

## Case Report

# A case of mycotic keratitis due to *Fusarium* sp. with an undesirable outcome

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## Abstract

Fungal keratitis, an infective disease of the cornea, represents a serious diagnostic and therapeutic problem that, if not recognized on time, could lead to irreversible eye damage. Herein we report a case of fungal keratitis due to *Fusarium* spp. infection. The 60-year-old man was admitted to our clinic due to an atraumatic acute onset of the disease, with a decrease in the visual acuity, photophobia, redness, and severe pain in the right eye. Clinical observation revealed an ulcer that affected 1/3 of the cornea and a hypopyon in the anterior chamber. After the first results of microbiological analyzes, local and systemic antifungal therapy was applied. Due to the fact that the patient voluntarily left the treatment, there was a drastic worsening of the local findings as a full thickness total corneal infiltrate with more intense anterior chamber reaction. Finally, evisceration was performed. Given the fact that fungal keratitis is more prevalent in developing countries, official protocols and available effective antifungals are crucial for adequate treatment and a favorable outcome of this infection.

**Key words:** *Fusarium* spp.; keratitis; treatment; antifungal; evisceration.

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## Introduction

Fungal keratitis is a serious eye disease that if unrecognized in time, can lead to corneal ulcer, corneal abscess, in extreme cases, corneal perforation that could cause consequent evisceration and irreversible blindness [1,2].

*Fusarium* spp. and *Aspergillus* spp. are predominant causative agents of fungal keratitis [3,4]. *Fusarium* keratitis (FK) is mostly prevalent in tropical and subtropical areas, with eye trauma followed by contamination of the corneal lesion as the dominant risk factors [5]. On the other hand, in urban areas the use of contact lenses is the most common risk factor that predisposes occurrence of FK.

The most important clinical signs suggestive of this condition are rugged corneal infiltrates with uneven fluffy edges that can transmit above its surface, satellite lesions, endothelial plaques, hypopyon, and conjunctival hyperemia [6].

Complications, such as corneal perforation, endophthalmitis, and visual loss, could be prevented only by prompt diagnostic analyses, using molecular

methods [7] or the new techniques like in vivo confocal microscopy, tomographic imaging method with labeled caspofungin, two-photon microscopy using moxifloxacin marked with fluorescent dyes. The aforementioned methods are promising, rapid, and non-invasive diagnostic procedures in diagnosis of FK, but these procedures are not routinely performed in clinical practice and are not yet available to most clinics [7]. Given the severity of FK which can result in severe eye damage and blindness with all enumerated diagnostic and therapy problems, herein we described one case of FK that progressed to corneal abscess with hypopyon and required evisceration at the end.

## Case history

The 60-year-old man of Roma ethnicity, was administered in Ophthalmology Clinic, University Clinical Center, Niš, Serbia, due to atraumatic acute onset of decrease in visual acuity, photophobia, redness, and severe pain in the right eye. Patient was otherwise healthy and had no obvious risk factors for keratitis. Patient refused the proposed hospitalization which led

to rapid worsening of the symptoms and progression of the ulcer over the next few days. Clinical observation fortified an ulcer that affected 1/3 of the cornea and a hypopyon in the anterior chamber. A large oval-shaped epithelial defect overlying the inferior temporal corneal quadrant with grey/white subepithelial feathery infiltrates was noted. Conjunctival injection, dilated iris vessels, and a mild anterior chamber reaction with a small hypopyon were observed. At that time the right eye visual acuity was 1/60. His left eye had normal visual acuity of 1,0 according to Snellen.

The corneal scraping was done and material was sent for microbiological examinations that were performed using standard methodology. After 5 days, filamentous colonies were formed on media incubated on 26 °C (Figure 1). Microscopic examination of these colonies demonstrated characteristic sporulation which indicated *Fusarium* species (septate hyphae with formation of numerous hyaline, multiseptated, fusiform to sickle shaped macroconidia) (Figure 2). This finding was confirmed in the second mycological analyses of corneal scraping.

While waiting for the results of microbiological testing, the treatment was started with fortified antimicrobial regime. However, the patient's condition worsened in terms of occurrence of ocular pain, visual acuity with light perception, expanding epithelial defect with increased stromal infiltrates, worsening of the anterior chamber reaction and purulent discharge during antibacterial treatment. After the first results of mycological analyses, the local and systemic antifungal

therapy, fluconazole, the only available drug in our hospital was administrated. Unfortunately, patient left the hospital treatment at his own request and after a few days, he was re-admitted to the hospital, 40 days after the first hospitalization.

On slit-lamp examination, the lids were edematous, conjunctiva was congested, and cornea showed a full thickness total corneal infiltrate with hypopyon in anterior chamber. The intraocular details of the eye could not be observed because of the hazy cornea (Figure 3). Therefore, B scan ultrasonography of the posterior segment of the eye was performed to define any intraocular extension of the infection. The test was unremarkable with no echos seen in the vitreous cavity of the eye, indicating no involvement of the vitreous or retina, only anterior segment was involved. The evisceration was finally performed when whole cornea and intrabulbar contents was sent to histopathological analyses. Hematoxylin eosin (H&E) stained slides

**Figure 1.** Growth of *Fusarium* sp. on Sabouraud dextrose agar.



**Figure 2.** Chlor-lactophenol-wet preparation microscopy showing characteristic fusiform to sickle shaped macroconidia of *Fusarium* sp. (x250).



