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Case Report

From Skin to Cornea: A Rare Case of Dermatophyte Keratitis Caused by *Trichophyton mentagrophytes/interdigitale*

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Abstract

Introduction: Fungal keratitis is a major cause of corneal blindness in tropical countries, with filamentous fungi such as *Aspergillus* and *Fusarium* being the most common etiological agents. Dermatophytes, although frequently responsible for superficial infections of skin, hair, and nails, are rarely implicated in corneal infections. Their involvement in keratitis is uncommon and often associated with delayed diagnosis and poor outcomes.

Case Presentation: We report a case of a 58-year-old male agricultural worker who presented with progressive pain, redness, and visual impairment in the right eye. The patient had a history of chronic dermatophytosis and onychomycosis, with prolonged use of over-the-counter topical steroid-containing preparations. Ocular examination revealed a central corneal ulcer with stromal infiltrates and hypopyon. Direct microscopy of corneal scrapings showed septate hyaline hyphae, and culture yielded white, granular colonies. Microscopic morphology demonstrated round to pyriform microconidia and spiral hyphae. Identification by MALDI-TOF MS confirmed *Trichophyton mentagrophytes/interdigitale*. The patient was managed with antifungal therapy; however, the response was limited due to advanced disease.

Discussion: Dermatophyte keratitis is a rare entity and may occur in the presence of predisposing factors such as epithelial disruption, chronic dermatophytosis, and corticosteroid misuse. The clinical presentation often mimics other filamentous fungal infections, making microbiological confirmation essential. Early diagnosis using microscopy, culture, and molecular methods is critical for appropriate management. This case highlights the need to consider dermatophytes as potential, though uncommon, causative agents of fungal keratitis to prevent delayed treatment and adverse outcomes.

Keywords: *Fungal keratitis, Dermatophytes, Trichophyton mentagrophytes/interdigitale, Corneal ulcer*

Introduction

Fungal keratitis is a major cause of corneal blindness worldwide, accounting for a significant proportion of microbial keratitis cases in tropical and subtropical regions, including India. Recent epidemiological studies suggest that fungi are responsible for approximately 30–50% of all infectious keratitis cases in developing countries, with higher prevalence in agricultural populations.[1] Among the causative agents, filamentous fungi such as *Aspergillus* and *Fusarium* species predominate, while yeasts like *Candida* are more common in temperate climates and immunocompromised hosts.[2]

Dermatophytes, a group of keratinophilic fungi belonging primarily to the genera *Trichophyton*, *Microsporum*, and *Epidermophyton*, are well recognized for causing superficial infections of keratinized tissues.[3] Their role in ocular infections, particularly keratitis, is exceedingly rare. The cornea, although non-keratinized, shares certain structural proteins with the epidermis, which may permit dermatophyte invasion under favorable conditions such as epithelial compromise, chronic infection, or altered host immunity.[4]

A review of published literature reveals that dermatophyte keratitis constitutes only a minute fraction of fungal keratitis cases, with fewer than 20 well-documented cases reported globally over several decades.[5] These infections are frequently associated with delayed diagnosis, atypical clinical features, and poor therapeutic response, often culminating in severe visual impairment or loss of the affected eye. The rarity of this entity, coupled with low clinical suspicion, underscores the importance of documenting such cases to enhance awareness and guide management strategies.

Case Presentation

A 58-year-old male agricultural worker presented in 2025 to the ophthalmology emergency services with complaints of severe pain, redness, and progressive blurring of vision in the right eye for approximately 6 weeks. The patient described the onset as initially mild irritation with foreign body sensation following exposure to dust while working in the fields. Over time, the symptoms intensified, with increasing photophobia, tearing, and a noticeable white opacity developing over the cornea. In the week prior to presentation, he reported a rapid decline in vision, limiting him to perception of hand movements.

The patient's past medical history was notable for recurrent, untreated fungal infections of the skin over the past 2 years. He reported multiple episodes of itchy, circular, scaly lesions over the groin, abdomen, and forearms, which were intermittently treated with over-the-counter creams obtained from local pharmacies. These preparations reportedly provided temporary relief but were often followed by relapse and extension of lesions. On further inquiry, it was revealed that the topical medications frequently contained a combination of antifungal agents and corticosteroids.

Approximately 3 months prior to presentation, the patient had also noticed thickening and discoloration of finger nails, suggestive of onychomycosis. He had not sought medical consultation for these complaints. There was no documented history of diabetes mellitus, hypertension, or systemic immunosuppressive conditions. However, the patient belonged to a low socioeconomic background, with limited access to healthcare and poor adherence to treatment.

