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Case Study

Emergence of Dematiaceous Fungal Hypopyon in a Tertiary Care Hospital in Tamil Nadu: A Case Study

Dinesh Kumar[1], Ambujavalli Balakrishnan Thayikkannu[2], Alice Peace Selvabai R[3], Priyadarshini Shanmugam[4]

[1]Post Graduate Tutor, [2]Associate Professor, [3]Associate Professor, [4]Professor and Head, Department of Microbiology, Chettinad Hospital and Research Institute, Chettinad Academy of Research and Education.
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I N F O

Corresponding Author:
Priyadarshini Shanmugam, Department of Microbiology, Chettinad Hospital and Research Institute, Chettinad Academy of Research and Education.
E-mail Id:
priyadarshini0018@gmail.com
Orcid Id:
https://orcid.org/0000-0003-4382-562X
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A B S T R A C T

Fungal keratitis attributed to ocular trauma is common in developing countries. Curvularia is a dematiaceous fungus ubiquitously found in the environment. In humans,Curvularia causes fungal keratitis, sinusitis, onychomycosis, endocarditis, peritonitis, mycetoma, pulmonary infection, and cerebral infection. We report a 28-year-old male patient with corneal ulcer and hypopyon caused by the Curvularia species. He developed ocular pain and diminished vision in the left eye following an injury/trauma caused due to a foreign body(vegetative matter). Ocular examination revealed a corneal ulcer with a feathery margin with hypopyon. Corneal scrapings subjected tomicrobiological examination revealed septate hyphae on KOH preparation. Culture yielded pigmented fungal colonies, which wereidentified to be Curvularia species. The patient was put on conservative management.He responded welland feltsymptomatically better on local examination.His corneal ulcer size reduced, hypopyon in the anterior chamber subsided and his vision acuity improved.Diagnosis and treatment of fungal keratitis haveprovedto be challenging. Early diagnosis usingmicrobiology helped to restore the patient's vision, prevented him from vision-threatening complications and helped in the management of the case by medical intervention without surgical intervention.

Keywords: Eye Infections, Mycotic Keratitis, Filamentous Fungi, Fungal Corneal Ulcer, Fungal Hypopyon

Background

Corneal inflammation is called keratitis, and fungal infections of the cornea are known as fungal keratitis. Fungal species invade corneal tissue, causing disastrous (catastrophic) visual effects. Topical steroid usage, trauma, ocular surface diseases, climate, and location can also affect the types of fungi and their risks. Yeasts of Candida spp., filamentous with septate such as Aspergillus spp., Fusarium spp., Cladosporium spp., Curvularia, and non-septate such as Rhizopus, are potential infectious agents capable of infecting hosts with debilitating diseases. India is located in a tropical area, which means that the country has year-round excellent environmental conditions for the growth of fungi. In India, the percentage of cases of fungal keratitis varies from 25.6% to 36.7%. Between 7.3% and 25.6% of people in North and Northeast India, 36.3% of people in West India, and 36.7% of people in Southern India are reported to have the condition.[1] Curvularia is an opportunistic fungus that affects immunocompromised people, including transplant recipients, cancer patients, patients on corticosteroid therapy, and those with HIV/AIDS. It can cause peritonitis, keratitis, sinusitis, mycetoma, phaeohyphomycosis, and onychomycosis. It causes corneal ulceration, and its incidence is increasing due to the use of antibiotics and steroids. Fungal keratitis leads to permanent corneal blindness in tropical and subtropical countries. Curvularia is a dematiaceous fungus found in soil and plants. It is a pathogen isolated from plants, soil, air, animals, and humans. We present a case of Curvularia species-caused fungal keratitis in our patient, which resulted in corneal ulcers and scarring.

Case Report

A 28-year-old, male farmer from Nepal, visited the Ophthalmology Department of Chettinad Hospital and Research Institute with complaints of pain in the left eye, redness, and diminished vision for one-week duration. He gave a history of injury to the eye caused by a foreign body (vegetable matter - ground nut) during cultivation, following which he developed the symptoms. The patient had been using ofloxacin and dexamethasone eye drops thrice daily for 1 week, which he had obtained over the counter from a local pharmacy.

The patient did not have any past ocular illnesses or systemic diseases like diabetes mellitus, hypertension, or bronchial asthma. He gave no history of tobacco chewing, smoking, or alcohol consumption. Family history was elicited and no significant information was obtained.

