

KERATOMYCOSIS - CASE SERIES OF THREE DIFFERENT SPECIES OF FILAMENTOUS FUNGI ENCOUNTERED IN MYCOTIC CORNEAL ULCERS AT A TERTIARY CARE CENTRE-THANJAVUR

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Received : 08/12/2024
Received in revised form : 21/01/2025
Accepted : 06/02/2025

Keywords:

keratomycosis, filamentous fungi, corneal ulcer, exserohilum, fusarium, paecilomyces.

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DOI: 10.47009/jamp.2025.7.1.53

Source of Support: Nil,
Conflict of Interest: None declared

Int J Acad Med Pharm
2025; 7 (1); 274-277



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Abstract

Background: We reported 3 cases of fungal corneal ulcer; one case of phaeohyphomycosis caused by *Exserohilum* sps and two cases of hyalohyphomycosis caused by *Fusarium* sps and *Paecilomyces* sps. The majority of the cases occur among agricultural workers following corneal trauma with vegetative matter contaminated by the fungi. These are opportunistic organisms and colonise when natural defences of eye are abrogated by corneal trauma, use of topical corticosteroids or any other predisposing factors. Essentially most of them are saprophytic fungi and are occasionally associated with true infections among healthy individuals. Ocular morbidity is frequently caused by corneal ulcers. To reduce corneal structural damage and vision loss, infectious corneal ulcers must be diagnosed and treated as soon as possible. **Materials and Methods:** This prospective study was conducted at Thanjavur Medical college, a tertiary care centre at Thanjavur, from march 2023 to april 2024. A total of 45 clinically suspected samples of mycotic corneal ulcers of all age groups were included. Samples were sent to Microbiology. Preliminary test using KOH mount was done in microbiology lab, followed by culture in SDA slant/plate and Blood agar plate. **Result:** A total of 3 fungal isolates were successfully isolated and treated with topical antifungals with 5% Natamycin drops, miconazole ointment, 1% atropine drops, 0.9% gentamycin drops and Oral Acetazolamide and fluconazole. **Conclusion:** This case series highlights the prevalence of fungal etiology in corneal ulcer in our locality and its importance in early diagnosis and prompt treatment to prevent ocular morbidity.

INTRODUCTION

The cornea is prone to infection by a variety of microorganisms due to changes in exogenous factors, local and systemic host defenses. Almost all the microorganisms can infiltrate the vulnerable cornea has superseded the out dated notion of ocular pathogens and non-pathogen. Commonly encountered fungal agents in keratomycosis are *Aspergillus* sps, *Fusarium* followed by dematiaceous or phaeoid fungus.^[1] Infection is acquired by penetrating injury with contaminated soil, thorns or wood splinters, immunocompromised individuals have an increased risk. While fungal ulcers are less prevalent than bacterial ulcers, the latter pose special diagnostic difficulties. Fungal species are frequently not included in empirical therapy for corneal ulcers. Additionally, several fungal genera exhibit high

levels of resistance to widely used antifungal drugs. These elements might encourage the spread into the cornea's or sclera's deeper layers. Earlier phaeoid fungi were not considered to be significant but now these are also important cause of keratomycosis. Fungal keratitis has been a neglected tropical disease. The WHO is taking an initiative to document this disease so that it maybe categorised under the neglected tropical disease.^[1,2]

CASE HISTORY

Case 1:

A 72 yrs male presented with complaints of foreign body sensation, pain, watering, redness and diminished vision in right eye for 7 days duration, with history of corneal transplant done before 6 months. Ocular examination of left eye revealed

blepharospasms and photophobia. Visual acuity (6/18) was grossly diminished. Conjunctiva showed ciliary congestion. On Slit lamp examination ulcer of 4mm×3mm was seen in cornea on nasal side, with irregular border and black colored deposits over the ulcer [Figure 1] corneal scrapings from the base of the ulcer was subjected for microbiological examination.

