sclera.
3. A nasal conjunctiva transplant measuring 8 mm × 8 mm was taken from the right eye.
4. The conjunctival transplant (2nd layer) was placed over the AM and sutured to healthy bulbar conjunctiva with 5 polyglactin 8-0 stitches.
5. Fibrin adhesive layer was applied (Tissucol DUO, Baxter SL, Valencia, Spain) sealing the edges of the incisions (Fig. 2).

Treatment was initiated with tobramycin and dexamethasone eyedrops (Tobradex eyedrops, Alcón Cusí SA, El Masnou, Barcelona, Spain) in descending pattern over 8 weeks. In the first 2 weeks the bleb exhibited low vascularization and therefore 20% autologous serum was added and maintained for 3 months. The bleb vascularization and congestion peaked at day 15 and gradually went down (Fig. 3).

After 3 years of follow-up, the patient exhibited a good filtration bleb (Fig. 4). The intraocular pressure of the left eye oscillated in the range of 16–18 mmHg in treatment with 0.5% timolol eyedrops (Timofol 0.5%, MSD Spain SA, Madrid, Spain) and the VA remained constant at 0.3 despite a papillary cup of 9–10/10.

Fig. 1 – Large post-trabeculectomy necrotic and filtrating bleb, exhibiting injected autologous blood. Conjunctival necrotic tissue resection. Amniotic membrane transplants and stitching (1st layer).
Fig. 2 – Resection of conjunctiva-Tenon self-transplant of the contralateral eye. Suture of transplant to conjunctiva (2nd layer), with amniotic membrane below. Fibrin adhesive at edges to facilitate watertight closure.

Discussion

The two most prevalent factors in the appearance of post-mitomycin C delayed leaks are the number of years elapsed since surgery and the greater extension of the avascular area. Conservative treatments for halting said leaks frequently fail due to the poor repairing response of tissues treated with mitomycin C (MMC). The residual MMC components present in the scleral sub-strate produced a sustained cytotoxic effect on fibroblasts. Despite a broad surgical resection of necrotic tissue and after implanting a new flap, the leak may reappear. The appearance in the following weeks or months of areas with local necrosis in the new filtration bleb causes the recurrence of the leak.

The conjunctiva-Tenon graft is the standard procedure for repairing delayed leaks. EM exhibits several positive

Fig. 3 – Two days later, the grafts exhibited a large avascular area. Vascularization was very active at day 15 and less active at day 19. Final fibrosis in the nasal area where the contralateral eye graft was taken from.
characteristics such as high hydraulic conductivity, avascular nature and low immune response. We have applied it over the scleral substrate due to its anti-fibrotic properties and because it is reabsorbed or integrated in the surrounding conjunctiva. The AM avoids the direct toxic effect of MMC remains over the conjunctival self-transplant while providing a temporary scaffolding for the new filtration bleb to be formed and consolidated.

In order to treat said large avascular bleb and avoid further leaks, we carried out a dual-layer conjunctiva-Tenon transplant of the other eye over one AM, recovering and sealing the resected area. This dual transplant was supplemented with incision ceiling with sibling adhesive and with 20% autologous serum in the postop period.

For repairing delayed post-mitomycin C filtration blebs with medium and large necrotic blebs, the conjunctiva-Tenon transplant over AM could be a useful surgical technique.

**Conflict of interest**

None of the authors have declared any conflict of interests.

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