The sequence of ocular events began shortly after an episode of intense itching around the periocular region, which the patient frequently rubbed with unwashed hands. He did not recall any definite trauma but admitted to repeated eye rubbing, especially during episodes of sweating and dust exposure. Initial symptoms were mild and self-limiting, leading him to ignore them. Subsequently, he consulted a local practitioner who prescribed topical eye drops; the composition of which could not be recalled by the patient. The use of these drops over several weeks led to transient symptomatic relief but was followed by rapid worsening of the condition.

On presentation, general examination was unremarkable. Cutaneous examination revealed multiple annular, erythematous plaques with central clearing and peripheral scaling over the lower abdomen and forearms. Several finger nails appeared thickened, brittle, and discolored. [Figure 1[A-D]]

Ocular examination of the right eye demonstrated marked conjunctival congestion, lid edema, and a central corneal ulcer measuring approximately 5 × 4 mm with irregular margins and underlying stromal infiltrates. The ulcer surface appeared dry with feathery edges, and a dense stromal haze was noted extending into the deeper layers. A small hypopyon was present in the anterior chamber. Corneal sensation was reduced. Visual acuity was limited to hand movements close to face. The left eye was clinically normal.

Corneal scrapings were obtained promptly for microbiological analysis. Direct microscopy with potassium hydroxide mount revealed abundant septate hyaline hyphae. Culture on Sabouraud dextrose agar yielded slow-growing, white granular colonies over the next few days. On potato dextrose agar macroscopic examination revealed white, granular, powdery colonies with a dry surface and yellowish-brown pigmentation on the reverse. Microscopic examination of the cultured isolate showed characteristic round to pyriform microconidia along with the presence of spiral hyphae suggestive of a dermatophyte species. [Figure 2[A-E]]

Subsequent identification by MALDI-TOF MS (Matrix-Assisted Laser Desorption/Ionization Time-of-Flight Mass Spectrometry) confirmed the isolate as *Trichophyton mentagrophyte/interdigitale*. The minimum inhibitory concentration for antifungals could not be performed due to patient's poor financial condition.

Based on the clinical presentation and laboratory findings, a diagnosis of dermatophyte-associated fungal keratitis was established. The patient was managed with topical luliconazole cream along with oral itraconazole for a duration of one month. Slight clinical improvement was noted after 1 month. Subsequently, due to irreversible ocular involvement, the patient was further managed in the ophthalmology department.

