



An Unusual Case of Mycotic Keratitis due to *Neoscytalidium dimidiatum* in an Agriculturist from Karnataka, India

ARTICLE INFO

Article Type Case Report

Authors

Asem Ali Ashraf, MD¹
Pratibha Bhat U, MD^{2*}
Ann Mary Anil, MBBS³
Faiq Sakaf Seythin Akath, MBBS³

¹ Assistant Professor, Nitte (Deemed to be University), KS Hegde Medical Academy (KSHEMA), Department of Microbiology, Mangalore, Karnataka, India

² Associate Professor, Nitte (Deemed to be University), KS Hegde Medical Academy (KSHEMA), Department of Microbiology, Mangalore, Karnataka, India

³ Junior Resident, Nitte (Deemed to be University), KS Hegde Medical Academy (KSHEMA), Department of Microbiology, Mangalore, Karnataka, India

* Correspondence

Associate Professor, Department of Microbiology, Nitte (Deemed to be University), KS Hegde Medical Academy (KSHEMA), Deralakatte, Mangalore-575018, Karnataka, India
E-mail: pratibhabhat.u@nitte.edu.in

How to cite this article

Ashraf AA, Bhat U.P., Anil A.M., Akath F.S.S. An Unusual Case of Mycotic Keratitis due to *Neoscytalidium dimidiatum* in an Agriculturist from Karnataka, India. Infection Epidemiology and Microbiology. 2024;10(2):153-156

Article History

Received: February 29, 2024
Accepted: May 22, 2024
Published: June 21, 2024

ABSTRACT

Background: There are few keratitis cases caused by the plant pathogen *Neoscytalidium dimidiatum*, which is known to cause skin and nail infections in humans. This fungus primarily affects immunocompromised patients; however, cases have rarely been reported in immunocompetent individuals. In this case report, we present an uncommon case of *N. dimidiatum* keratitis in an immunocompetent Indian male patient with no significant co-morbidities, admitted to Justice K.S. Hegde Charitable hospital in Mangaluru, India.

Materials & Methods: The patient underwent corneal scraping, and a sample was sent for further microbiological evaluation. KOH (potassium hydroxide) mount of corneal scrapings was performed. Additionally, corneal scrapings were inoculated on Sabouraud dextrose agar (SDA), with and without cycloheximide, as well as blood agar (BA). Slide culture was conducted to observe fungal growth on SDA without cycloheximide. Subsequently, lactophenol cotton blue (LPCB) mount of the fungal colony isolated from the aforementioned slide culture was performed.

Findings: KOH mount of corneal scrapings revealed septate fungal hyphae, while fungal culture showed grey-to-brown colonies with black pigmentation on the reverse after ten days of incubation at room temperature. Chains of arthroconidia, typical of *Neoscytalidium* species, were observed upon staining with lactophenol cotton blue mount of the fungal colony isolated from the slide culture. The patient was clinically managed with debridement and ophthalmic antifungal agent.

Conclusion: *N. dimidiatum* cases could also occur in immunocompetent individuals. Therefore, prompt diagnosis and vigorous antifungal therapy are critical for effective recovery and prevention of severe ocular complications.

Keywords: *Neoscytalidium dimidiatum*, Corneal ulcer, Keratitis, Fungal keratitis, Fungal infection

CITATION LINKS

[1] Chowdhary A, Singh K. Spectrum of fungal keratitis in north India... [2] Prajna VN, Prajna L, Muthiah S. Fungal keratitis: The Aravind experience... [3] Mandlik K, Ramakrishnan S, Kabra N, Bhattacharya D, Gubert J. Mycotic keratitis due to rare fungal species... [4] Kidd S, Halliday C, Alexiou H, Ellis D. Descriptions of medical fungi... [5] Crous PW, Slippers B, Wingfield MJ, Rheeder J, Marasas WF, Philips AJ, et al. Phylogenetic lineages in the... [6] Dharmshale S, Shinde D, Bali A, Kandle S. A rare fungal isolate *Neoscytalidium dimidiatum* from keratitis... [7] Tendolkar U, Tayal RA, Baveja SM, Shinde C. Mycotic keratitis due to *Neoscytalidium dimidiatum*... [8] Calvillo-Medina RP, Martínez-Neria M, Mena-Portales J, Barba-Escoto L, Raymundo T, Campos-Guillén J, et al. Identification and biofilm development by a new... [9] Al-Rajhi AA, Awad AH, al-Hedaithy SS, Forster RK, Caldwell KC. *Scytalidium dimidiatum* fungal endophthalmitis... [10] Dunn JJ, Wolfe MJ, Trachtenberg J, Kriesel JD, Orlandi RR, Carroll KC. Invasive fungal sinusitis caused by *Scytalidium dimidiatum* in a lung... [11] Farjo QA, Farjo RS, Farjo AA. *Scytalidium* keratitis: Case report in a human eye... [12] Gumbo T, Mkanganwi N, Robertson VJ, Masvaire P. Case report. *Nattrassia mangiferae* endophthalmitis...