On local examination, the left eye demonstrated a visual acuity of being able to count fingers close to the face. Conjunctival congestion was present and ocular movements were full and free (Figure 1). Corneal examination revealed a corneal ulcer of size 7 x 5 x 1 mm at 5–10 o'clock position with feathery margins involving one-third of stroma. Stromal infiltrate was present. The anterior chamber showed a 2 mm hypopyon with cells (grade 1+) and flare (+). The pupil/lens was hazy, and the fundus (undilated) could not be assessed due to an ulcer at the visual axis. Right eye ocular movements were full and free. The cornea was clear and the anterior chamber vitreous humour was of grade III. The pupil was reactive to light. The lens was clear, visual acuity was 6/6, Cup-to-Disc Ratio (CDR) of the fundus (undilated) was 0.3, and the disc and vessels were normal.

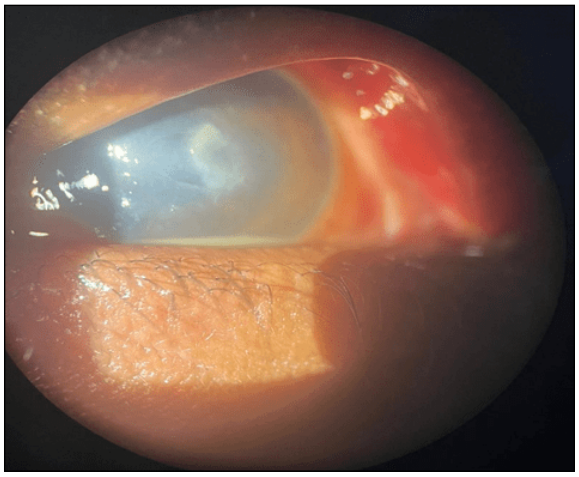

Figure 1.Left Eye: Conjunctival Congestion with Corneal Ulcer and Anterior Chamber Hypopyon

The patient was admitted with the aforementioned complaints, and after a local clinical examination, he was diagnosed with a left corneal ulcer.

Investigations

A corneal scraping sample was sent to the microbiology laboratory for KOH mount and fungal culture. Direct microscopy with 10% KOH revealed septate hyphae (Figure 2). The sample was inoculated on blood agar, chocolate agar and Sabouraud Dextrose Agar. Cultures on blood (Figure 3) and chocolate agar (Figure 4) showed cottony wool-like colonies. On Sabouraud dextrose agar, colonies that were grown at 25 °C and 37 °C were initially grey which later changed to greyish black (Figure 5a). The colony's base was black without diffusion of pigments (Figure 5b). Conidia were generally ellipsoidal; some were curved or lunate. They had rounded ends or a slightly tapered base. They were pale brown, reddish brown to dark brown in colour with 3–10 septa (typically 3–5). They were smooth to verrucose conidial walled, and most conidia had 4 septa (Figure 6).

His blood investigations revealed a total count of 10300, haemoglobin of 16.4, platelet count of 2.88 lakhs, random blood sugar of 78 mg/dl, blood urea of 12 mg/dl, and serum creatinine of 0.7 mg/dl.

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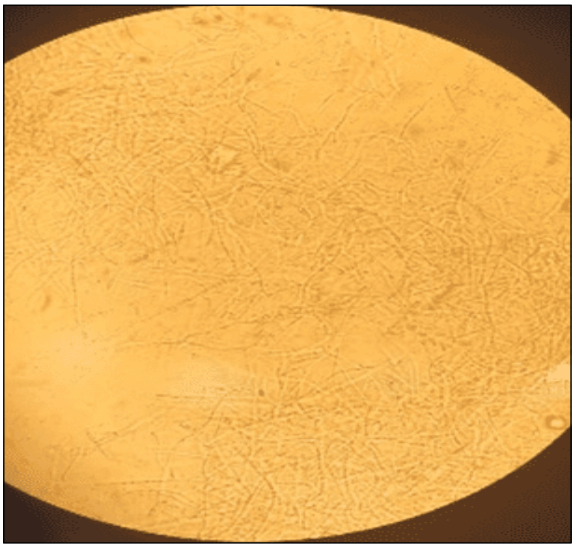

