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Case report

Severe microbial keratitis and associated perforation after corneal crosslinking for keratoconus

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ABSTRACT

Purpose: To report two cases of microbial keratitis with subsequent corneal perforation immediately following corneal collagen crosslinking (CXL).
Methods: Retrospective case note review.
Results: First case was a 19 year old female presented with staphylococcal corneal abscess 3 days post CXL procedure. Corneal perforation occurred during hospital admission and was successfully treated with corneal gluing. Microbial keratitis eventually resolved, with both topical and systemic antibiotics therapy, resulting in a vascularized corneal scar. Second case was an 18 year old male whom developed Methicillin Resistant *Staphylococcus aureus* (MRSA) corneal abscess 5 days after CXL procedure for progressive keratoconus. Corneal perforation occurred 48 h after presentation and patient underwent uneventful corneal gluing. Although infective keratitis was successfully treated with topical therapy, patient had visual outcome of count fingers due to scarring.
Conclusions: CXL has been widely used in the treatment of corneal ectatic conditions and complications, such as infective keratitis, are uncommon post procedure. We present two cases of severe microbial keratitis with subsequent corneal perforation within 7 days of CXL. The exact mechanism for the accelerated keratolysis process is unclear. Nonetheless, patients should be well-informed of such potentially devastating complication.

1. Introduction

Corneal collagen crosslinking (CXL) with riboflavin has become a widely used procedure to halt the progression of keratoconus by increasing the biomechanical strength of the inherently weak cornea [1,2]. Riboflavin and its products have been proven to have a very high safety profile. Together with ultraviolet A (UVA) therapy, their role has been encompassed in the management of other corneal conditions including the treatment of microbial keratitis from different micro-organisms: gram positive or negative bacteria, acanthamoeba, atypical bacterium and fungus and associated corneal melting [3].

We report two cases with severe microbial keratitis, corneal melting and perforation within a week following CXL – a complication that is a rare event and has not been encountered within a week of CXL before in published literature.

2. Case reports

2.1. Case 1

A 19 year old female with history of keratoconus, presented to our tertiary referral unit with a painful red left eye, 3 days after a CXL procedure elsewhere. Her topographic findings (Pentacam, Oculus, Optikgeräte GmbH, Münchholzhäuser, Germany) showed a large oval cone (K_1-52.1diopter (D), K_2-54.9D, K_m-53.4D) with the thinnest corneal location measuring 379 μm (grade 3, krumeich classification) (Fig. 1). She gave a history of atopy with allergic eye disease, but was otherwise systemically healthy at the time of treatment.

2.1.1. Procedure

Trans-epithelial corneal cross-linking was performed under topical anesthesia. The epithelium was scratched using the Daya's epithelial disruptor. An accelerated Dresden protocol was

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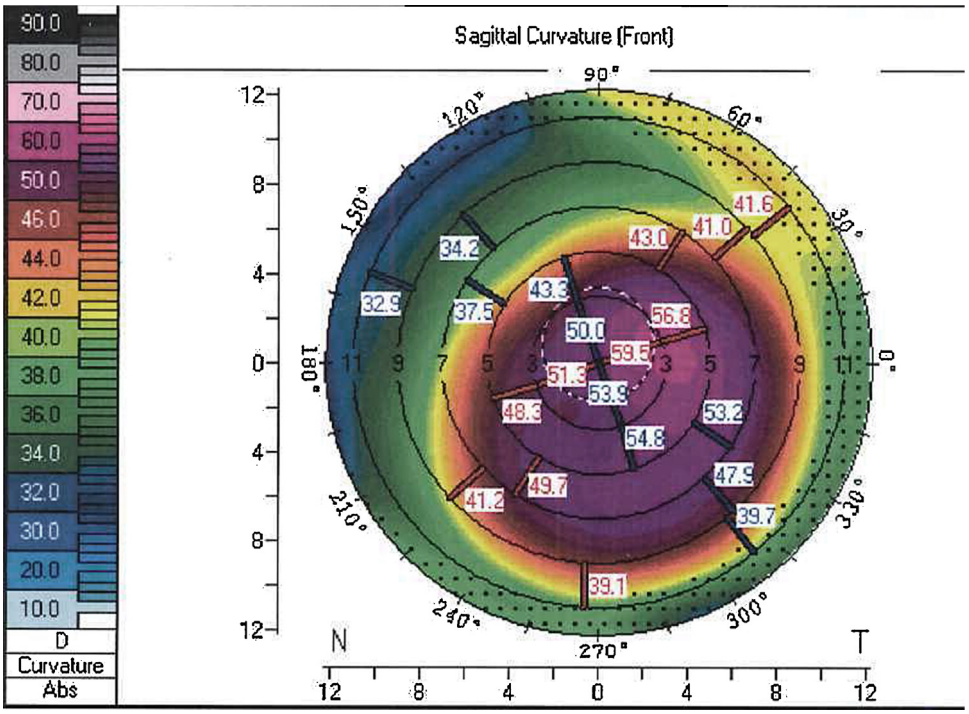