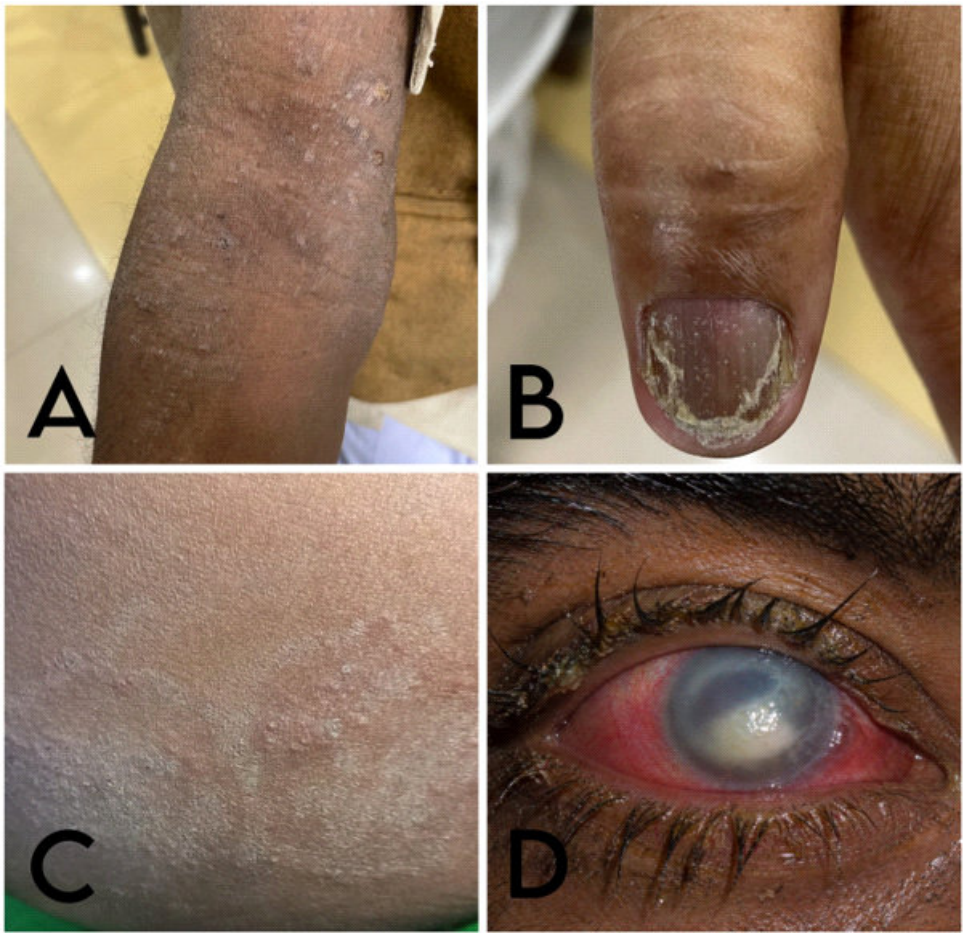

Figure 1 (A–D): Clinical manifestations of dermatophyte infection with ocular involvement.

(A) Multiple erythematous, scaly, annular plaques over the forearm with well-defined margins, suggestive of tinea corporis.

(B) Nail changes consistent with onychomycosis, showing distal discoloration, subungual hyperkeratosis, and nail plate dystrophy.

(C) Multiple annular, ring-shaped lesions with peripheral scaling and central clearing over the abdominal skin, characteristic of dermatophytosis.

(D) Clinical photograph of the right eye demonstrating fungal keratitis, with a central corneal ulcer, and surrounding conjunctival congestion

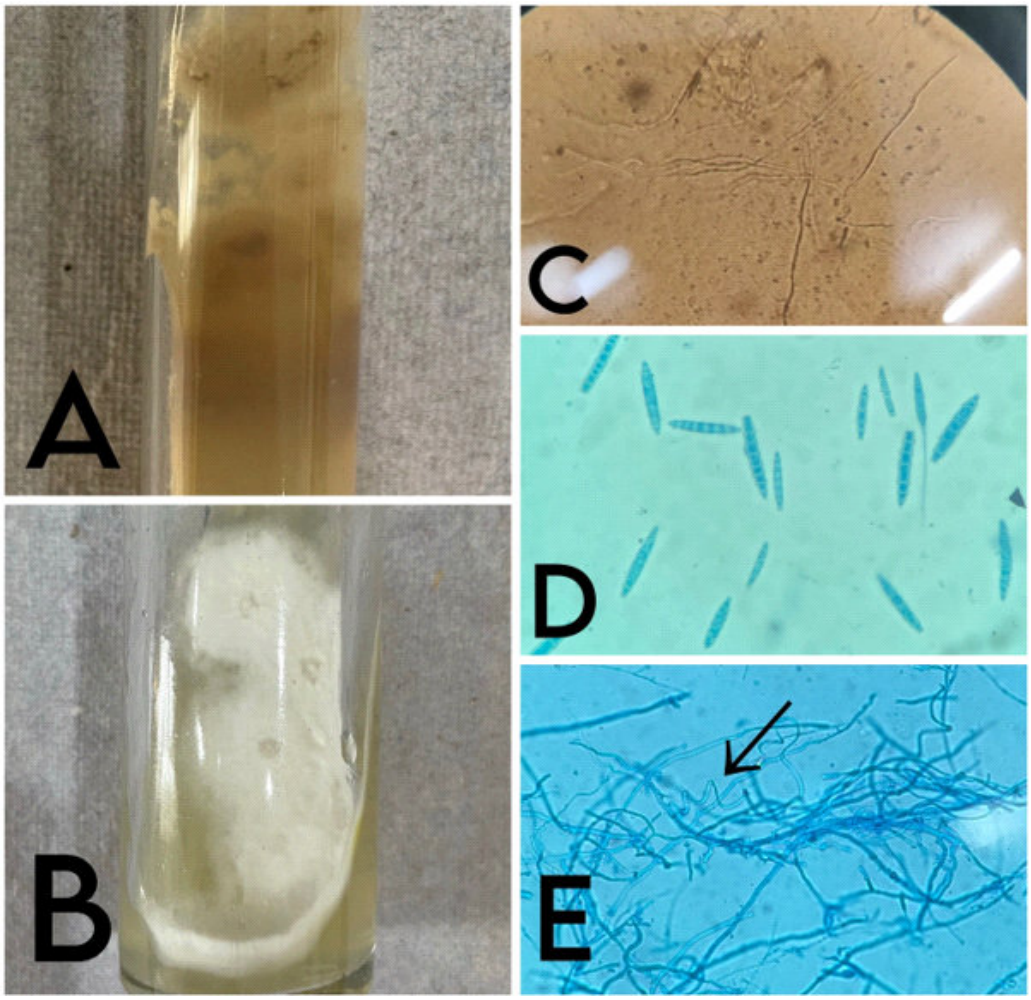

Figure 2 (A–E): Microbiological characteristics of *Trichophyton mentagrophytes/interdigitale*.