Figure 2.Septate Hyphae Revealed by 10% KOH

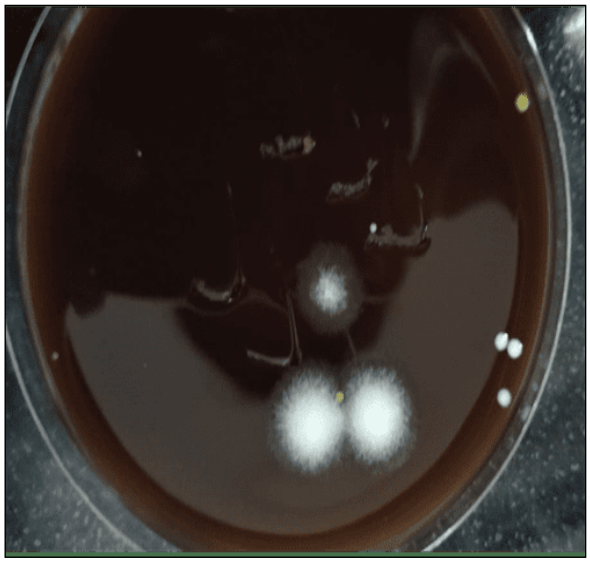

Figure 3.Blood Agar showing Cottony Growth

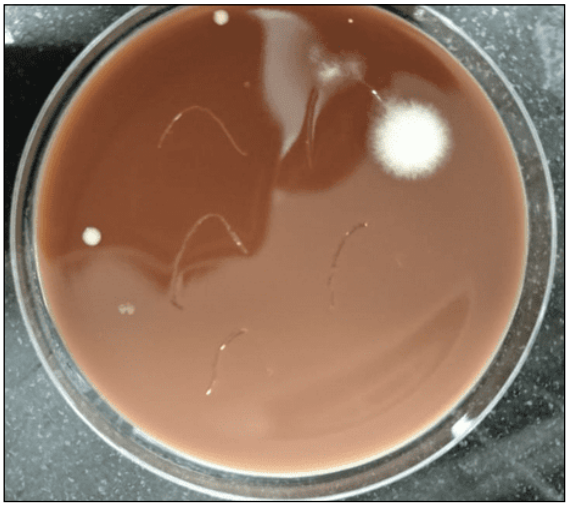

Figure 4.Chocolate Agar showing Cottony Wool Appearance

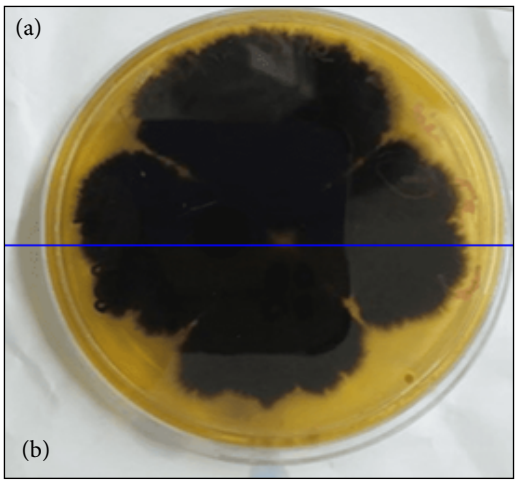

Figure 5a.Sabouraud Dextrose Agar Figure 5b.Sabouraud Dextrose Agar Slant showing Rapidly Growing, Floccose and Brown Colonies of Curvularia

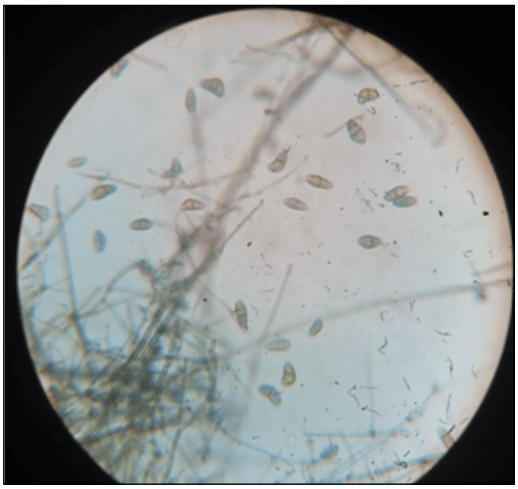

Figure 6.Transversely Septate and Cylindrical or Slightly Curved Conidia, with One of the Central Cells, being Larger, Broadly Ellipsoidal, Often Curved or Lunate, Rounded at the Ends, Pale Brown, Medium Reddish Brown to Dark Brown, Conidial Wall Smooth to Verrucose

Management

A conservative management was planned for the patient. He was treated with E/D fortified ceftazidime hourly, E/D fortified vancomycin hourly, E/D natamycin hourly, E/D homatropine TDS, E/D gatifloxacin HS, C. doxycycline 100 mg BD, T. famotidine 20 mg OD, T. Zerodol SP BD, T. Limcee 500 mg TDS and E/D sodium carboxymethylcellulose 1 drop 6 times a day. The patient became symptomatically better. His vision improved with antifungal agents and he was discharged within a week.

