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Severe fusarium oxysporum keratomycosis: About 2 Cases

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Abstract

Fungal keratitis is a destructive ocular infection, representing a serious diagnostic and therapeutic problem, difficult to treat and with poor results. It can cause irreversible damage.

Keratomycoses are rare and may be under-diagnosed. Direct microscopic examination and culture are essential for early specific diagnosis and must be taken into consideration to establish the most effective treatment and avoid serious complications. The pathogenesis of this infection is based on three factors: colonization, tissue damage and immunosuppression.

We report 2 cases of *Fusarium oxysporum* keratomycosis treated with amphotericin B. The diagnosis of corneal abscess was made after ophthalmological examination in 2 adult males with no previous ophthalmological history, referred to the Omar Drissi hospital in Fez for decreased visual acuity, photophobia, redness and intense pain in the right/left eye.

Corneal scrapings were taken for microbiological analysis, and after initial mycological results, local and systemic antifungal treatment was initiated with amphotericin B and natamycin eye drops. The evolution was marked by a corneal perforation with a tenon patch graft for the first patient, and healing for the 2nd

Keywords: Keratitis; Fusarium; Oxysporum; Amphotericin B

1 Introduction

Fungal keratitis, or keratomycosis, is a serious invasive disease of the corneal stroma caused by the presence of certain opportunistic fungal pathogens. It is difficult to treat and can be life-threatening [1, 7].

They are more common in hot, humid countries, where they can account for 17% to 47% of all keratitis [9], and their incidence varies from country to country, representing around 42% of all corneal ulcers in developing countries [3, 4].

Currently, the most common infections associated with these fungi are caused by several species of the *Fusarium* genus [5], more specifically *Fusarium solani,* which is currently the most dangerous strain due to its virulence and ability to develop resistance to many antifungal drugs [2, 6].

Fusarium fungal keratitis is a common disease in the inter- and subtropics [8].

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In addition to the commensal bacterial flora, the cornea and conjunctiva of a healthy person can host a fungal flora whose composition depends on the individual's climate and environment [1].

Various types of environmental fungi, which are not part of this normal fungal flora, can affect the eye during surgery or foreign body trauma, as well as through the increasing use of contact lenses, overuse of corticosteroid-based eye drops or corneal dystrophy [1].

2 Observation 1

A 41-year-old man, with no notable pathological antecedents, a welder by profession, was admitted to the ophthalmological emergency department 10 days prior to an ocular trauma sustained in the course of his work. He presented with reduced visual acuity in the left eye, intense pain and ocular redness.

Ophthalmological examination revealed the presence of a whitish corneal abscess measuring 7 mm by 3 mm paraxial Temporal inferior épithélio stromal very sunken roughly oval ill-limited with significant peri-lesional edema, the anterior chamber showed an inflammatory reaction graded 3++ with whitish tyndall without hypopyon, Examination of the right eye was unremarkable(Figure 1).

The diagnosis of corneal abscess was accepted, and a swab of the abscess was taken for possible microbiological study (mycological +bacteriological-virological) in search of the infectious agent responsible: the bacteriological and virological investigations were negative, while the mycological study was positive.

The swab received was suspended in a few drops of physiological water, then vortexed, and used for mycological study (direct examination + culture).

Fresh direct examination was positive, showing numerous large, irregular, septate mycelial filaments, then culture was performed on Sabouraud-Chloramphenicol (SC), Sabouraud-Chloramphenicol-Actidione (SA) medium incubated at 37c° and on Sabouraud-chloramphenicol (SC) at 27c°. 4 days later, small colonies appeared on the surface of the agar, initially whitish on the front and orange-yellow on the reverse, which then became larger, with a cottony appearance and the appearance of a pink to purple pigment with a dark reverse.

A mounting in lactophenol blue between slide and coverslip showed the presence of numerous oblong, unicellular microconidia arranged in false heads on short phialides, fairly abundant curved macroconidia with three to five logettes, and round terminal or intercalary chlamydospores characteristic of *F. oxysporum*(Figure1).

