



Case Report

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An atypical presentation of *Streptococcus pyogenes* keratitis

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ABSTRACT

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The purpose of this report is to present a case of multiple peripheral keratitis associated with chronic dacryocystitis and to discuss its management. A 58-year-old woman with redness, pain, and decrease of vision in her right eye that remained refractory to medical therapy with antibiotics and cycloplegics was referred to our clinic. The patient had history of chronic dacryocystitis for two years. Ocular examination revealed conjunctival injection, diffuse corneal edema and multiple peripheral corneal infiltrates two of which were associated with corneal thinning. *Streptococcus pyogenes* was isolated from the corneal and conjunctival cultures. Since there was no any clinical improvement and corneal thinning continued despite medical treatment, external dacryocystorhinotomy (DCR) and amniotic membrane transplantation (AMT) were performed at the same session. After surgery, the patient responded well to medical treatment, symptoms relieved and corneal findings improved. *Streptococcus pyogenes* can cause multiple peripheral keratitis with corneal thinning in the patient with chronic dacryocystitis. The surgical treatment for dacryocystitis may be necessary for management of the keratitis.

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1. Introduction

Streptococcus pyogenes is a gram-positive group-A streptococcus within the group of β -hemolytic streptococci. It induces the disease by three mechanisms: Suppuration, as in pharyngitis; toxin elaboration, as in streptococcal toxic shock syndrome; or immune-mediated inflammation, as in acute rheumatic fever or post-streptococcal uveitis (Nizet and Arnold, 2008). It also can cause marginal keratitis with direct infection (Kim and Ostler, 1977) or hypersensitivity reaction (Cohn et al., 1979). We present a case with multiple peripheral keratitis associated with

chronic dacryocystitis that was culture positive for *Streptococcus pyogenes* and its surgical management.

2. Case

A 58-year-old woman with redness, pain, and decrease of vision in her right eye was examined in Ondokuz Mayıs University ophthalmology department. She had admitted to another hospital with same symptoms 15 days before. Topical moxifloxacin and syclopentolate were initiated at that time. Because the patient's signs and symptoms worsened despite this treatment the ophthalmologist referred her to a tertiary clinic. The

patient had past ocular history of chronic dacryocystitis in her right eye for 2 years.

On presentation, the visual acuity was 4/10 Snellen lines in her right eye and 10/10 in her left eye. Slit lamp examination was significant for conjunctival injection, diffuse corneal edema, and multiple peripheral circumferential corneal infiltrates on the right. There was a clear corneal zone between the infiltrates and the limbus. Two of these infiltrates were associated with corneal thinning (Fig. 1a, 1b). Purulent material came out through the punctum by digital pressure over the lacrimal sac.



Fig. 1. Streptococcal marginal keratitis. a, Conjunctival injection, mild corneal edema and multiple peripheral corneal infiltrates separated from the limbus by a clear corneal rim. b, Corneal thinning at the corneal periphery. c, Appearance on postoperative day 1. Amniotic membrane on the inferior cornea. d, e, Appearance on postoperative 1st month. The cornea healed with residual leucoma.

Corneal scrapings and conjunctival swabs were collected for the cultures. Nasolacrimal irrigation confirmed the diagnosis of chronic dacryocystitis. Vancomycin (50 mg/mL) and ceftazidime eye drops (50 mg/mL) were initiated topically every hour and cyclopentolate hydrochloride three times a day. Nasolacrimal irrigation with sefazoline was performed twice a day. The following day fluorometholone 0.1% eye drops was added to her therapy with the thought that the keratitis could be caused by bacterial exotoxins. *Streptococcus pyogenes* was isolated from both the corneal and conjunctival cultures. It was susceptible to vancomycin according to the antibiogram. Despite this suitable therapy, there was no improvement at slit lamp examination on day 5. Corneal thinning also progressed. Fluorometholone was discontinued and topical cyclosporine was initiated as an anti-inflammatory agent. Chronic dacryocystitis may have prevented the healing process so external dacryocystorhinostomy (DCR) was performed. Because the corneal thinning at 5 o'clock and 8 o'clock positions was still present, amniotic membrane was sutured on inferior hemi field

of cornea in the same session with DCR (Fig. 1c).

The same topical treatment and nasolacrimal irrigation with antibiotics were continued after surgery. Because her symptoms improved the patient was discharged on postoperative day 3 and called for follow-up. The next visit was on postoperative day 10. The amniotic membrane was still on its place. Nasolacrimal passage was patent. The patient did not have any complaints. Antibiotic therapy was continued for two more weeks. Corneal thinning healed with a residual leucoma at the periphery and patient's vision increased to 10/10 on postoperative first month (Fig. 1d, 1e).

3. Discussion

Streptococcus pyogenes can cause ophthalmic pathologies such as dacryocystitis (Chaudhary et al., 2010), post-streptococcal uveitis (Leiba et al., 1998) or corneal ulcers (Millender et al., 2012). There are two reports in the literature mentioned about streptococcal marginal ulcers. Both of them were associated with chronic dacryocystitis and conjunctivitis caused by *Streptococcus pyogenes* in a similar way with our case (Kim and Ostler, 1977, Cohn et al., 1979). Kim and Ostler (1997), suggested that the keratitis was because of direct infection with bacteria but, Cohn et al., (1979) thought that a hypersensitivity or toxic response to streptococcal superantigens may have been the major cause of these marginal problems such in staphylococcal marginal keratitis. The mechanism underlying the development of staphylococcal marginal keratitis is thought as a result of a reaction against staphylococcal superantigens. The lesions are sterile and steroid responsive (Kanski, 2007). Besides *Staphylococcus aureus*, *Streptococcus pyogenes* can produce superantigens. So, it is possible that *streptococcus pyogenes* can be the cause of these lesions like in staphylococcal marginal keratitis.

Since this case presented to us like a staphylococcal marginal keratitis, we started the treatment with antibiotic and steroid. After a few days, culture results revealed *Streptococcus pyogenes* in both corneal and conjunctival samples. *Streptococcus pyogenes* is not a common cause of chronic dacryocystitis. It was accounting for 3.77% of culture positive chronic dacryocystitis according to another study (Chaudary et al., 2010). The chronic dacryocystitis may induce abnormal bacterial colonization in the eye. Despite the suitable antibiotics according to the antibiogram and steroid were used, this abnormal bacterial colonization may have prevented the healing of the corneal ulcers. The corneal healing after surgical treatment corroborated this assertion. In addition, AMT surgery may have helped the process by preventing the contact between cornea and bacterial exotoxins and by facilitating the wound healing.

Streptococcus pyogenes is not a common cause of either chronic dacryocystitis or marginal keratitis. The abnormal bacterial colonization may trigger keratitis by causing direct infection or toxic reaction. In case

of medication resistant peripheral keratitis, surgical treatment may be necessary for treatment of both keratitis and chronic dacryocystitis.

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