



# Clinical Manifestations and Treatment Outcomes of Rare Genera Fungal Keratitis

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## ABOUT THE STUDY

Fungal keratitis can result in serious visual impairment and mainly concentrated in tropical and subtropical regions in developing countries, such as India and Brazil, as it accounts for 40% to 50% of all isolated keratitis cases. Currently, there are more than 70 pathogens that can cause fungal keratitis, but the clinical isolates of these pathogens are mainly concentrated in a few genera. The fungal isolates vary from country to country due to climate and environmental impacts. *Fusarium* and *Candida* are the most common pathogens in developed countries (such as the United States and the United Kingdom). Rare pathogens, such as *Rhizopus*, *Sarocladium*, *Colletotrichum*, *Exserohilum*, *Bipolaris*, *Curvularia crescentulum*, *Purpureocillium lilacinum*, and *Pythium insidiosum* have been reported in dozens of cases among both white and black populations.

Because fungal species have different growth patterns, so do their clinical manifestations, pathogenic invasiveness, and microbial characteristics. The clinical diagnosis of infectious keratitis based on slit lamp examination poses a challenge, and microbial detection remains the gold standard. However, early empirical treatment based on lesion manifestations is also required. Many studies have shown that *Fusarium* keratitis has feathery edges due to horizontal growth, whereas *Aspergillus* keratitis has immune rings and hypopyon due to vertical growth.

*Pythium insidiosum* is a fungal-like organism that appears as branching, sparsely septate or aseptate filaments. Its host animals are mammals, but ocular infections are uncommon in China. Water exposure, contact lens wear, and trauma are the main predisposing factors. Despite the fact that this study focused on fungi, the microbial species of *Pythium insidiosum* still has to be explored more. Endothelial plaque, hypopyon, and peripheral reticular infiltration are the most common clinical

symptoms, indicating that the genus produces considerable enzymatic hydrolysis in the surrounding and deep tissues. Because of the lack of ergosterol drug targets in the cytoplasmic membrane, antifungal medications are ineffective and illnesses are difficult to manage.

*Exserohilum*, *Bipolaris*, and *Colletotrichum* are dematiaceous fungi that are predisposed by foreign materials or plant damage. Human infections primarily affect the skin and respiratory tract, with cornea infections occurring seldom. Feathered edges, which penetrated the surrounding corneal tissues in a carpet-like fashion, were the most prevalent expression of the three fungal taxa. The key explanation for this was melanin in the cell wall, which has been shown to impact the host's immunological response to infection and lower pathogen toxicity during deep infection. Furthermore, *Colletotrichum's* specific temperature sensitivity slowed its advancement to deeper depths (35°C growth restriction), albeit the low virulence of these three taxa has yet to be confirmed.

The first-line treatment for filamentous fungal keratitis caused by *Fusarium spp.* and *Aspergillus spp.* is natamycin. In our investigation, no zoospore was found in *Pythium insidiosum* culture, and drug susceptibility testing yielded no findings. Amphotericin B, voriconazole, and itraconazole were effective against fungus in the other seven genera; voriconazole appeared to be more efficient against fungi, especially in dematiaceous species. For *Pythium insidiosum* keratitis, antifungal medication combined with antimicrobial therapy has been used in other countries and has achieved certain effects. Agarwal et al. reported cryotherapy or absolute alcohol might prove beneficial. These adjunctive measures may be beneficial to the treatment *Pythium insidiosum* keratitis.

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