



## Onychomycosis due to a rare fungus, *Paecilomyces variotii* – A Case Report

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### Abstract

*Onychomycosis is an infection of the nails commonly caused by dermatophytes. There is a change in epidemiology of the causative agents. Non-dermatophytic fungal agents though rarely implicated are recently being recognised as nail pathogen more frequently. Paecilomyces variotii is a non-dermatophytic mold which is exceptionally reported as a cause of fungal infections. It has been rarely associated with human infections like endocarditis, endophthalmitis, pneumonia, sinusitis and cutaneous hyalohyphomycosis, invariably in poor immune responders. Onychomycosis due to Paecilomyces variotii is rarer still as only two cases are reported earlier. The present case focuses the relevance of recognition of an uncommon causative fungus in onychomycosis, a frequent infection in an immunocompetent individual.*

**Keywords:** Onychomycosis, *Paecilomyces variotii*, itraconazole, immunocompetent.

### Introduction

Onychomycosis, fungal infection of the nail, constitutes an important public health problem because of its high prevalence and associated morbidity more so with advanced age. Prevalence in patients 60-79 years of age is 18.2% as compared to 0.7% in subjects younger than 19 years of age<sup>[1]</sup>. The condition is characterised by irregular, brittle, discoloured and disfigured nails with complete destruction of nail plate in extensive disease. Being difficult to treat, onychomycosis may trigger more infectious lesions on other parts of the body. Dermatophyte fungi are the predominant pathogens responsible for onychomycosis. The yeasts and non

dermatophytic molds including *Acremonium*, *Alternaria*, *Aspergillus* sp., *Fusarium* sp., *Scytalidium* and *Scopulariopsis* are implicated in few cases<sup>[2]</sup>. *Paecilomyces variotii* is an exceptional causative agent. It has been rarely associated with human infections like endocarditis, endophthalmitis, pneumonia, sinusitis and cutaneous hyalohyphomycosis, invariably in poor immune responders<sup>[2,3]</sup>. Onychomycosis due to *Paecilomyces variotii* is rarer still as only two cases are reported earlier.<sup>[4,5]</sup> This patient highlights the relevance of recognition of an uncommon causative fungus in onychomycosis which is a widespread infection.

### Case Report

A 65-year-old lady presented with changes in her nails of left foot. They had been discoloured brownish-yellow distally for the past 6 months. The nails had become thickened and difficult to cut. She experiences pain while walking especially in closed shoes. Recently, the patient has observed similar changes in nails of thumb and ring finger of right hand also. The patient was otherwise in good health and denied nail trauma or dystrophic abnormalities prior to the present lesions. There was no history of diseases like diabetes mellitus, psoriasis or any other conditions where nails are involved. General physical examination revealed a healthy afebrile woman with normal vitals. In physical examination, affected toes showed thickened nails with longitudinal ridges, irregular plate and a crumbling material beneath. Nail of the great toe was completely infected and weathered (Figure 1).



**Figure 1:** Great toe nail dystrophy

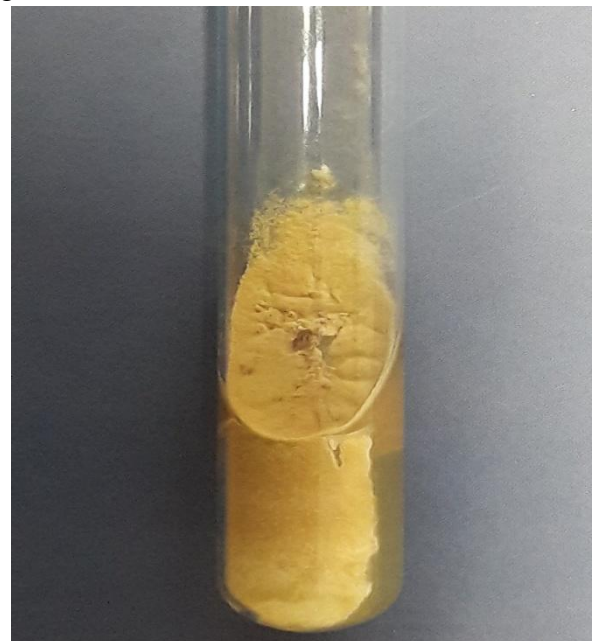


**Figure 2:** Finger nail involvement



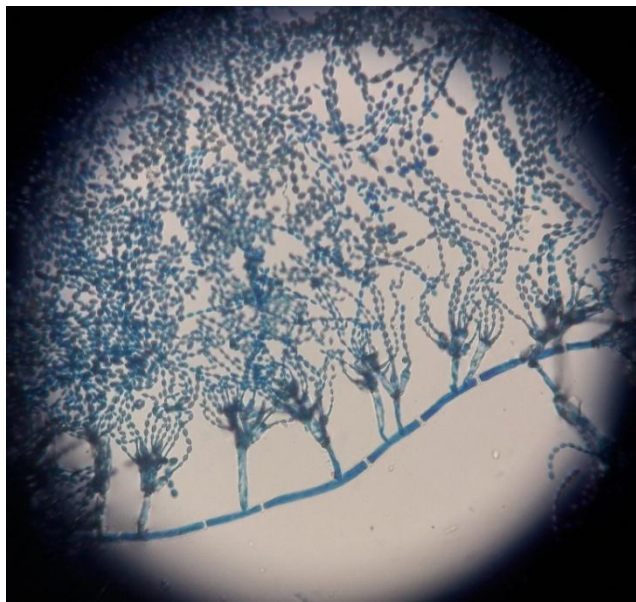
**Figure 3:** Dystrophic thumb nail

The thumb nail was lifted and appeared thick, brownish-yellow and nearly detached from nail-bed (Figure 2 and 3). Nails were discoloured yellow, more distally than proximally. The nearby skin was normal and no maceration was observable in the inter digital spaces. Rest of the mucocutaneous and systemic examination was non-contributory. Infected nails were clipped and subjected to direct microscopy using 40% KOH which revealed hyaline septate branching hyphae. Fungal cultures from different nail specimens were performed on Sabouraud's dextrose agar with chloramphenicol at 25°C and 37°C. Fast growing, powdery to floccose yellow-brown colonies were observable in 3-5 days (Figure 4).