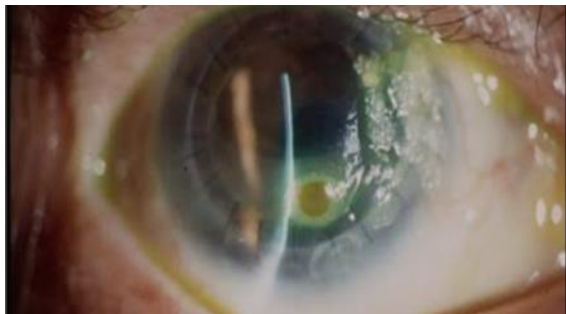


Figure 1: showing corneal ulcer on right eye

Microbiological examination: Corneal scrapings were brown to black in colour, and was processed for mycological examination. A direct examination was performed with 10% potassium hydroxide (KOH), Gram Stain smears were made. Specimen was cultured on two sets Of SDA (Saboraud's dextrose Agar) without actidione and incubated at 25C and 37 C separately, corneal scrapings were streaked in 'C' and 'S' shape in culture plates. The scrapings were also inoculated in Brain Heart Infusion Agar(BHI) with antibiotics and blood agar as well.^[1,2,4] The bacterial culture were negative.

1. KOH Mount: showed few septate, branched long filamentous hyphae [Figure 3]

2. SDA PLATE/SLANT: [Figure 2]

Macroscopy: The fungal growth started on day 4 after inoculation. At 7th day at both the SDA plates at 25°C and 37°C. Obverse - colonies appeared grey and floccose, Reverse- black [Figure 2].

Microscopy: LPCB from the slide culture preparation on corn meal agar revealed many dematiaceous, septate, branched fungal hyphae with sympodial conidiophores. The conidia were ellipsoidal with truncated and protruding hilum with darkly pigmented basal and distal septa with 6 to 9 disto septa. [Figure 3]

3. Germ tube test for dematiaceous fungi:

[Figure 3] GTT plays an important role in identification of the genera of dematiaceous fungi that form macroconidia with transverse septa. i.e. Bipolaris, Drechslera and Exserohilum spp

Procedure:

1. Place a drop of water on a microscope slide
2. Inoculate the drop of water with a small amount of the actively growing fungus examine the slide microscopically to confirm that conidia are present
3. Place a coverslip over the suspension
4. Incubate in a moist chamber at room temperature for 8 to 24hrs
5. Examine the slide microscopically to determine the origin and orientation of the germ tubes

Interpretation: Germ tube was seen on one or both the ends, adjacent to hilum and along the axis of conidium. The fungus was identified as Exserohilum rostratum according to description of McGinnis et al.

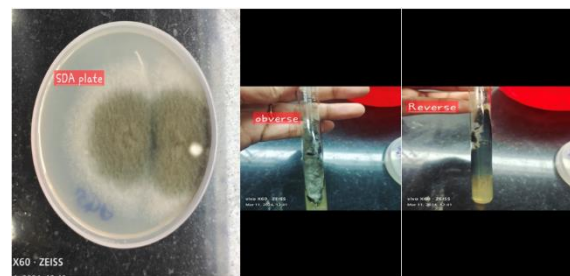


Figure 2: showing morphology of Exserohilum rostratum on SDA plate and slant

Treatment: Topical corticosteroid was immediately withdrawn. Treatment was initiated with topical antifungals with 5% Natamycin drops, miconazole ointment, 1% atropine drops, 0.9% gentamycin drops and Oral Acetazolamide and fluconazole. Following treatment there was gradual absorption of corneal infiltrate and decrease in ulcer size.^[3,4]



Figure 3: LPCB mount, slide culture and GTT of Exserohilum rostratum

Case 2:

45 yrs Male, farmer, came with history of thorn prick to right eye with redness, watering and diminished vision. Ocular examination of right eye revealed ulcer of approximately 4 to 5 mm in size, white opaque with irregular border on the temporal side of right eye [Figure 4] Visual acuity was grossly diminished. No abnormality on left eye. Corneal scrapings were sent for microbiological investigations.