Once the diagnosis of *F. oxysporum* fungal keratitis had been established, amphotericin B-based treatment was initiated; the clinical course was marked by persistent inflammatory signs and the appearance of mucopurulent secretions and a hypopyon occupying 1/3 of the anterior chamber. An ocular ultrasound examination revealed a staphylomatous globe, the presence of fine IV echoes without cavities, papillary excavation with corneal perforation, leading to a tenon patch graft,

3 Observation 2

A 53-year-old man with no previous ophthalmological history was referred to the ophthalmology department for a 10-day history of red, painful left eye, for which he consulted a private ophthalmologist who prescribed antiviral treatment with local corticosteroids, leading to a worsening of his symptoms.

On admission, visual acuity in the affected eye was limited to light perception. Local examination of the cornea revealed an abscess with an inferior para-axial infiltrate, covering the optic axis, epithelial-stromal, 3.5x2mm in large vertical diameter, with poorly limited margins, with an ulcer taking up the central fluo 1.7mm x 0.8mm in diameter, and in the anterior chamber a strong inflammatory reaction with a hypopyon blade 1.4mm high, the diagnosis of corneal abscess was confirmed. Corneal samples were taken. These were then subjected to a microbiological study.

Fresh direct examination was positive, showing numerous septate, broad and irregular mycelial filaments. Mycological study was positive, showing culture on Sabouraud-Chloramphenicol (SC), Sabouraud-Chloramphenicol-Actidione (SA) incubated at 37°C and Sabouraud-chloramphenicol (SC) incubated at 27°C, fluffy to flaky colonies, white at first, then turning pinkish to purple, the reverse side dark, microscopic examination with lactophenol blue showed the presence

of short microconidiophores with numerous phialides. Microconidia were rather narrow, with thin walls, characteristic of *F. oxysporum*.

Once the diagnosis of fungal keratitis had been made, treatment with amphotericin B was instituted. The evolution was favorable, with healing of the abscess and a visual acuity of 6/10.

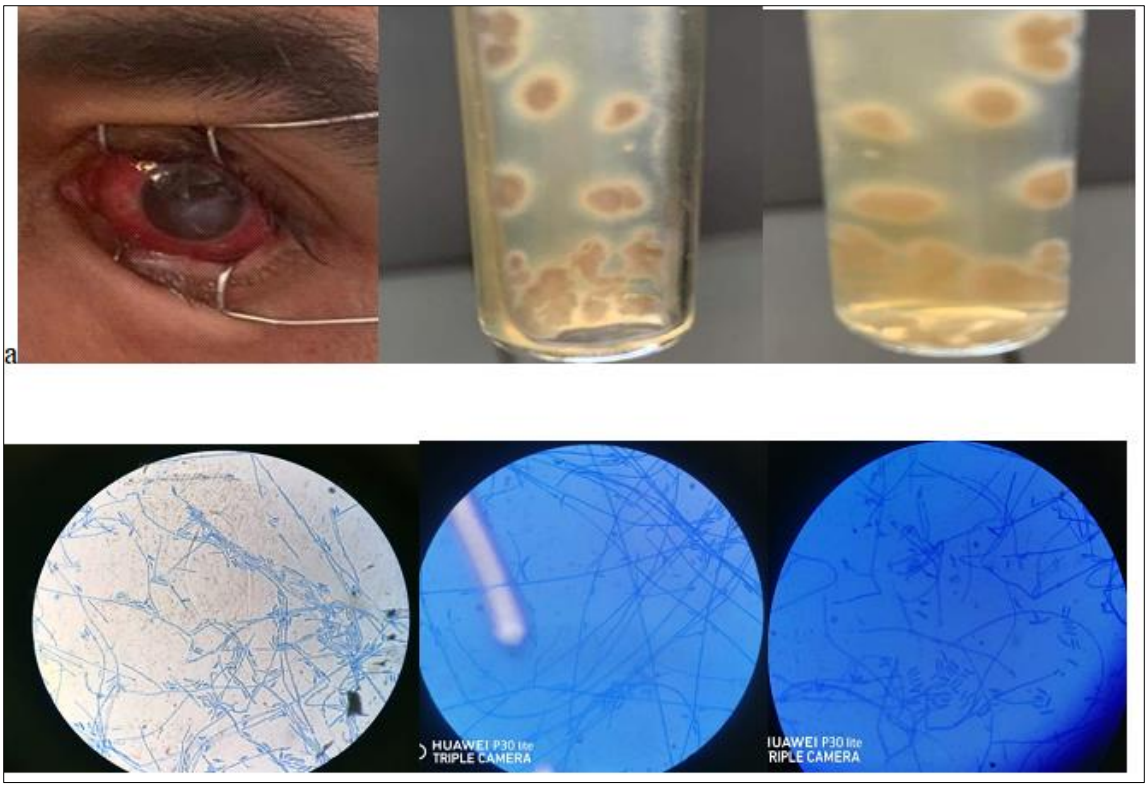

Figure 1 Morphological description of *Fusarium oxysporum* (A) Corneal abscess on admission (B) Macroscopic appearance of colonies (C) Microscopic observation showing numerous microconidia associated with macroconidia (40).