Introduction

Given India's tropical climate and large agrarian population, mycotic ulcers constitute a significant portion of culture-proven keratitis cases, with *Aspergillus* and *Fusarium* species being the most commonly isolated species [1, 2]. *Neoscytalidium dimidiatum*, a plant pathogen known to cause skin and nail infections in humans, has rarely been reported to cause keratitis. While this fungus primarily affects immunocompromised individuals, a few cases have been documented in immunocompetent individuals as well [3]. In this case report, we present a successfully-treated unusual case of *N. dimidiatum* keratitis in a 57-year-old immunocompetent Indian male patient with no significant comorbidities.

Materials and Methods

A 57-year-old male patient with no significant co-morbidities presented to the Ophthalmology Out-Patient Department (OPD) at Justice K.S. Hegde Charitable hospital (Mangaluru, India) with complains of pain, redness, and diminished vision in his right eye, persisting for five days. His perception of light (PL) with projection of rays (PR) in all four quadrants of his right eye was accurate.

The symptoms had an insidious onset and gradually worsened. The patient reported a history of foreign body trauma to the same eye 15 days prior while engaging in agricultural work. There was no history of contact lens usage or local application as well as systemic intake of antifungals, antimicrobial agents, or steroids. Additionally, the patient denied experiencing itching, discharge, headache, or fever. He initially sought care at a local hospital, where he received topical antibiotics and analgesics. Since his symptoms persisted, he was referred to the present tertiary healthcare setting for further evaluation.

Findings

Ophthalmological evaluation: In the local examination, the right eye showed congested conjunctiva, stromal infiltrates in the cornea, and a 3x3 mm ulcer. Additionally, there was a 1 mm hypopyon in the anterior chamber and mild eyelid edema with matting of the eyelashes. The patient underwent corneal scraping, and a sample was sent for further microbiological evaluation. Empirical therapy with antibiotics was initiated by the clinician with a provisional diagnosis of 'right eye corneal ulceration with hypopyon'.

Microbiological evaluation: KOH mount of corneal scrapings revealed septate fungal hyphae. Subsequently, corneal scrapings were inoculated on Sabouraud dextrose agar (SDA), both with and without cycloheximide, as well as blood agar (BA). Mold growth was observed along the inoculation line on blood agar and SDA without cycloheximide. On the SDA plate without cycloheximide, the mycelial growth observed after 3 days of incubation at room temperature appeared flat, cottony in consistency, and grey to brown in colour on the obverse side, becoming darker on the reverse side (Figure 1A). By the end of 10 days of incubation, the mycelial growth was black in colour on the reverse side (Figure 1B). A slide culture was conducted, and lactophenol cotton blue (LPCB) mount of the fungal colony isolated from the slide culture revealed thin branched hyaline septate fungal hyphae along with few thick pigmented septate hyphae displaying chains of thick-walled cylindrical arthroconidia (Figure 2). The arthroconidia appeared flattened at the ends, resembling a barrel. These arthroconidia, characteristic of *N. dimidiatum*, typically occur in chains of one to two cells, are darkly pigmented, and are produced by holothallic fragmentation of undifferentiated hyphae [5]. The fungus was identified as *N. dimidiatum* based on

