

Case Report

Necrotizing *Streptococcus pyogenes* Infiltrating Conjunctiva and Tenon's Capsule: A Case Report

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Keywords

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Abstract

We report a case of a patient with necrotizing infection of the conjunctiva and Tenon's capsule caused by *Streptococcus pyogenes*, a rare and atypical ophthalmologic condition. A 50-years-old male patient with acute red-eye, purulent discharge, and pain diagnosed with post-septal cellulitis presented with a yellowish and dense membrane covering the ocular surface with necrotic Tenon's capsule. Patient was hospitalized, and intravenous antibiotics were initiated (ceftriaxone and clindamycin). Topical antibiotics and corticosteroids were also administered, and the infection was eradicated in 2 weeks. Ancillary exams excluded rheumatologic involvement. Conjunctival culture confirmed *Streptococcus pyogenes* growth. Tenon's biopsy revealed unspecific acute inflammatory necrosis. This is an uncommon condition in daily ophthalmological clinic. Literature review reported 3 cases associated with previous ocular surgery.

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Introduction

Conjunctiva and eyelids are natural reservoirs of bacteria and occasionally fungi from the external environment. These agents do not normally cause infectious diseases. Gram-positive bacteria are the main component of the normal ocular bacterial flora. The most prevalent pathogens are *Streptococcus pneumoniae*, *Haemophilus influenzae*, and *Staphylococcus aureus* [1]. Although those are part of the natural flora, in certain conditions they can grow and predominate among other bacteria causing ophthalmologic diseases like conjunctivitis and

keratitis. Even though corneal ulcers are commonly seen among bacterial keratitis, necrosis of the conjunctiva leading to infection of Tenon's capsule and the sclera is rare.

Streptococcus pyogenes is a beta-hemolytic gram-positive bacterium that can cause several human diseases, such as pharyngotonsillitis, impetigo, cellulitis, scarlet fever, toxic shock syndrome, and necrotizing fasciitis. It is also related to autoimmune-mediated complications such as glomerulonephritis, rheumatic fever, and Sydenham's chorea. However, necrotizing involvement of conjunctiva and Tenon's capsule is not a common presentation among this vast clinical spectrum. This case report describes a male patient with unilateral *Streptococcus pyogenes* necrotizing conjunctivitis and adjacent Tenon's capsule.

Case Report/Case Presentation

A 50-years-old male patient presented to the emergency room complaining of itching, red-eye, and tearing of both eyes. His past medical history was positive for asthma. Past ophthalmologic history was unremarkable. Visual acuity was 20/20 in both eyes. Anterior segment biomicroscopy revealed bilateral mild hyperemia and follicular reaction in the inferior conjunctival fornix. At his first visit, he presented conjunctival pseudomembrane in his right eye, and the diagnosis of a presumable viral conjunctivitis was assumed based on clinical findings. We prescribed preservative-free lubricant eye drops and advised the patient about the contagious risk associated.

Patient returned 1 week later complaining of worsening symptoms in his right eye. He presented with painful swelling of the superior and inferior eyelids, yellowish mucopurulent discharge, and decrease of vision in this eye. Visual acuity decreased to hand motion in the right eye and remained 20/20 in the left eye. The slit-lamp exam was impaired in the right eye due to the lids swallow. We noticed mucopurulent discharge, diffuse hyperemia with conjunctival necrosis, and a dense yellowish membrane covering the anterior surface (Fig. 1a). Visualization of the cornea and the anterior segment were compromised. The left eye showed a mild follicular reaction, but cornea, lens, and the anterior chamber were normal.

Conjunctival scraps of the mucopurulent discharge and the conjunctival lesions were performed. Bacterioscopy showed gram-positive cocos. Microbiology revealed *Streptococcus pyogenes* growth which was responsive to most of the antibiotics tested.

We performed a debridement of the necrotic conjunctival tissue. During the procedure, we noticed that there was a conjunctival ulcer with necrotic tissue affecting the Tenon's capsule, but preserving the sclera (Fig. 1b). Conjunctival and Tenon biopsy showed an



Fig. 1. **a** Slit-lamp photo of the right eye in the seventh day after initial diagnosis of viral conjunctivitis. Note dense yellowish membrane covering the ocular surface. **b** Slit-lamp photo of the right eye showing ulcerative and necrotic aspect of the conjunctiva and Tenon's capsule. **c** Slit-lamp photo of the right eye 14 days after initial treatment. Note significant improvement of the necrotic tissue.

exudative chronic conjunctivitis. Orbital computerized tomography images were suspicious of post-septal involvement. The patient was hospitalized and medicated with systemic antibiotics (ceftriaxone and clindamycin). Topical 0.5% moxifloxacin and 1% prednisolone acetate eye drops were prescribed right after systemic treatment was initiated.