4 Discussion

Keratomycosis is one of the main causes of infectious keratitis, a condition that is widespread worldwide. It can progressively impair vision and potentially spread to other parts of the body [10]. It can result from infection by various types of fungi, including yeasts such as Candida albicans, as well as filamentous fungi such as *Fusarium, Aspergillus, Scedosporium, Paecilomyces, Acremonium and Curvularia*. Other genera of fungi have also been identified as responsible for this condition [13]. In general, infections caused by *Fusarium* are the most common, and several species of *Fusarium* have been reported, including *F. solani, F. dimerum, F. oxysporum, F. sacchari, F. verticilloïdes and F. polyphialidicum*[16]. Of these, the species most frequently implicated are *F. solani and F. oxysporum*[11, 12].

Fusarium species are widespread worldwide in a wide variety of habitats such as soil, plant debris, and as pathogens on a wide variety of host plants [15].

The most commonly identified risk factors include plant or soil corneal trauma [14], eye injuries involving contaminated organic materials, eye surgery, use of contaminated contact lenses, and pre-existing eye problems, In the cases presented, one of the patients developed a corneal infection with no obvious history of trauma or comorbidité, while the 2nd reported trauma, which could explain the transfer of the etiological agent to the cornea.

The visual prognosis depends largely on rapid diagnosis and treatment, and in cases of suspected ocular infection, it is crucial to take biological samples, in particular to test for the presence of fungal agents, among other elements.

The treatment of *Fusarium* fungal keratitis remains partly problematic due to the limited and variable sensitivity of antifungal agents, their poor penetration of the cornea and the severity of the infection, which can lead to corneal perforation and even endophthalmitis.

Numerous therapeutic regimens involving the use of several molecules have been suggested, but their efficacy remains rather limited, and no specific protocol has demonstrated superiority over another in a randomized controlled trial with adequate statistical power. Amphotericin B eye drops at 0.15 or 0.25% (1.5 to 2.5 mg/ml) represent the best compromise between efficacy and toxicity [3].

A study published by Ndoye et al (2006) proposed the use of povidone-iodine eye drops as an alternative [10]. In this case, despite the addition of povidone-iodine, the ulceration had not yielded.

In our 2 cases, we used an intra-stromal antifungal based on amphotericin B to treat both patients. In the 2nd patient, signs and symptoms improved, with healing of the corneal abscess and improvement of visual acuity to 6/10. The first patient, on the other hand, experienced a different course, characterized by corneal perforation, ultimately necessitating corneal grafting using a tenon patch.

M. Er-Rami and H. Souhail, in2011 reported a case of severe *Fusarium* solani fungal keratitis in a young man in the Sahara region of Morocco, where the climate is arid. Treated by amphotericin B in the form of 0.1% eye drops, he subsequently benefited from enucleation due to the extension of lesions caused by this fungal infection [17].

A study published by K. Diongue a and A.S. Sow b in 2015 had proposed as treatment povidone-iodine eye drops and fluconazole per os, The results showed a favorable evolution of the patient, with healing of the abscess and visual acuity assessed at VLDB (1/200th) [19].

In 2022, Marija Trenkic and Gordana Stanković Babić documented a case of fungal keratitis caused by Fusarium spp. infection in a 60-year-old man. The patient was initially treated withfluconazole, but the course was marked by a significant worsening of his keratitis, manifesting as a full-thickness total corneal infiltrate and a more intense reaction of the anterior chamber of eye l. Ultimately, the patient had to undergo evisceration to manage the situation [18]

5 Conclusion

Fusairum keratomycosis is one of the clinical conditions responsible for ocular morbidity and blindness. Given the late diagnosis, the prognosis is often poor.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study

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