

## Onychomycosis caused by *Acremonium* species: A case report

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### ABSTRACT

Onychomycosis is a common condition constituting fungal infection of nails. It is generally caused by dermatophytes but non-dermatophytic mold and yeast as its causative agent are on the rise. *Acremonium*, a non-dermatophytic mold, is commonly found in decaying vegetation, soil, and air. Identification of the causative agent is important as non-dermatophytic molds are resistant to commonly used antifungals. This is a case of an Indian woman who presented with onychomycosis of the toenail and the causative agent was documented and reported as *Acremonium* species.

**Key words:** *Acremonium*, Non-dermatophytic mold, Onychomycosis

Onychomycosis is an infection of the nails due to dermatophytes, Non-Dermatophytic Molds (NDMs), or yeasts having a worldwide prevalence of 5.5%. The commonly involved dermatophytes are *Trichophyton rubrum* and *Trichophyton mentagrophyte*. NDMs are filamentous fungi commonly present in nature as saprophytes and plant pathogens [1]. NDM constitutes 20% of cases of onychomycosis and the common ones involved in this condition are *Scopulariopsis brevicaulis*, *Aspergillus* spp, *Acremonium*, *Fusarium* spp, *Alternaria alternate*, and *Neoscytalidium* [1]. Identification is of utmost importance as NDMs are on the rise and they may not respond to the commonly recommended antifungals [1]. *Acremonium* is a saprophytic hyaline fungal mold having pathogenic potential and capable of causing infections, especially in immunocompromised hosts. The common species of *Acremonium* (previously known as *Cephalosporium*) are *Acremonium falciforme*, *Acremonium kiliense*, *Acremonium recifei*, *Aspergillus alabamensis*, *Acremonium roseogriseum*, and *Acremonium strictum* and can cause mycetoma, mycotic keratitis, onychomycosis, and disseminated infection in immunocompromised patients [2].


This patient, an adult female, presented with onychomycosis of the toenail. The nail clipping grew an NDM which was identified as *Acremonium* species. Bearing in mind its ubiquitous nature and its presence as an environmental saprophyte, reporting it or not was a challenge. However, it was reported and the reasons for reporting it are presented in this case report.

### CASE REPORT

A 53-year-old Indian female doctor presented with the brittleness of the left second and third toenails for the past seven and two months, respectively. It started as a white spot at the tip of the second toenail, gradually involving the nail further. Later, the tip of the third toenail also got involved. There was no pain and daily activities were not affected. There was a past history of trauma to both nails. She uses an open type of footwear. There was no family history of a similar infection. She does not have a history of diabetes mellitus or any other immunocompromised condition.

On examination, the surface of the distal half of the second toenail with less than half of the nail was involved. It was yellowish and in places, the nail had broken. The remaining nail was normal in color. It was not separated from the nail bed. There was no involvement of the surrounding skin (Fig. 1). The tip of the third toenail was white and no major dystrophy or significant findings were present in it.

Her blood investigations were normal. Nail scraping from the second toenail was collected. 20% Potassium Hydroxide (koh) mount did not show fungal elements. It was plated on Sabouraud Dextrose Agar (SDA) plain and with antibiotics (chloramphenicol, gentamicin, and cycloheximide). Plates were incubated at 37°C and 24°C, respectively. Growth started after a week as a tiny mold on plain SDA. There was no growth in SDA with cycloheximide. At the end of 10 days, colonies had a flat smooth pastel color, yeast-like appearance. Five days further to this, the colonies were powdery white and cottony. The reverse was initially pale yellow, which later turned brown (Fig. 2). Lactophenol cotton blue mount

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Figure 1: Involvement of second and third toenails



Figure 2: Obverse and reverse of growth

from the growth showed fine narrow septate hyphae. Delicate phialides extending at right angles from hyphae bearing hyaline conidia were seen. Conidia were single-celled, straight, non-crescentic having three to four septations with one end truncated (Fig. 3). Slide culture from the growth confirmed the findings. It was reported as *Acremonium* species. She was given an alcohol-based liquid (lacquer) for local application which she applied twice weekly. At the end of 3 months, further involvement of the nail was not seen and there was improvement in the affected part of the nail.

## DISCUSSION

Onychomycosis is generally not a life-threatening condition. However, it can impact a patient's quality of life due to its associated morbidity and can be a cosmetic blotch thus making it an important public health problem [3]. As per Marinez-Herrera *et al.*, toenails were the most commonly affected in onychomycosis. They also observed that it is more common in females between the range of 41 and 65 years [4]. This patient was a 53-year-old female with an affected toenail.