Due to the possibility of an autoimmune disease as a differential diagnosis, we performed a rheumatologic workup, but all ancillary exams related were negative. Patient was also tested for infectious diseases including HIV, syphilis, cytomegalovirus, tuberculosis, and hepatitis, but all tests were negative.

Patient-reported significant improvement of his symptoms 4–5 days after antibiotic therapy was initiated. The visual acuity improved to 20/20 in the right eye. There was a mild conjunctival hyperemia with remarkable improvement of the ulceration (Fig. 1c). Clinical and functional recover was achieved after 2 weeks of treatment. Topical preservative-free artificial tears were maintained for 2 months.

Discussion/Conclusion

We found 3 case reports of severe eye infection caused by *Streptococcus pyogenes*. Two of them were associated with strabismus surgery and had conjunctival and Tenon's capsule necrotized. The other case report describes a patient systemically affected by *Streptococcus pyogenes* involving the conjunctiva [2–4].

Brennecke et al. [2] reported a case, in 1897, of a 3-years-old male patient with measles, sore throat, headache, slight coryza, and vomits. During the hospitalization, he developed a painful red-eye, swollen eyelids, and the presence of a heavy white membrane, with hazy cornea. This was initially considered as diphtheria conjunctivitis, but the postmortem exam showed only *Streptococcus pyogenes* not only in the conjunctiva but also in the anterior chamber, ciliary body, sclera, and optic nerve. The authors speculated that the primary infection was the throat itself with eye dissemination, affecting Tenon's capsule and conjunctiva [2].

Yau et al. [3] described a 23-months-old male patient who developed painful red-eye, swollen eyelids, and purulent discharge the first day after a strabismus surgery. Conjunctival culture was positive to *Streptococcus pyogenes*, and a debridement of nonviable conjunctiva and Tenon's capsule was performed. The child was hospitalized and received a 2-week course of intravenous antibiotics followed by 10-days oral trimethoprim/sulfamethoxazole and amoxicillin-clavulin with no sequelae after 6 months [3].

Chang et al. [4] described a necrotizing Tenon's capsule infection in a 11-years-old boy. He underwent a bilateral medial rectus muscle recession. Necrotic tissue underneath the conjunctiva and Tenon's capsule were observed and conjunctival scrapings and culture were performed with *Streptococcus pyogenes* growth. The patient was medicated with oral ciprofloxacin and clindamycin [4]. As far as we are aware, this might be the first description of Tenon's capsule infection and necrosis due to *Streptococcus pyogenes* without any previous surgical procedure or trauma.

Although *Streptococcus pyogenes* are part of the normal ocular flora, they can sometimes cause infection to the ocular surface, especially in the cornea. But ulceration of the conjunctiva and the underneath Tenon's capsule is not common. In cases like this, differential diagnosis with immune-related diseases and systemic infections might be necessary. In addition, identification of the pathogen is mandatory for the correct choice of treatment and a fast recovery. Scraping of the lesion for bacterioscopy and culture is indicated whenever available. Likewise, considering the severity of the case, although topical eye drops are the first choice of treatment for corneal ulcers, lesions that affect episclera and sclera often require adjuvant treatment

with systemic antibiotics, and therefore, it is important to consider maintaining the patient admitted to the hospital [5]. The patient had a pseudomembrane removed a few days prior to the necrosis of the conjunctiva, and this might have been the entrance of the bacteria to the swollen conjunctiva ending up with the infection affecting adjacent conjunctival stroma and Tenon's capsule. Surgical debridement was helpful to remove the necrotic tissue accelerating conjunctival healing and allowed determining the extension on the infection.

Statement of Ethics

Research was conducted ethically in accordance with the World Medical Association Declaration of Helsinki. Written consent to publish this case has been obtained from the patient. This report does not contain any personal identification.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

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Author Contributions

Dalton de Freitas Santoro: research design, data acquisition and/or research execution, and manuscript preparation. Murilo Ubukata Polizelli: research design, data acquisition and/or research execution, and manuscript preparation. Paulo Alberto Cervi Rosa: research design, data acquisition and/or research execution, and manuscript preparation. Denise de Freitas: research design, data acquisition and/or research execution, and manuscript preparation. Luciene Barbosa de Sousa: research design, data acquisition and/or research execution, and manuscript preparation. Lauro Augusto de Oliveira: research design, data acquisition and/or research execution, and manuscript preparation.

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