**Figure 4:** Powdery to floccose yellow-brown colonies on SDA media.

Lactophenol cotton blue (LCB) wet mounts revealed characteristic hyaline, septate hyphae with conidiophores bearing dense verticillately arranged branches. Cylindrical, tapering phialides bearing smooth-walled, ellipsoidal conidia arising in long divergent chains were seen (Figure 5).



**Figure 5:** Lactophenol cotton blue (LCB) wet mounts revealed hyaline, septate hyphae with conidiophores bearing dense verticillately arranged branches

The isolate was dispatched to National Culture Collection of Pathogenic Fungi (NCCPF), PGIMER, Chandigarh, where identification was confirmed as *P. variotii* vide accession number IL3420. Patient was prescribed itraconazole 100mg b.i.d. Favourable response was observed with slow clearing of infection.

### Discussion

Onychomycosis is traditionally referred to non-dermatophyte nail infection but lately used as a general term to illustrate all fungal infections of nails. The toenails are more often affected in a ratio of 4:1 to finger nails<sup>[6]</sup>. Trauma or disease-causing dystrophy of nails predisposes to infection and our patient indulging in farming as a part-time job probably acquired the infection in a similar fashion though no history of trauma was notified.

*Paecilomyces* species are ubiquitous soil saprophytes also obtained in cultures from indoor air, wood and pasteurized foods. It is an emerging

causative agent of human mycosis<sup>[2,7]</sup> The two species frequently implicated in human infections are *P. lilacinus* and *P. variotii*.

The significance of isolating *P. variotii* from specimens can be dubious as this is an unconventional human pathogen. Only sporadic cases are reported. The spectrum of diseases includes endocarditis, pneumonia, rhinosinusitis, endophthalmitis and ocular mycosis<sup>[2,3,8,9]</sup>. *P. variotii* has been isolated from samples of liver biopsy, vitreous aspirates, sputum, CSF, faeces and nails<sup>[7]</sup>. It is reported to colonize renal pelvis in a patient of nephrolithiasis and CSF shunts as well<sup>[2]</sup>. Onychomycosis is rarely encountered and extensive search of published reports revealed only two cases previous to the present case.<sup>[4,5]</sup> In the present case, *P. variotii* was isolated from samples obtained from two separate infected nails and confirmation of the species was done at NCCPF, PGIMER.

Taxonomically, this hyalohyphomycotic fungus belongs to the Order Eurotiales<sup>[7]</sup>. It bears resemblance to *Penicillium* and *Aspergillus* species. The other pathogenic species, *P. lilacinus* can be differentiated on the basis of colony colour and microscopic features. Another look-alike fungus is the *Talaromyces eburneus* which unlike *P. variotii* is not thermophilic<sup>[7]</sup>. *P. variotii* is characterised by slow growth at 25°C, grows moderately at 28°C and 40°C and rapidly within 3 days at 37°C. This fungal agent grows well even at temperatures as high as 50°C and possibly 60°C<sup>[10]</sup>. *P. variotii* produces fast growing, powdery to floccose yellow-brown or sand coloured colonies with a sweet odour<sup>[3]</sup>. Preliminary identification was done on colony morphology and micro-slide culture showing typical conidiophores bearing dense verticillately arranged branches with 2-5 cylindrical phialides tapering abruptly into a long thin cylindrical neck. Conidia were ellipsoidal, smooth-walled arising in long divergent chains. Subspherical chlamydospores were visualized arranged singly at places<sup>[3,9,11]</sup>

The differentiation of *P. variotii* from *P. lilacinus* becomes relevant from patient management point of view. The antifungal susceptibilities of the two are variable as *P. lilacinus* is more resistant to multiple

antifungal drugs. *P. variotii* is uniformly sensitive to amphotericin B.<sup>[7,9,10]</sup> Amphotericin B in a total dose of 1gm followed by itraconazole 400mg daily with continuation of itraconazole for five months as a prophylactic measure has been used for complete cure of severe systemic infection.<sup>[12]</sup> Contrary to resistance in *P. lilacinus*, itraconazole and fluconazole used alone have also been found to be useful in some *P. variotii* infections.<sup>[12]</sup> Our patient responded to itraconazole and treatment was effected by prescribing 100mg b.i.d for 6 months. Other effective azoles include ketoconazole, posaconazole, voriconazole and the novel triazole UR-9825<sup>[12]</sup>. In vitro testing has demonstrated susceptibility to terbinafine<sup>[10,13]</sup>. Interestingly, echinocandins like caspofungin and especially micafungin and anadulafungin are highly active agents<sup>[7]</sup>.

The consciousness to the pathogenic role of *P. variotii* is essential for the clinician and microbiologist to spot this fungal agent as pertinent and successfully treat both mild and serious infections when encountered.

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