**Figure 3.** Slit-lamp photograph of the right eye with edematous lids, congested conjunctiva, a full thickness total corneal infiltrate with hypopyon and purulent discharge.

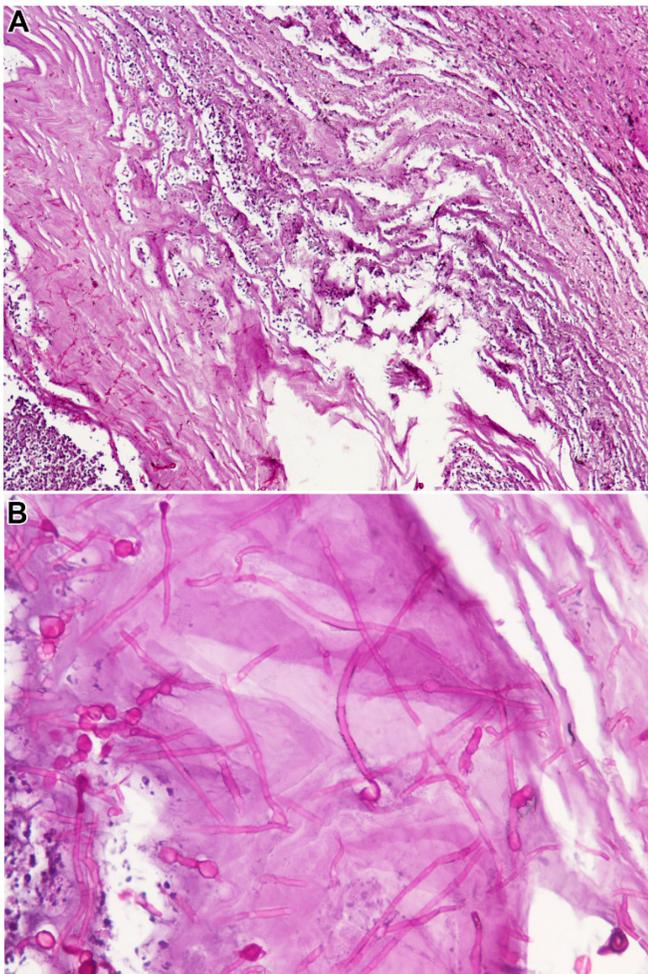


revealed inflammatory damage and ulceration of corneal epithelium associated with extensive necrotic debris. Histochemical periodic acid shift-PAS-staining indicated the presence of fungal structures on the surface comprised of pseudo-hyphae and conidia (Figure 4). Following the evisceration, the patient recovered well and was discharged home 3 days post-procedure with no further sequelae. Locally, the inflammation of the conjunctiva decreased, the conjunctival sac was formed and the wound healed well.

## Discussion

Fungal keratitis, one of important causes of blindness, is the most challenging type of infectious keratitis for an ophthalmologist to diagnose and treat [8]. In most cases, FK diagnosis is very difficult due to

**Figure 4.** Micromorphology of *Fusarium* keratitis. A – PAS stain revealed inflammatory and necrobiotic destruction of cornea with fungal elements (PASx200); B – PAS stain visualization of pseudo-hyphae and conidia (PASx400).



non-specific symptoms at the beginning of the infection [3].

Risk factors for the development of fungal keratitis are eye trauma, followed by contamination of the corneal lesion with soil or plant parts [5], topical application of corticosteroids, administration of systemic immunosuppressants, contact lens wearing [9], fungal skin diseases, occlusion of the lacrimal duct, and eye surgery amongst others [7]. However, some of the patients may not report any of the aforementioned possible risk factors, as was the case with the patient described in this paper.

Clinical examination alone is not sufficient for diagnosis and microbiological tests are mandatory to make a final diagnosis before starting a treatment. Corneal scraping is sampled for microbiological analysis and these conventional methods are characterized by high specificity. However, invasive sampling, a small amount of sampled material which can affect the sensitivity of the methods, as well as a long cultivation procedure (one week to one month), are the major disadvantages of this standard procedure [7]. Using the conventional mycological analyses, we got the first growth of mold, which was able to determine the presence of *Fusarium* sp., after 5 days.

Fungal keratitis is usually misdiagnosed as bacterial keratitis and accordingly, the treatment of our patient began with antibacterial drugs. Moreover, unsatisfactory communication with a distrustful patient who refused hospitalization at the onset of infection significantly affected the delay with diagnosis and adequate treatment.

Treatment of fungal keratitis remains partially problematic due to the main limitations of antifungal agents such as poor bioavailability and limited eye penetration [10]. Available literature could not provide to us a unique protocol or single treatments for FK. As the most effective, combination of systemic, topical, and intraocular (intracameral, intrastromal, and intravitreal) administration of amphotericin B, voriconazole or natamycin, is recommended [11]. In this case, we had only one antifungal drug available, all other drugs required the approval of special commissions. Described case was the first diagnosed FK in our institution, so we did not have established treatment protocols and experience, but with the first laboratory evidence of FK we started to consider antimycotic treatment and administered the only available drug. Unfortunately, our patient was totally unaware of the severity of his illness and the lack of conducting proper treatment resulted in an unfavorable outcome i.e., the loss of the eye.

Given the fact that keratomycosis is more prevalent in the developing countries, official protocols and availability of effective antifungals along with patient participation are crucial for adequate treatment and remediation of this infection.

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