



Case report

A case of fungal keratitis due to *Fusarium solani* after an indigenous healing practice

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ABSTRACT

Fusarium keratomycosis is a destructive eye infection that is difficult to treat and produces a poor outcome, which can affect healthy patients. Keratomycoses are rare and can be underdiagnosed, thus, direct microscopic examination and culture are essential for an early specific diagnosis and must be taken into consideration to establish the most effective treatment and avoid severe complications. Herein, we present a case of a healthy patient, who was diagnosed with *Fusarium solani* keratitis. He developed a corneal infection without an obvious history of trauma, and any comorbidity but with a history of contact with juice of herbs during an indigenous healing practice, which was the most likely cause for the development of the fungal infection. He was treated with intrastromal voriconazole and systemic itraconazole, with a good clinical course, however with sequelae of decreased visual acuity.

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Introduction

Corneal infections have a profound impact on the visual quality of the global population, being today an important cause of blindness. Fungal keratitis represents one of the most severe forms of corneal infections due to its difficult diagnosis and treatment [1]. Keratomycosis is defined as an invasive infection of the corneal stroma caused by the presence of certain opportunistic pathogenic fungi. It is considered an infrequent condition, although a slight increase in its prevalence has been described [2]. Its incidence by countries is variable, representing around 35% in South Florida (USA) and has been reported up to 42% of total corneal ulcers in developing countries [3,4]. Currently, the most common fungi involved in these infections are several species of the genus *Fusarium* [5], mostly *Fusarium solani* which is the most virulent, associated with the ability to generate resistance to many antifungals [2,6]. *Fusarium* keratomycosis is more common in tropical and subtropical areas, where the main risk factors are defects in the corneal epithelium caused by trauma, which often involves plant material. However, with the increasing use of contact lenses, *Fusarium* keratitis has also become a problem in urban areas with moderate climates [7]. An early and accurate

diagnosis will allow to implement an appropriate treatment in a timely manner and avoid serious complications such as keratocele, perforation, endophthalmitis and irreversible visual loss [8].

Case report

A 37-year-old male, born in Ecuador, resident in a rural area of Ecuador, indigenous (Saraguro), without any antecedents of significance, presented with complaints of foreign body sensation, redness and itching from the right eye for fifteen days. On asking details, he gave history of contact with juice of herbs that were rubbed on face and body during an indigenous healing practice. After that, patient started complaining of redness and itching from right eye and developed white patch on cornea that was progressed gradually and causing blurring of the vision of his right eye.

On local examination, the cornea was found to have an ulcer of approximately 5 mm in size, with a central leukoma on the visual axis of 60% of the total corneal surface, irregular in shape, with a whitish cottony appearance [Fig. 1]. Vision was impaired in the right eye. No abnormality was detected in left eye. Routine blood tests were normal. HIV and VDRL serologies were negative. Vital signs were normal. For microbiological analysis, scraping from the cornea was collected with aseptic precautions. He was diagnosed with a corneal ulcer and given intravenous ciprofloxacin and topical gentamicin eye drops. Considering the suspicion of keratomycosis, systemic antifungal was administered with itraconazole 200 mg daily.

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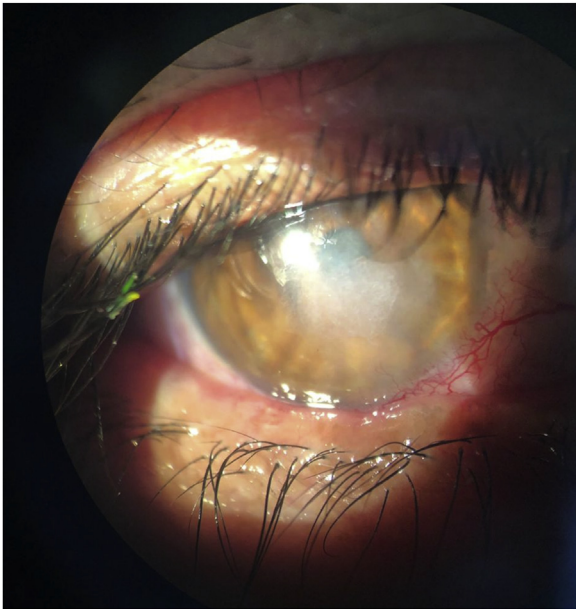


Fig. 1. Corneal ulcer 5 mm in size, with a central leukoma on the visual axis of 60% of the total corneal surface, irregular in shape, whitish cottony appearance.

KOH wet preparation revealed the presence of septate, branched, hyaline hyphae, indicative of a fungal infection due to a hyaline filamentous fungus [Fig. 2]. With the probable diagnosis of *Fusarium* keratitis, intrastromal voriconazole was injected into the anterior chamber [Fig. 3]. In addition, the sample was processed for bacterial culture in Blood agar and fungal culture in Sabouraud dextrose agar (SDA). No bacterial growth was observed on blood agar within 24 h. Culture on SDA grew white, cottony colonies at first pink in the center [Fig. 4]. Lactophenol Cotton Blue mount revealed hyaline branched septate hyphae, moderately curved macroconidia and oval microconidia. The fungus was identified as *Fusarium solani*. Patient continued oral itraconazole 200 mg daily and topical voriconazole 1% eye drops with an hourly frequency. After 21 days of treatment, it was evident that corneal ulcer was closed, visual acuity improved to 20/30.