Fig. 1. Corneal Pentacam topographic image showing the advanced keratoconus in Case 1.

followed using riboflavin (0.1%, hypotonic solution) and the corneal crosslinking machine (IROC-innocross-UV-X^{TM} 2000 Illumination system, Bahnhofstrasse 216300 Zug, Switzerland) at 9 mW/cm^2 for 10 min. After the treatment a therapeutic bandage contact lens (Bausch and Lomb, Purevision^{TM}, silicone hydrogel, base curve 8.6 mm/39.25D and 14 mm diameter) was inserted.

2.1.2. Post procedure

She presented with a large central corneal abscess, measuring 5 × 5.3 mm in size with a 3 mm hypopyon, and was admitted for intensive topical antibiotic therapy after taking corneal scrapes. She was commenced on cefuroxime 5% preservative free (PF) eye drops and gentamycin 1.5% PF eye drops (fortified preparations made at in-house pharmacy) at half hourly intervals day and night and oral ciprofloxacin 750 mg twice a day. Microbiological samples isolated large colonies of *Staphylococcus aureus*. Within 48 h of presentation, superior corneal thinning was noted which subsequently perforated on day 7, post CXL treatment. Corneal gluing was performed with cyanoacrylate glue using the modified technique [4] (Figs. 2 and 3). In the following weeks, she had complete resolution of the infective keratitis. However, she has been left with a large central vascularized corneal scar (Fig. 4), with visual acuity of count fingers (CF), which will require optical penetrating keratoplasty.

2.2. Case 2

An 18 year old male was referred to our tertiary unit with a large corneal abscess in his right eye 5 days post CXL procedure at a unit elsewhere, for progressive keratoconus. He was also atopic with allergic eye disease. His Pentacam findings (Fig. 4) showed a large inferior cone with topographic measurements of: K_1-46.5D; K_2-48.1D; K_m-47.3D and the thinnest corneal thickness measured at 466 μm (grade 2 krumeich classification).

2.2.1. Procedure

The accelerated Dresden protocol using isotonic riboflavin (0.1% in 20% dextran) with epithelium-off technique, that was achieved by using 20% alcohol and corneal crosslinking machine (IROC-innocross-UV-X^{TM} 2000 Illumination system, Bahnhofstrasse 216300 Zug, Switzerland) at 9 mW/cm^2 for 10 min. Post treatment, a bandage contact lens (Bausch and Lomb, Purevision^{TM}, silicone hydrogel, base curve 8.6 mm/39.25D and 14 mm diameter) was inserted.

2.2.2. Post procedure

Patient presented with a large corneal abscess measuring 4.5 × 6 mm with an area of extreme thinning (corresponding to the thinnest point observed on the corneal topography). He was admitted and commenced on intensive topical therapy – cefuroxime 5% PF eye drops and gentamycin 1.5% PF eye drops (prepared

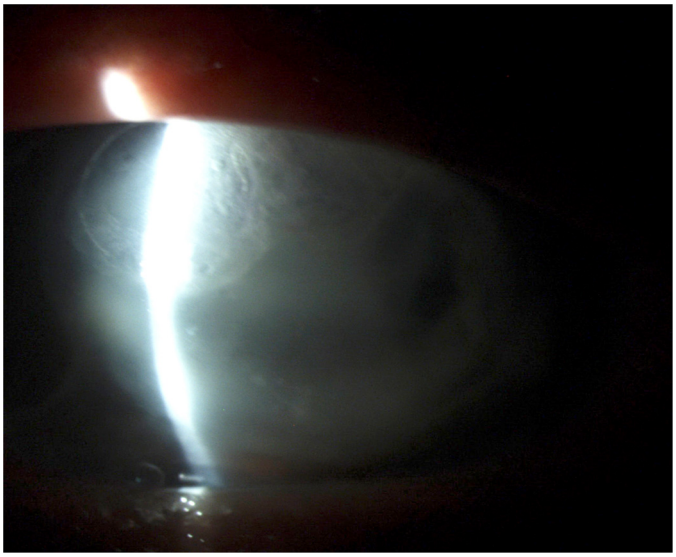

Fig. 2. Left eye of Case-1 showing area of perforation supported by the corneal glue and therapeutic bandage CL.