

A Successfully Treated Case of *Aspergillus Flavus* Fungal Keratitis Caused by Stale Bread Corneal Injury

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Abstract Fungal keratitis is difficult to treat that can result in corneal blindness requiring penetrating keratoplasty and in fungal endophthalmitis. We report a case of fungal keratitis following a recent eye trauma by stale bread particle. Ophthalmological and Microbiological investigation revealed a fungal keratitis with *aspergillus flavus*. The case was successfully treated with oral antifungal (voriconazole), and combination of topical antifungal medications. The patient responded well to the antifungal treatment and gain 20/20 vision with complete resolution of the fungal keratitis and absence of recurrence. Early presentation and diagnosis are the key factor toward successful management of fungal keratitis.

Keywords: *keratitis, asperigillus, eye trauma, amphotericin B*

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1. Introduction

Microbial keratitis is well known as one of the leading causes of visual loss worldwide [1]. One of the common causes of corneal infections is fungal organisms. In a retrospective study done at King Khaled Eye Specialist Hospital in Riyadh (KKESP) included 2300 suspected microbial keratitis patients from 2006 to 2009, it was concluded that the overall mycotic keratitis incidence was 3.8% [2]. Many reports highlighted factors such as contact lens wear [3], photorefractive keratectomy and Lasik [4], the use of eye topical steroids [5], and corneal injury as common predisposing factors. Corneal trauma with contaminated plant parts represents the major cause of fungal keratitis and comprises to almost 55 to 65% of all types of fungal keratitis [6]. The occurrence of grayish or yellowish-white infiltration of the anterior stroma together with corneal tissue forming coarse granules one or two days post trauma are considered the common manifestations of fungal keratitis [7].

Diagnosis and management of fungal keratitis is highly challenging. Delayed diagnoses and improper management is considered one of the main causes of permanent visual morbidity and blindness in developing countries [6]. The most common causative fungal organism in Saudi Arabia is *Aspergillus* spp. (commonest is *Flavus*) followed by *Trichophyton* spp., then *Candida* [8]. The rapid identification of the causative microorganism in cultures and stains of

corneal scrapes, vitreous aspirates, and/or corneo-scleral biopsy is crucial in the successful management of keratitis. We report a case of keratitis caused by *A Flavus* in a patient who had a corneal injury by stale bread particle. The clinical and laboratory diagnosis was confirmed and the case was successfully treated and regained visual acuity of 20/20.

2. Case Report

A 24-year-old gentleman, working as a soldier, presented to King Abdulaziz Medical City emergency department at the second of November 2014 complaining of foreign body sensation, redness and mild pain in the right eye for two days following a trauma to the right eye with a piece of stale bread given to livestock. There is no history of similar illness before, the patient does not wear contact lenses, no history of previous ocular surgeries, and he is otherwise medically free without any known allergies.

On initial examination, uncorrected visual acuity was 20/22 on right eye and 20/20 on left eye, intra ocular pressure was within normal in both eyes. There was a 2.0mm by 1.5mm corneal infiltrate at the inferior-nasal quadrant and the rest of ophthalmic exam was within normal limits. Corneal scraping was done and the patient was diagnosed and managed as a case of bacterial keratitis. Patient was admitted and started on vancomycin (fortified) 25mg per mL and ceftazidime 50mg per mL eye drops

every hour around the clock plus cyclopentolate 1% eye drops twice daily.

On the third day of admission, the infiltrate remained the same and re-scraping was done. The results of the culture showed a positive *A. Flavus* infection. A photographic image of the culture is shown in Figure 1. The microscopic examination of the corneal tissue, depicted in Figure 2, also confirmed the diagnosis. Based on this, vancomycin and ceftazidime were stopped and the patient was shifted to voriconazole 400mg as a loading dose orally and then 200mg every 12 hours plus amphotericin B 0.1% eye drops every 2 hours, fluconazole 0.2% eye drops every hour, sodium hyaluronate 0.1% eye drops four times a day, cyclopentolate 0.1% eye drops three times a day and moxifloxacin eye drops three times a day as prophylaxis; all for the right eye. Then the patient was followed up on daily basis.



Figure 1. Photographic image of *Aspergillus Flavus* growth on culture

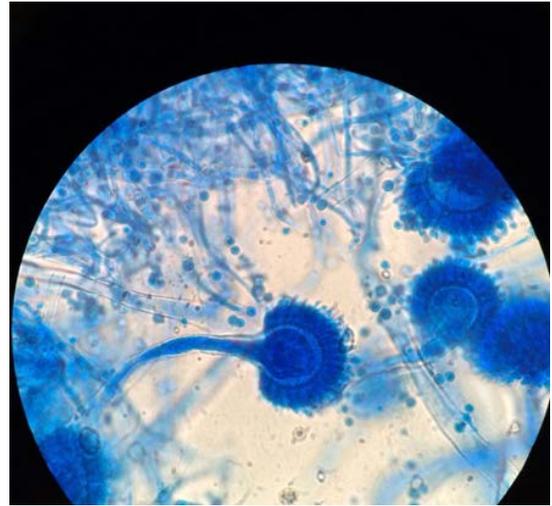
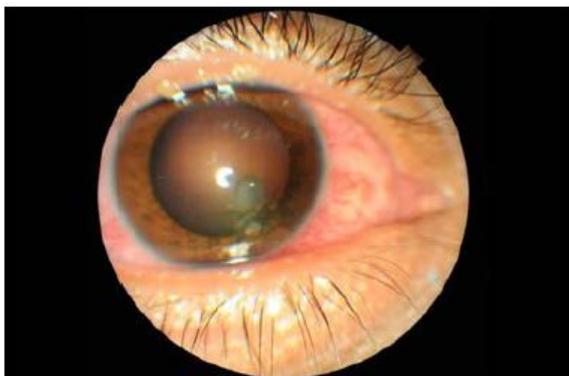