Figure 4: showing corneal ulcer on right eye

Microbiological examination:

1. 10% KOH: No obvious findings

2. SDA PLATE/SLANT: [Figure 5]

Macroscopy: Obverse-rapidly growing colonies with flat surface and powdery to suede texture, yellow- brown in colour, Reverse-off white. [Figure 5]

Microscopy: LPCB mount [Figure 5] Hyaline septate hyphae, conidiophores are branched, phialides elongated and taper to a long slender tube showing drawn-out tenpins appearance, phialides bend away from the axis of the conidiophore and appear singly along the hyphae, conidia are elliptical or oblong and occur in long unbranched chains

Interpretation: Paecilomyces sps

Treatment: Patient was initiated with topical antifungals with 5% Natamycin drops, voriconazole eye drops, 1% atropine drops, 0.9% gentamycin drops and oral fluconazole. Following treatment there was gradual absorption of corneal infiltrate and decrease in ulcer size.^[4,5]



Figure 5: SDA slant and LBCB features of Paecilomyces spp

CASE 3:

58yrs old male agricultural worker presented with complaints of pain, defective vision, redness, lacrimation and photophobia in eye for 2weeks, he is a known diabetic for more than 10yrs, no history of any foreign body injury. On examination visual acuity was 5/60. slit lamp examination showed full thickness corneal ulcer of size 6 to 8mm on nasal side with irregular margin, hypopyon filled the lower third of anterior chamber [Figure 6]. Clinically diagnosed as corneal ulcer and Pt was put on antibiotics like Ciprofloxacin eye drops and oral antibiotics along with atropine e/d to which patient doesn't respond so corneal scrapings were obtained and sent to laboratory to rule out fungal etiology.



Figure 6: corneal ulcer on left eye

Microbiological examination:

1.10% KOH: few hyaline septate hyphae seen [Figure 8]

2.SDA PLATE/SLANT: [Figure 7,8]

Macroscopy: Obverse-At first white and cottony but develops orangish centre with a light periphery, Reverse-white [Figure 7]

Microscopy: LPCB-Hyaline septate hyphae, branched conidiophores with phialides that produce large sickle shaped macroconidia with five to seven septa and few oval shaped microconidia [Figure 8]

Interpretation: Fusarium oxysporum

Treatment: Patient was initiated with topical antifungals with 5% Natamycin drops, voriconazole eye drops, 1% atropine drops, 0.9% gentamycin drops and oral fluconazole. Following treatment there was gradual absorption of corneal infiltrate and decrease in ulcer size.^[4,6,7]



Figure 7: showing morphology of F.oxysporum on SDA plate and slant

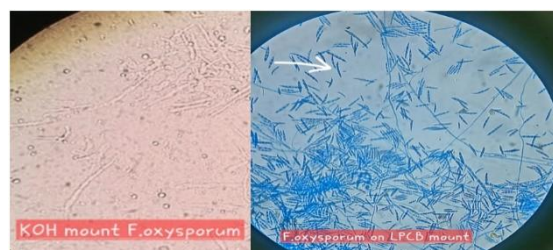


Figure 8: KOH mount and LPCB mount of F.oxysporum

DISCUSSION

Fungal infections are major threat to agricultural workers especially during harvest times. Risk factors include occupation, ocular trauma, male sex more than female etc.^[1] After accidental inoculation into the eyes, the fungus starts to produce mycotoxins and

proteolytic enzymes which leads to development of inflammation resulting in fungal keratitis and other eye infections. Hyalohyphomycosis like *Fusarium* and *Aspergillus* spp are more common than pheoid fungus.^[5] Prevalance varies according to certain geographical area and climatic conditions and host immune response. Fungal keratitis are often difficult to diagnose and treat, resulting in blindness in most of the cases corneal ulcer which are refractory to routine antibiotics maybe due to fungal cause. According to multiple studies, the prevalence of fungal corneal ulcer in India is significantly high which accounts for 40% to 47% of all microbial keratitis case, making it a major concern especially South India has high prevalence rate.^[1,2,5]

CONCLUSION

The visual outcome of fungal corneal ulcer might not be satisfactory when compared to bacterial ulcers due to the fact that these ulcers are difficult to diagnose and are almost resistant to all treatment modalities. Hence rapid diagnosis and early initiation of anti-fungal therapy can prevent ocular morbidity.

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