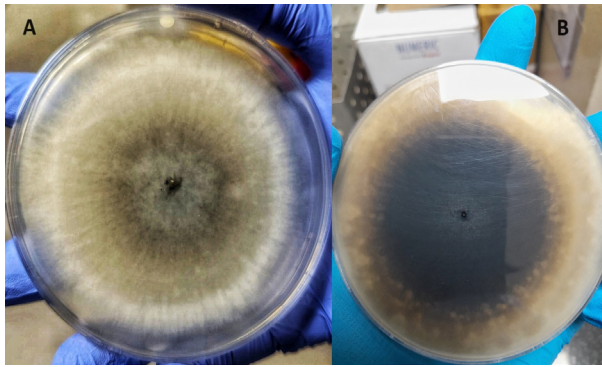


Figure 1) A) Sabouraud dextrose agar (SDA) plate: fungal growth is darker in colour on the reverse side following 72 hours of incubation. B) SDA plate: fungal growth exhibits black pigmentation on the reverse side by the end of 10 days of incubation.

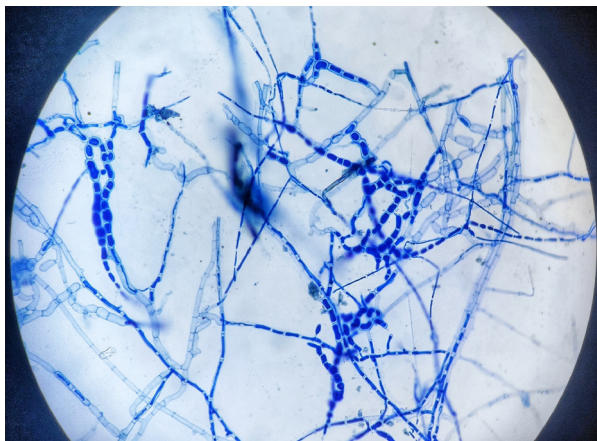


Figure 2) Lactophenol cotton blue (LPCB) mount of the fungal colony, showing thin branched hyaline septate fungal hyphae and few thick pigmented septate hyphae with chains of thick-walled cylindrical arthroconidia

its microscopic, morphological, and culture characteristics [4]. The patient was diagnosed with fungal keratitis of the right eye and managed medically with debridement and ophthalmic antifungal natamycin eye drops along with homatropine eye drops and moxifloxacin eye drops. Additionally, the patient was discharged with oral ketoconazole, ciprofloxacin 500 mg tablets, analgesics, antacids, and vitamin C supplements in addition to the aforementioned eye drops. In the subsequent follow-ups at the Ophthalmology OPD on a weekly basis, the patient's eye condition

improved, and his antifungal drugs were gradually discontinued.

Discussion

N. dimidiatum, formerly known as *Scytalidium dimidiatum* and *Hendersonula toruloidea*, is a dematiaceous fungus primarily recognized as a plant pathogen and rarely involved in keratitis. In India, the most common pathogens causing keratitis include *Aspergillus* species (27–64%), *Fusarium* species (6–32%), and *Penicillium* species (2–29%) [6]. *N. dimidiatum* primarily affects the skin and nails and could pose challenges in treatment. Tendolkar et al. (2015) conducted a study demonstrating the virulence and complexity of eliminating this fungus [7]. Therefore, early diagnosis of keratitis caused by such fungal species is crucial to prevent the development of disseminated infections. The first reported case of keratitis caused by *N. dimidiatum* was documented in a Yemeni farmer with a history of eye trauma caused by a thorn prick, which served as the route of infection [9]. Similarly, in this case report, the patient also had a history of foreign body entry into the affected eye, suggesting a potential route of infection.

In many cases, such fungal infections like those caused *Neoscytalidium* species may go undiagnosed or improperly treated. Research suggests that the culture method, which is considered as the gold standard for identifying such infections, is essential and should be included in the routine diagnostic investigations used for suspected cases [7]. Although *Neoscytalidium* species mycosis is successfully treated with a combination of medications such as amphotericin B or systemic azoles (voriconazole and itraconazole), there is currently no established conventional treatment protocol for these infections [8]. Despite the in vitro susceptibility of this

