

CUNNINGHAMELLA BERTHOLLETIAE FUNGAL CORNEAL ULCER: A CASE REPORT

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Abstract

Zygomycoses are invasive mycotic diseases usually found in immunocompromised and malnourished patients. Zygomycotic diseases are rapidly progressing infections known for their difficulty in diagnosis and treatment. Orbital and intracranial extension of rhinocerebral zygomycosis is fatal and may rapidly develop worsening ophthalmoplegia and even blindness. *Cunninghamella spp* are mainly saprobic fungi of the Mediterranean and subtropical zones. Here we report a rare case of fungal corneal ulcer in an 80-year-old male due to *Cunninghamella bertholletiae*. As the symptoms, clinical signs and imaging findings of these infections are non-specific, a high index of suspicion is required for timely diagnosis.

Key words: *Cunninghamella bertholletiae*, fungal corneal ulcer, zygomycosis

Introduction

Zygomycosis are rare fungal infections caused by saprophytic fungi of the class Zygomycetes. These are opportunistic pathogens causing disease predominantly in the immunocompromised and malnourished patients. It presents in many forms such as rhino-orbito-cerebral, pulmonary, gastrointestinal, cutaneous and disseminated. Most of the reported cases are of rhino-orbital-cerebral form, being rapidly progressive and fatal in outcome¹

Cunninghamella spp (order Mucorales, class Zygomycetes) are ubiquitous fungi found in the soil. *Cunninghamella bertholletiae* is the only clinically relevant species known to infect humans²⁻⁵. The present report describes a rare case of a fungal corneal ulcer due to *Cunninghamella bertholletiae* in an elderly male.

Case report

An 80-year old male farmer residing in Pune presented to the Ophthalmology department with history of traumatic injury to the left eye with a pointed wooden stick. He complained of pain, redness, diminution of vision and discharge from the eye one week after the injury. There was no history of diabetes, previous antifungal or immunosuppressive drug use or any history suggestive of immunocompromised state. On examination, anterior segment revealed a corneal ulcer with infiltrate measuring 5 x 6 mm involving central area of the cornea. Endothelial plaque was present. There were no satellite lesions or hypopyon present. Right eye showed no visible abnormality. Haematological and biochemical parameters were also normal. Patient was HIV negative.

Corneal scraping from the ulcer was subjected to microscopy and culture. Fungal filaments were seen on 10% Potassium hydroxide (KOH) mount as broad, hyaline, aseptate hyphae. Fungal culture was done on Sabouraud's dextrose agar (SDA) with and without cycloheximide and incubated at 25°C and 37°C. A rapid growth in 4 days was observed. Cotton candy colony which was white initially but later turned grey with reverse pale was seen in SDA slant without cycloheximide (Figure 1 and 2). On performing Lactophenol cotton blue mount (LPCB), broad, hyaline, aseptate, ribbon like hyphae with long branched sporangiophores terminating in globose or pyriform shaped vesicles were seen (Figure 3). Each terminal vesicle was covered with spine like denticles, and each denticle with a single sporangium. Sporangiospores were spherical to ovoidal. Similar findings were observed in slide culture as well. The slant was also incubated at 45°C and showed similar morphology after 48 hours of incubation. On repeating LPCB wet

mount, microscopy revealed similar structural details suggesting the final diagnosis to be *Cunninghamella bertholletiae*.

A therapeutic penetrating keratoplasty was done and voriconazole eye drops were started. Later liposomal amphotericin B was administered and patient's vision gradually improved. He was relieved hence discharged but was lost to follow up.

Discussion

Cunninghamella bertholletiae (Order Mucorales, class Zygomycetes) is a rare cause of zygomycosis often associated with trauma and immunosuppression⁶⁻⁷. The infection tends to follow a malignant course due to angioinvasion and rapid tissue destruction ending in death of the patient. Its potential for pathogenicity is associated with its thermotolerant growth capabilities which also distinguishes it from *Cunninghamella elegans*⁸

This fungus normally enters the host by inhalation but infection by percutaneous inoculation or ingestion is also being increasingly reported⁹. Similar to our study, Sulatha et al also reported corneal ulcer caused by *Cunninghamella spp* following trauma by a stick in an immunocompetent patient. This type of infection usually presents with rhino-orbito-cerebral involvement which is the most common form¹⁰ Other forms of infection like pulmonary, disseminated, cutaneous and gastrointestinal develop depending upon the patient's comorbidities and risk factors.

Cunninghamella bertholletiae is a fast growing mold that can grow at room temperature to 45°C. The species appear as branched sporangiospores terminating at a swollen terminal vesicle with spherical or oval sporangioles. Accurate diagnosis of these species requires novel methods such as Polymerase Chain Reaction (PCR) and sequencing of the Internal Transcribed Spacer (ITS) region¹.

Mainstay for management remains surgical resection and systemic Amphotericin B. Though, intravenous Amphotericin B is the gold standard for successful treatment of zygomycetes¹, various in vitro susceptibility studies have also raised the possibility of resistance of *Cunninghamella* to Amphotericin B³. Furthermore, its usage is limited by potentially severe side effects like renal toxicity due to raised creatinine levels which can be overcome by using higher doses of the liposomal preparations.

To conclude, there is a need for newer active antifungal drugs, rapid diagnostic modalities and treatment strategies to improve the outcome of these potential life-threatening infections. A strong clinical suspicion and high vigilance by the microbiologists is imperative to diagnose rare keratomycoses of the eye.

References

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Acknowledgment

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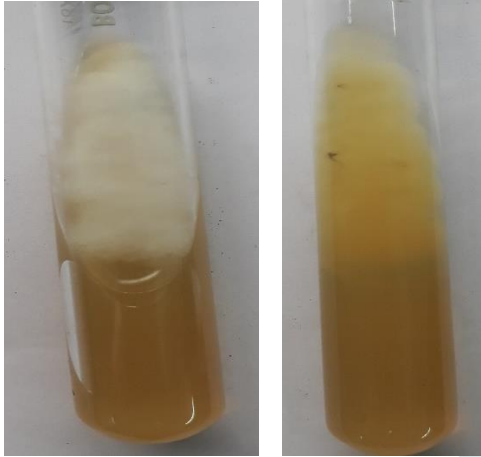


Figure1: Showing initial white obverse and pale reverse colony on Sabouraud's dextrose agar after 24 hours of incubation at 25°C and 37°C

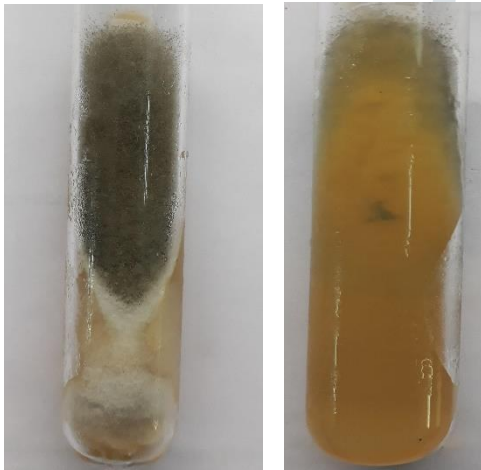


Figure2: Showing mature obverse grey and reverse pale colony on Sabouraud's dextrose agar after 72 hours of incubation at 25°C, 37°C and 45°C



Figure3: Lactophenol cotton blue mounts showing sporangiophore forming a swollen, terminal vesicle around which single celled globose sporangia develop