Trauma to the nail by walking barefoot or in ill-fitting shoes is considered a predisposing factor as it leads to inoculation of

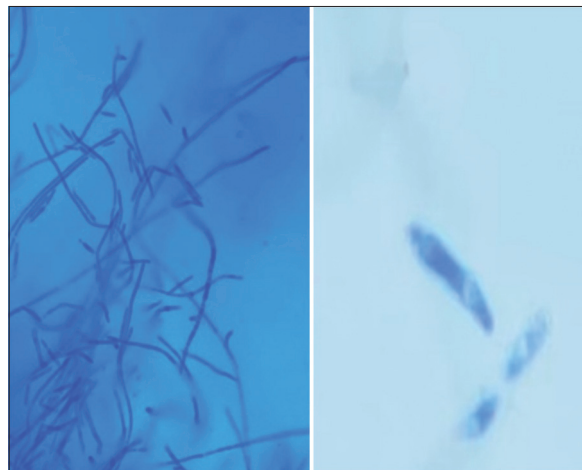


Figure 3: LPCB mount from the growth showing hyphae with conidia and straight, single conidia with septations and truncated at one end ( $\times 40$ )

the organism and initiation of pathogenesis. In most cases, the duration is less than one year [5], likewise in this one. Although this patient used an open type of footwear, she did give a history of trauma to the nails. Among all, the culture-positive cases, dermatophytes account for 70% of isolates, whereas NDMs 1.45 to 16.6% and yeasts 1–31% [6]. *Acremonium* species is one among the other NDMs which are the causative agents of onychomycosis [4]. Among the variants of onychomycosis, white superficial onychomycosis involves only the superficial layers of the nail, and *Acremonium potronii* and other species of *Acremonium* are involved in it [4,7]. Our patient also presented with a similar presentation where the entire nail was not involved. As per Khan S, there is a rising trend of onychomycosis caused by NDMs, hence the need to be on the look for it [3]. Kyriakou *et al.* have reported a case of nail bed infection caused by *Acremonium* simulating squamous cell carcinoma [8]. NDMs are difficult to diagnose as they are generally regarded as contaminants [9]. With several diagnostic methods available, repeated laboratory isolation is the most accurate method [9]. However, in this case, repeated isolation was not done as the sample could not be re-collected.

Although usually considered a saprophyte, onychomycosis is a part of the disease spectrum of *Acremonium* [1,2,10,11]. It could be differentiated from other molds like *Fusarium* species due to its growth characteristics and morphology as the latter is fast growing and produces deep woolly colonies. Furthermore, conidia of *Fusarium* species are crescentic [2,7]. Based on morphology, growth rate, arrangement, and structure of conidia, growth was confirmed to be *Acremonium*, probable species *kiliense*. However, species of *Acremonium* being morphologically very similar to each other can only be distinguished on the basis of minor differences which makes their species identification difficult. Identification of species requires DNA-based techniques [12]. In the absence of such techniques, the isolate was reported up to the genus level. Bearing in mind the rising spectrum of NDMs in onychomycosis, demographic features of the patient, history of trauma, and involvement of toenails, this NDM was reported.

Treatment of onychomycosis due to NDM requires more time than treatment of those with onychomycosis due to dermatophytes, and some patients with onychomycosis due to NDM frequently do not respond to antifungal agents [1]. For NDMs, maximum susceptibility was seen to itraconazole, terbinafine, fluconazole, and griseofulvin [6]. Topical antifungals include antifungal nail lacquers and should be restricted to superficial white onychomycosis, early DLSO or when systemic antifungals are contraindicated [13]. In this case too, keeping in mind, the limited involvement of the nail, alcohol-based lacquer was used due to the antifungal effect of alcohol and there was improvement seen at the end of 3 months.

## CONCLUSION

*Acremonium*, an NDM, should not be overlooked as a mere contaminant and should be recognized as a potential pathogen that can cause all forms of onychomycosis with profound therapeutic implications. Especially, keeping in mind its worldwide upward trend in causing this type of infection, its isolation from such samples needs to be given heed too. This can contribute to its timely management and prevent further involvement of nails, thus avoiding further cosmetic distortion to the patient as well as further spread of the fungus.

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