Discussion

Keratomycosis represents one of the major causes of infectious keratitis that has a worldwide distribution. It can cause progressive loss of vision and possible extension to other organs [9]. Common recognized risk factors include trauma with contaminated organic material, eye surgery, prolonged treatment with topical steroids, use of contaminated contact lenses and previous ocular surface pathology, as well as systemic diseases such as diabetes mellitus. A history of trauma by plant leaves occurs in 61% of cases of keratomycosis [10], although some have not reported a history of corneal trauma in their cases [11,12]. In this particular case presented, the patient developed the corneal infection without an obvious history of trauma, and any comorbidity but with a history of contact with juice of herbs during an indigenous healing practice, which was the most likely cause for the development of the fungal infection.

If the diagnosis of fungal keratitis can be made in a short time, the chances of a full recovery improves. The symptoms resemble those reported in other forms of keratitis but, possibly, have a longer duration (5–10 days). The general symptoms are pain, tearing, photophobia, decreased visual acuity and edema of the cornea. The presence of a hypopyon should alert to the existence of this type of mycosis [13]. Our patient presented redness and itching from right

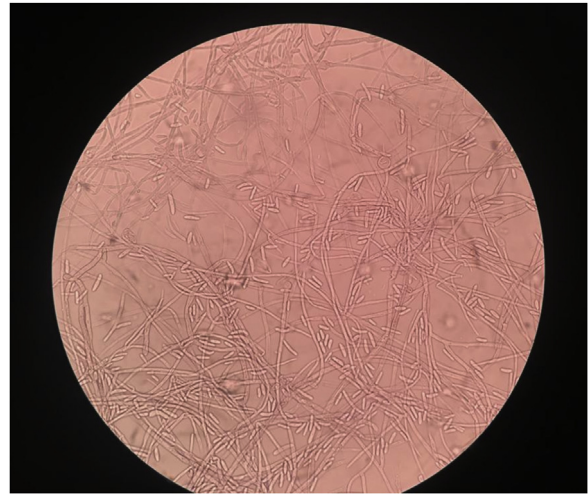


Fig. 2. KOH wet preparation microscopy showing septate, branched, hyaline hyphae of *Fusarium solani*.

eye, developed a white patch on cornea and blurring of vision in the same eye, however, he did not have a hypopyon.

Microbiological diagnosis is crucial in the treatment of *Fusarium* keratomycosis. Direct microscopic examination of a corneal scraping sample provides great information for diagnosis immediately. The KOH wet-mount preparation has proven to be extremely useful with more than 81% sensitivity and about 83% specificity [14]. In our case, we have found septate, branched, hyaline hyphae in the KOH sample. The most commonly used media for isolation of causal fungi include Sabourauds dextrose agar (SDA), potato dextrose agar, and blood agar. Most fungi grow within 48–96 h of incubation, but at least 25% of them require an incubation period of up to 3 weeks [9]. At 3 days in SDA, in this case, the colonies were white, wooly and cottony. Lactophenol Cotton Blue mount revealed hyaline branched septate hyphae, with long monophialidic conidiogenous cells which differentiates *Fusarium solani* from *Fusarium oxysporum* [15].

The treatment of *Fusarium* keratitis is challenging due to the limited and variable susceptibility to antifungal agents, poor penetration of topical antifungal agents into tissues and the possible severity of infection by this pathogen, which can cause corneal perforation and even endophthalmitis. A lot of research work has been done on the treatment outcome of these individual

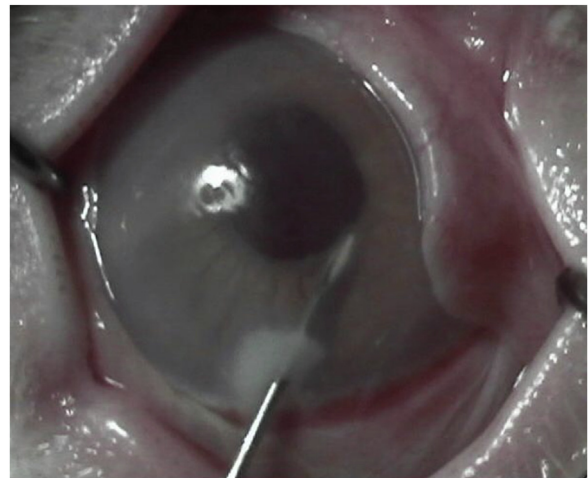


Fig. 3. Intrastromal voriconazole injection in anterior chamber.



Fig. 4. Colony of *Fusarium solani* on SDA at 3 days and at 7 days.

drugs and combination therapy. However, there are no well-defined standard management guidelines for cases of fungal keratitis. In our study, intrastromal antifungal was applied and it was shown that the signs and symptoms improved after the start of antifungal therapy. It has been shown that the success rate in cases of keratomycosis requiring intrastromal antifungal agents was 89% [16].

Conclusion

Fusarium keratomycosis are important among the clinical conditions responsible for ocular morbidity and blindness. It has a clinical challenge due to its slow pathological process, characteristics similar to other microbial keratitis and possible complications. Direct microscopic examination and culture are essential for an early specific diagnosis, which will allow the administration of timely treatment and avoid irreversible complications, and avoid inappropriate treatment that may only worsen the infection.

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CRediT authorship contribution statement

Alberto Ortega-Rosales: Conceptualization, Investigation, Writing - original draft, Methodology. **Yomara Quizhpe-Ocampo:** Investigation, Methodology, Writing - original draft. **María Montalvo-Flores:** Investigation, Methodology, Writing - original draft. **Carlos Burneo-Rosales:** Investigation, Methodology, Writing - original draft. **Gilda Romero-Ulloa:** Investigation, Methodology, Writing - original draft.

Declaration of Competing Interest

The authors have no funding to disclose.

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

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