Figure 2. Microscopic image of corneal sample showing *Aspergillus Flavus*

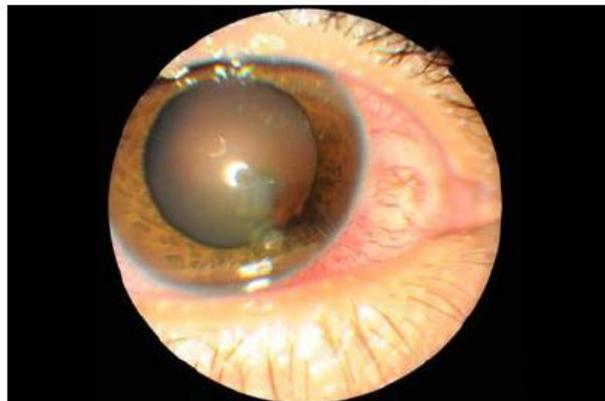
On the second week, according to MIC (Minimum Inhibitory Concentration) report, fluconazole eye drops was replaced by natamycin eye drops every hour. Re-debridement of the corneal epithelium was repeatedly done to help for penetration of the antifungal eye drops. The patient condition was improving day by day until he was discharged after two weeks of admission. Fig. 3 shows the image of the infected eye on the 7th, 8th, and 9th day post initial examination. The patient was discharged on eye drops to the right eye; amphotericin B 0.1% every 2 hours, natamycin every 1 hour, cyclopentolate 0.1% three times, and moxifloxacin three times and oral voriconazole 200mg every 12 hours.



(A)



(B)



(C)

Figure 3. Photographic images of the infected eye after different time intervals after initial assessment: A, after 7 days; B, after 8 days (showing fluorescein stained infiltrate); and C, after 9 days

On the first follow up (two days after discharge), the examination of his right eye clearly indicated clinical improvement, while infiltrate and corneal epithelial defect was not disappeared. Debridement was re-conducted and was given a follow up appointment on the next day. On the next day, the corneal infiltrate and the epithelial defect were reduced and patient visual acuity was 20/20 for the affected eye.

On the tenth day after discharge, the corneal ulcer was completely healed. The patient was instructed to discontinue voriconazole, cyclopentolate and moxifloxacin and to continue on natamycin every three hours, amphotericin B four times per day. After two months of discharge, amphotericin B was discontinued and the patient was continued on natamycin every four hours four times per day.

Three months after discharge, the patient was doing fine. Examination showed corneal scar 3.0 mm x 2.75mm, natamycin twice daily were continued for another month, then discontinued.

3. Discussion

The incidence of fungal keratitis has witnessed tremendous increase in the last two decades, probably due to the development of better diagnostic laboratory techniques [5]. Based on a retrospective study done at KKESH, Jastaneiah et al. [8] showed that the success rate of treatment has been tremendously increased with sharp declining in the number of cases deteriorated to endophthalmitis in the period 1997-2004 compared with 1984-1996.

Among all the laboratory diagnostic methods, fungal culture and microscopic examination after staining are considered the most applied techniques [7]. According to Mills [9], corneal scraping is very useful and all for successful management of microbial keratitis in general.

In this case, the patient presented on the second day after the trauma, and keratitis was suspected and treated aggressively to prevent any further growth of the organism. Comparing with a case presented by Arisa Mitani et al [10] in Japan, in which a fungal keratitis patient was introduced after two months of his initial complaint and corneal opacity was already occurred. After complete recovery, his vision acuity of the affected eye was improved to 20/100 only. In contrast to our case, excellent visual outcome of 20/20 in the affected eye was achieved. This can be attributed to the early patient presentation (two days after the trauma), the prompt hospitalization, proper diagnosis, and efficient treatment. This emphasizes the importance of early aggressive management of fungal keratitis.

The use of topical natamycin is considered the drug of choice for all types of filamentous fungi [11]. The use of the topical antifungal combination of amphotericin B and natamycin together with a systemic voriconazole is frequently applied in the management of fungal keratitis as it allows covering a broader range of filamentous and yeast infections [12].

The choice of the right medication is essential to get optimal results, as in Tabatabaee et al. [6], a study in Oman; the patient presented after 11 days of treatment in another

hospital with oral ketoconazole as the only antifungal medication, after that they added amphotericin eye drops. And eventually after the fungal keratitis was healed her BCVA was 20/200 in the affected eye.

4. Conclusion

This case report showed the benefit of early diagnosis and management of fungal keratitis, caused by *A. Flavus*. It also emphasizes the importance of MIC report in deciding the most effective medication to use. Also, scraping and re-debridement helped with identification of organism and the penetration of antifungal eye drops.

Conflict of Interest

All authors declare no conflict of interest to disclose.

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