Short communication

Therapeutic sectorial full-thickness sclero-keratoplasty for recurrent fungal keratitis

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ABSTRACT

Objective: To report the management of a severe and recurrent fungal keratitis that required repeated penetrating keratoplasties. Despite multiple topical, intraocular and systemic antifungal treatments, superotemporal hyphal infiltration repeatedly penetrated the corneal transplant causing continuous recurrences. Cultures collected before and during surgery isolated the same organism, Fusarium spp.

Conclusion: Corneal infection extending to the sclera and internal angle structures is the main cause of recurrence of fungal keratitis after corneal transplantation. Sectorial full-thickness sclero-keratoplasty combined with a central penetrating keratoplasty should be a surgical technique to be considered in cases where these locations are suspected to be the source of recurrence. It enables a definitive elimination of the infection, with excellent final visual acuities. No postoperative complications were reported in this case.

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Escleroqueratoplastia terapéutica sectorial de grosor completo en queratitis fúngica recurrente

RESUMEN

Objetivo: Comunicar el manejo de una queratitis fúngica recurrente severa, que requirió repetidas queratoplastias penetrantes. A pesar de los múltiples tratamientos antifúngicos tópicos, intraoculares y sistémicos, una infiltración micótica superotemporal repetidamente penetraba y descompensaba al trasplante corneal. Los cultivos preoperatorios y operatorios aislaron al mismo organismo, Fusarium spp.

Discusión: La infección corneal que se expande a la esclera o a las estructuras del ángulo interno es la causa más frecuente de recurrencia en la queratitis fúngica después del trasplante de córnea. En estos casos, la escleroqueratoplastia sectorial de grosor completo del sitio sospechoso de recurrencia, asociada a una queratoplastia penetrante central,

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**Introduction**

Fungal infections can occur after ocular traumatism with organic material and cause severe ocular morbidity. Antifungal treatments should be aggressive and initiated as early as possible. On some occasions, to achieve complete healing it is necessary to carry out a surgical resection of the affected tissue due to the poor intraocular penetration of antifungal drugs.

A case of recurring fungal keratitis is presented where the authors suspected an expansion of corneal infection towards the sclera, and the complicated therapeutic management thereof.

**Case report**

Healthy male, 32, was referred to our hospital with severe and extended infectious keratitis in the right eye. Three months earlier the patient had suffered ocular traumatism with mud. Previous cultures of the ulcer produced negative results. Topical treatment with antibiotics, antifungals and steroids associated to systemic deflazacort had not produced improvements.

The initial exploration revealed a best corrected visual acuity of light perception. Optical biomicroscopy showed a significant conjunctival injection associated to a dense superotemporal corneal infiltrate with a depth of 5.00 mm × 3.50 mm and a 1 mm hypopyon. The ulcer exhibited poorly defined edges, central staining under fluorescein and remarkable stromal thinning. After obtaining samples for culture, treatment was modified to initiate hourly eyedrops reinforced with antibiotics and 15% amphotericin B, oral voriconazole and ciprofloxacin, with progressive withdrawal of corticosteroids. Twenty-four hours later, emergency penetrating keratoplasty had to be performed in association with intra-chamber cleansing with amphotericin B due to corneal perforation. Postoperatively, oral voriconazole and ciprofloxacin were added.

The microbiological analysis and histological preparation of the collected samples revealed the presence of *Fusarium* spp. Despite adjusting the treatment, 5 weeks later fungal infiltration signs appeared in the superotemporal edge (Fig. 1) which progressed to the point of requiring a second large diameter penetrating keratoplasty.

Culture results confirmed the presence of *Fusarium* spp. and the antimicograph confirmed good sensitivity to treatment. However, an infiltration with the same characteristics reappeared 2 weeks later. Based on clinic, superotemporal quadrant sclerocorneal involvement was suspected and a new surgical approach was considered, i.e., full thickness partial sclerokeratoplasty.

The first step was conjunctival peritomy, resecting 90° of perilymic corpus and 9–12 o'clock peripheral cornea. The scleral tissue dissection was deepened to expose uveal tissue (Fig. 2A). Subsequently, a quadrant of the donor tissue sclerocorneal ring was positioned over the receiving window and sutured with 10-0 nylon in the corneal edge and 9-0 Vicryl® (Ethicon, Johnson & Johnson (T’dad) Ltd.) (A.A. Laquis Medical Division) at the scleral edge. The infiltrated central corneal graft was withdrawn and abundant anterior chamber cleansing procedures with amphotericin B were performed. Finally, a new corneal button was sutured with nylon 10-0. Postoperatively the systemic, topical and intrachamber antifungal treatment was maintained up to complete eradication of the infection.

After one year of stability without recurrence, cataract surgery was completed to attain a best corrected visual acuity of 20/23 with residual astigmatism of 160°–2.25.

**Discussion**

Fungal recurrence after corneal transplants is a severe surgical complication of fungal keratitis. It has been reported to range between 5% and 41%. The most common cause is the persistence of fungal pathogens in intraocular tissues.

As already reported in the literature, fungal keratitis extending towards the sclera can be treated with sclerokeratoplasty which can be large diameter (11.0 mm or more) or sectorial (in “D” or banana shape). Dissection size and depth (lamellar or full thickness) depends on the amount of infiltrated tissue. In this case, lamellar approach was not enough to withdraw all the infiltrated tissue and large diameter or “D” shaped sclerokeratoplasty was considered to be excessively aggressive and with increased post-surgery complications.

Finally, an alternative approach was carried out, i.e., sectorial and full thickness trephination comprising only the suspected area, on the basis of clinical characteristics and including 1 mm of healthy sclera as margin.

In order to complete the eradication of pathogens and at the same time of pain a clear central optic zone, central penetrating keratoplasty was performed. Cataract surgery was delayed to await full resolution of the affection as the iris-lens diaphragm is a natural barrier to prevent the dispersion of pathogens towards the vitreous cavity.

In conclusion, the above described approach seems to be a useful alternative in complicated recurring fungal keratitis.
Fig. 1 – (A) Optical biomicroscopy image showing dense temporal corneal ulcer with poorly defined edges and 1 mm hypopyon. (B) Five weeks after the first eccentric penetrating keratoplasty, a deep and peripheral superotemporal corneal infiltrate can be observed. (C) Two weeks after the second large diameter penetrating keratoplasty, superotemporal mycotic infiltrates can be observed extending towards the corneal transplant and producing hypopyon.

Fig. 2 – Full thickness sectorial sclerokeratoplasty. (A) Sectorial conjunctival peritomy exposing the superotemporal sclera. Escision of the perilimbar sclera and peripheral cornea from 9 o’clock to 12 o’clock. (B) Scleral tissue dissection up to uveal tissue exposure in order to withdraw all infiltrated tissue. (C) Image taken at the end of the surgery showing adequately sutured sclerocorneal and central corneal graft. (D) Result after cataract surgery.

cases with suspected well-defined scleral or angular involvement. Said approach could preserve the structural integrity of the ocular globe as well as its visual function with a minimum amount of post-surgery complications.

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