Case Report

Infectious crystalline keratopathy: Management of three cases with different risk factors

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Abstract

We present the management of three cases of infectious crystalline keratopathy. The first one, in a 46-year-old patient with two previous penetrating keratoplasties; the second one, in a 46-year-old patient with chronic alcoholism and limbal insufficiency; and the third one, in a 70-year-old patient with bullous keratopathy. Other systemic conditions that may mimic infectious crystalline keratopathy, such as multiple myeloma, gout or cystinosis were ruled out on each patient by laboratory testing. The cases were managed with topical or topical and systemic treatment that led to the disappearance of the symptoms. Infectious crystalline keratopathy is a chronic and indolent pathology in which interlamellar bacterial plaques are observed in absence of apparent ocular inflammatory signs. Microorganisms penetrate the cornea through epithelial defects, commonly after a penetrating keratoplasty, although other risk factors may be present.

Keywords: Cornea, Infectious crystalline keratopathy, Keratoplasty, Staphylococcus, Streptococcus, Bacillus

Introduction

First described by Gorovoy et al., infectious crystalline keratopathy is a rare, chronic and indolent pathology in which a characteristic plaque-shape interlamellar arboriform and crystalline bacterial stromal infiltrate is observed in absence of an apparent inflammation in cornea or anterior chamber.2,3 We present three cases of infectious crystalline keratopathy in patients with different risk factors, where a pharmacological treatment led to the disappearance of the symptoms.

Case 1

A 46-year-old woman with two previous penetrating keratoplasties in her left eye due to an anterior chamber phakic lens-corneal decompensation three years earlier, was referred for evaluation of disturbances and left ocular pain of one-week duration. Examination showed a best corrected visual acuity (BCVA) lower than 20/400, a failed corneal button, a central epithelial defect and the presence of an arboriform and crystalline central stromal infiltrate (Fig. 1). The patient was diagnosed of infectious crystalline keratopathy, and corneal scrape samples for microbiological cultures were taken. An empiric treatment with fortified ceftazidime and vancomycin drops together with fluorometholone drops was then established. Subsequent examinations revealed a slight improvement of the symptoms, and a clearer stromal infiltrate was observed. Microbiological laboratory reported a positive culture for Staphylococcus aureus, Staphylococcus warneri and Streptococcus oralis, and the antibiotic treatment was modified to tobramycin and fortified vancomycin drops according sensibility study. Tobramycin was later...

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changed by moxifloxacin due to new ocular surface disturbances. Seven weeks after the first visit, the epithelial defect resolved, and the stromal infiltrate appeared much clearer. As the crystalline keratopathy image disappeared, the patient was managed with a tapering dosage of fluorometholone together with artificial tears until the complete resolution of the process.

Case 2

A 46-year-old woman with chronic alcoholism was referred for evaluation of pain and redness in her right eye of two-week duration. Examination showed a BCVA lower than 20/400, meibomian gland dysfunction, intense ciliary hyperaemia, limbal insufficiency, an infiltrated and abscessed central corneal ulcer, folds in Descemet membrane, 4/10 hypopyon and small hyphema. The patient was diagnosed of corneal abscess, and corneal scrape samples for microbiological cultures were taken. An empiric treatment with fortified ceftazidime and vancomycin drops together with atropine, erythromycin cream and oral moxifloxacin was then established. After the addition of dexamethasone drops, subsequent examinations showed a progressive disappearance of the hypopyon, hyphema and corneal abscess. Then, an arboriform and crystalline stromal infiltrate typical of infectious crystalline keratopathy was observed at the edges of the ulcer, which appeared less infiltrated (Fig. 2). Despite negative culture results reported by microbiological laboratory, the treatment led to a gradual decrease of the stromal infiltrates two months after the first visit. A neurotrophic corneal ulcer remained as a sequel (Fig. 3), which required a therapeutic contact lens for the control of the symptoms.

Case 3

A 70-year-old woman with bullous keratopathy after cataract surgery in her right eye 10 months earlier was referred for evaluation of pain and decrease in her visual acuity of one-week duration. Examination showed a BCVA lower than 20/800, conjunctival hyperaemia, corneal bullae with oedema, and a whitish arboriform stromal infiltrate, in absence of inflammation in anterior chamber (Fig. 4). The
patient was diagnosed of infectious crystalline keratopathy, and corneal scrape samples for microbiological cultures were taken. An empiric treatment with fortified vancomycin, moxifloxacin, and dexamethasone drops was then established. Microbiological laboratory reported a positive culture for Bacillus spp. sensitive to the antibiotics prescribed. Three months after the first visit, examination revealed a good evolution of the process, with the disappearance of the disturbances and the characteristic arboriform infiltrates (Fig. 5).

Discussion

In addition to its appearance after a penetrating keratoplasty,3 other infectious crystalline keratopathy associated risk factors have been described, as are the topical steroids use, herpetic keratitis, neurotrophic keratopathy, topical anaesthesis abuse,3,4 or systemic conditions that lead to any grade of immunosuppression.1 In our cases, the use of topical steroids after the keratoplasties or in the bullous keratopathy, the existence of a chronic alcoholism associated with a neurotrophic ulcer, or the bullous keratopathy itself, would justify the appearance of the infectious crystalline keratopathy, as all these situations could compromise the local immune response.

Many microorganisms that cause crystalline keratopathy have been reported,2–4 although viridans-type streptococci are the most frequently isolated.3,4,9 The identification of Bacillus spp. in our third case constitutes one of the few isolations of this agent found in the literature as causative of the process.5,10 However, no responsible agent can be sometimes isolated from microbiological cultures, as occurred in our second case. On the other hand, a poor clinical response to pharmacological treatment has been in general described. These facts could be due both to the stromal location of the microorganisms and to the presence of some unusual bacterial factors that play a role in the pathogenesis,7 as can be the formation of a protective biofilm.2,5 This biofilm would require the application of prolonged antibiotic therapies or even the realization of a keratoplasty for the resolution of some cases.

As conclusion, infectious crystalline keratopathy is a pathology that requires a correct clinical and laboratorial diagnosis since a constant and prolonged therapeutic effort must be applied. The objectives of the treatment are both the control of the local symptoms and the improvement of the general status of the patients according their risk factors. However, this cannot guarantee the disappearance of the symptoms or the avoidance of other more aggressive surgical management, despite the observed in our three cases.

Conflict of interest

The authors declared that there is no conflict of interest.

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