fungus to various antifungals, including voriconazole, fluconazole, and amphotericin B, clinical responses to these antifungals are often subpar ^[10]. For example, despite intraocular application of antifungals such as amphotericin B, miconazole, and natamycin, coupled with extensive surgical debridement, the first documented case of eye infection in a Yemeni agriculturist with endophthalmitis following trauma in 1993 did not improve and ultimately required enucleation ^[9]. However, clinical outcomes could vary as documented in a study by Farjo and colleagues (2006), where a case of *S. dimidiatum* keratitis responded well to topical amphotericin B and oral fluconazole ^[11]. Similarly, oral ketoconazole was found to be effective in treating a case of endophthalmitis caused by *S. dimidiatum* in a study by Gumbo et al. (2000) ^[12]. In this case report, the patient showed gradual improvement during consecutive follow-ups, indicating a favourable response to oral ketoconazole and topical natamycin.

Conclusion

Neoscytalidium species undoubtedly pose a serious risk of corneal infection. Therefore, prompt diagnosis and aggressive antifungal therapy are essential to ensure effective recovery and prevent severe ocular complications, including end-stage blindness.

Acknowledgment

None declared by Authors.

Informed Consent Statement: Signed consent was obtained from the patient for publication and use of images.

Ethical approval: Not applicable.

Author Contribution: A.A.A; P.B.U; A.M.A - Data analyzing, interpretation, validation, literature search, manuscript writing, review A.A.A; P.B.U; F.S.S.A - Data analyzing, interpretation, validation, literature search,

manuscript writing, editing, review, final draft.

Conflict of Interest: The authors wish to state no conflict of interest.

Fundings: The article has not received any financial support from any organization whatsoever. It is self-funded.

References

1. Chowdhary A, Singh K. Spectrum of fungal keratitis in north India. *Cornea*. 2005;24(1):8-15.
2. Prajna VN, Prajna L, Muthiah S. Fungal keratitis: The Aravind experience. *Indian J Ophthalmol*. 2017;65(10):912-9.
3. Mandlik K, Ramakrishnan S, Kabra N, Bhattacharya D, Gubert J. Mycotic keratitis due to rare fungal species *Neoscytalidium*: A case series. *Indian J Ophthalmol Case Rep*. 2022;2(3):667-9.
4. Kidd S, Halliday C, Alexiou H, Ellis D. Descriptions of medical fungi. 3rd ed. Australia, Adelaide: Newstyle Printing; 2016.
5. Crous PW, Slippers B, Wingfield MJ, Rheeder J, Marasas WF, Philips AJ, et al. Phylogenetic lineages in the Botryosphaeriaceae. *Stud Mycol*. 2006;55(1):235-53.
6. Dharmshale S, Shinde D, Bali A, Kandle S. A rare fungal isolate *Neoscytalidium dimidiatum* from keratitis in a people living with HIV. *World J Public Health Epidemiol*. 2022;1(1):1-4.
7. Tendolkar U, Tayal RA, Baveja SM, Shinde C. Mycotic keratitis due to *Neoscytalidium dimidiatum*: A rare case: Mycotic keratitis due to *Neoscytalidium dimidiatum*. *Community Acquir Infect*. 2015;2(4):142-4.
8. Calvillo-Medina RP, Martínez-Neria M, Mena-Portales J, Barba-Escoto L, Raymundo T, Campos-Guillén J, et al. Identification and biofilm development by a new fungal keratitis aetiologic agent. *Mycoses*. 2019;62(1):62-72.
9. al-Rajhi AA, Awad AH, al-Hedaithy SS, Forster RK, Caldwell KC. *Scytalidium dimidiatum* fungal endophthalmitis. *Br J Ophthalmol*. 1993;77(6):388-90.
10. Dunn JJ, Wolfe MJ, Trachtenberg J, Kriesel JD, Orlandi RR, Carroll KC. Invasive fungal sinusitis caused by *Scytalidium dimidiatum* in a lung transplant recipient. *J Clin Microbiol*. 2003;41(12):5817-9.
11. Farjo QA, Farjo RS, Farjo AA. *Scytalidium* keratitis: Case report in a human eye. *Cornea*. 2006;25(10):1231-3.
12. Gumbo T, Mkanganwi N, Robertson VJ, Masvaire P. Case report. *Natrassia mangiferae* endophthalmitis. *Mycoses*. 2002;45(3-4):118-9.