An essential part of the topical management of ocular mycotic infections are polyenes and azoles. Fungal keratitis is a condition for which there is often a lengthy recovery period. Most cases take weeks or months to completely resolve.

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The two most often used topical anti-fungal medications are amphotericin 0.15% for yeast-like fungi and natamycin 5% drops for filamentous fungi.

In circumstances where the patient is non-responsive or resistant, azoles—both imidazoles and triazoles—are utilised as supplementary or alternative treatments. A growing number of new-generation azoles, such as voriconazole, are being utilised to treat fungal keratitis because of their improved ocular penetration profile and broad spectrum of action.

Discussion

Curvularia, a dematiaceous filamentous fungus found on soil, plants, and grains, is primarily found in tropical and temperate climates. It is a pollutant that causes accidental infections in both humans and animals.[2] Genus Curvularia has 18 species; C. brachyspora, C. clavata, C. geniculata, C. lunata, C. pallescens, C. senegalensis, C. verruculosa, C. affinis, C. caricae papaya, C. fallax, C. harveyi, and C. inaequalis are some among them. Most diseases in humans and animals are caused by C. lunata. It grows rapidly, produces woolly colonies, and is floccose and brown in colour with black reverse on Sabouraud dextrose agar at 25 °C. As the colony matures, it goes from white to pinkish grey to olive brown to black reverse. Curvalaria features septate, dark brown to black hyphae, brown conidiophores, and conidia.[3] Conidiophores are simple or branched. The bending pattern is called sympodial geniculate. The conidia are also called the poroconidia. They are straight or pyriform, brown, multi-septate and have dark basal protuberant hila. They divide each conidium into numerous cells using transverse septae. In the conidium, the central cell is darker and larger than the end cells. The central cell swelling usually gives the conidium a curved appearance.

Fungal keratitis in patients with traumatic ocular damage, proper diagnosis of the causal agent and treatment minimises the risk of additional problems such as iridocyclitis, secondary glaucoma, perforation, and scarring. Fungal keratitis is more virulent than bacterial keratitis. India reported that 34% to 44% of all keratitis was caused by fungi Aspergillus, Candida, and Fusarium (Aspergillus being the most common); globally Fusarium spp. and Aspergillus are the most isolated.[4] Dematiaceous fungi (Curvularia and Alternaria) cause 8% to 17% of keratitis in India. They are found in soil and decomposing plant material deeply pigmented with melanin on their hyphae and conidia.[4] Fungal (dematiaceous) keratitis patients usually present in hospitals during the months of September, October, and November. Farmers are most affected by dematiaceous fungal keratitis.[5] Injury caused by soil or vegetative matter (ground nut, cereal, sugarcane) predisposes them to corneal infection. This has also been found in previous studies.[6] Sugarcane was the most frequent cause of corneal trauma. The tall leaves of the sugarcane plants, being at eye level, constitute the main cause of corneal injury due to this plant. Hypopyon is common in fungal keratitis. The presence of hypopyon and satellite lesions is an important sign of fungal keratitis associated with large infiltrate size. The average duration for healing is 4 to 8 weeks. The predisposing factors for fungal keratitis are the use of contact lenses, previous penetrating keratoplasty, traumatic injury with vegetable matter, diabetes, herpes simplex keratitis, human immunodeficiency virus (HIV), head trauma, symblepharon, exposure keratopathy, peritoneal and venous catheters, and intravenous (IV) drug abuse. In Western countries, contact lens use is the most common causative factor for keratitis. It has an incidence of 2 to 20 cases per 10,000 wearers and can result in irreversible vision loss.[7] Fusarium spp. is the most common agent causing keratitis in the contact lens wear group.[8] Modes of transmission are inhalation and inoculation. Curvularia lunata causes disseminated illness including mycetoma, sinusitis, onychomycosis, mycotic keratitis, dialysis-associated peritonitis, phaeohyphomycosis and systemic phaeohyphomycosis.[9] Curvularia tamilnaduensis and Curvularia coimbatorensis are new species of Curvalaria found recently in south India.[10] The importance of early diagnosis of fungal infections and getting an ophthalmologist's opinion cannot be stressed more, as this patient was self-medicating with over-the-counter procured drugs such as antibiotics and steroids which had flared up the condition.[11]

Conclusion

Curvularia keratitis manifested as a superficial feathery infiltrate with hypopyon that progressed to focal suppuration. Corneal scrapings smear commonly disclosed hyphae and culture media demonstrated dematiaceous fungal growth after one week. Natamycin had remarkable in vitro action and improved vision in the patient without surgical intervention.

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Conflict of Interest: None

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