(A) Macroscopic appearance (reverse) of the colony showing yellowish-brown pigmentation.

(B) Obverse view of the culture demonstrating white, granular to powdery colony morphology typical of dermatophytes.

(C) Direct microscopy (KOH mount) revealing branching, septate hyaline hyphae.

(D) Lactophenol cotton blue mount showing numerous elongated, multicellular macroconidia.

(E) Microscopic morphology demonstrating septate hyphae with characteristic spiral hyphae (arrow), suggestive of *Trichophyton* species.

Discussion

Fungal keratitis is a significant cause of ocular morbidity in tropical countries, particularly in India, where it constitutes a major proportion of infectious keratitis cases. Recent studies report that fungi account for nearly 40–50% of microbial keratitis, with filamentous fungi such as *Aspergillus* and *Fusarium* being the predominant etiological agents.[6,7] In contrast, dermatophytes are rarely implicated in corneal infections, making their isolation noteworthy and diagnostically challenging.

Dermatophytes are keratinophilic fungi that typically infect superficial keratinized tissues such as skin, hair, and nails. Their ability to invade non-keratinized structures like the cornea is unusual and requires specific predisposing factors. In the present case, the coexistence of chronic dermatophytosis, possible autoinoculation through repeated eye rubbing, and prior use of topical corticosteroid-containing preparations likely contributed to corneal invasion. The increasing prevalence of chronic, steroid-modified dermatophytosis in India has been well documented in recent literature, and this expanding reservoir may play a role in such atypical presentations[3,5].

The microbiological diagnosis of fungal keratitis relies heavily on a combination of direct microscopy, culture, and increasingly, molecular techniques. In this case, potassium hydroxide (KOH) mount examination provided rapid evidence of septate hyaline hyphae, supporting an early presumptive diagnosis of fungal etiology. This simple, cost-effective technique remains indispensable in routine practice, especially in resource-limited settings.[8] Culture on Sabouraud dextrose agar allowed for the growth and phenotypic identification of the organism. The characteristic white, granular colonies along with microscopic morphology demonstrating septate hyphae and microconidia were suggestive of a dermatophyte.

However, phenotypic identification alone may be insufficient, particularly within species complexes such as *Trichophyton mentagrophytes/interdigitale*. Recent advances emphasize the importance of molecular methods, especially internal transcribed spacer (ITS) region sequencing, for accurate species-level identification.[8] Confirmation of *Trichophyton mentagrophytes/interdigitale* by MALDI TOF-MS in this case not only established the diagnosis but also contributed to the limited body of evidence regarding dermatophyte-associated keratitis.

Dermatophyte keratitis is rare, with only sporadic case reports and small case series described in the literature over several decades. Most reported cases are associated with delayed diagnosis and poor clinical outcomes, often due to low clinical suspicion and initial empirical antibacterial or corticosteroid therapy.[5] The clinical presentation in such cases typically resembles other forms of filamentous fungal keratitis, characterized by dry-looking ulcers, feathery margins, and stromal infiltrates, making laboratory confirmation essential.[5]

Another important consideration is antifungal susceptibility. Recent studies have reported emerging resistance among dermatophytes, particularly to commonly used agents such as terbinafine and azoles, in the context of chronic dermatophytosis in India.[3] Although antifungal susceptibility testing is not routinely performed in all cases of keratitis, it may be relevant in unusual or refractory infections. The suboptimal response to medical therapy observed in this case may be attributed to delayed presentation, deep stromal involvement, and potential variability in antifungal susceptibility.

The increasing availability of molecular diagnostic tools and improved laboratory techniques has enhanced the ability to detect rare fungal pathogens. Recent studies have highlighted the role of PCR-based assays and sequencing in improving diagnostic accuracy and reducing turnaround time in fungal keratitis.[8,9] These advances are particularly valuable in cases involving uncommon organisms, where conventional methods may be inconclusive or delayed.

Conclusion

In conclusion, this case underscores the importance of considering dermatophytes as rare but possible causative agents of fungal keratitis, especially in patients with chronic dermatophytosis. Early microbiological evaluation using a combination of microscopy, culture, and molecular methods is essential for accurate diagnosis. Increased awareness and timely identification of such atypical pathogens are crucial to guide appropriate therapy and improve clinical outcomes.

Author Contributions

Sachan Tanya: Conceptualization, microbiological analysis, drafting of manuscript, and final approval.

Pandey Tanya: Data collection, literature review, and manuscript editing.

Verma Rajat: Conceptualization, drafting of manuscript critical revision of manuscript.

Conflict of Interest

The authors declare that they have no conflict of interest.

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