

Proximal White Onychomycosis in an Immunocompetent Patient: A Case Report

Brian M. Schmidt¹, Crystal Holmes²

¹Department of Podiatric Medicine and Surgery, Yale New Haven Hospital/DVA West Haven, New Haven, CT, USA

²Department of Internal Medicine, University of Michigan, Ann Arbor, MI, USA
Email: bmcsch85@gmail.com

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Abstract

Objective: Onychomycosis is a diagnosis of fungal organisms in the nail unit. It frequently occurs in both the immunocompetent and immunocompromised patient. A variant of onychomycosis is proximal onychomycosis that occurs on the most proximal aspect of the nail. Proximal onychomycosis is known to be commonly associated with immunocompromised status. **Study Design:** A case report of a veteran who presented a dermatology clinic with complaint of solitary nail discoloration that was recalcitrant to over-the-counter therapy including topical hydrogen peroxide and foot soaks without improvement. **Results and Conclusions:** This individual case report demonstrates that pedal proximal onychomycosis can be associated with non-dermatophyte organisms, identified as *Fusarium* species, in immunocompetent individuals. The finding of pedal proximal onychomycosis caused by a *Fusarium* non-dermatophytic mold has not been reported. The veteran was successfully cured of the condition with treatment via oral terbinafine for a ninety-day course while monitoring patient's liver function test for any complications.

Keywords

Proximal Onychomycosis, Nail Fungus, Onychomycosis

1. Introduction

Onychomycosis is a diagnosis of fungal infection in the nail caused by dermatophytes, non-dermatophytic filamentous fungi, or yeast species [1]. It occurs frequently in patients that are at a risk of developing fungal infections. These include patients with concomitant fungal infections of the body or foot, people of advanced age, where excessive moisture or warmth occurs, in immunocompromised patients, in people who wear closed and

occlusive footwear, and in patients with nail deformity or other nail disease [2] [3]. While onychomycosis may present as one disease, it has different presentations and classification of these helps to understand causative organisms.

Onychomycosis can be divided into four groups: distal lateral subungual onychomycosis, proximal white onychomycosis, white superficial onychomycosis, and candidial onychomycosis [4]-[6]. Proximal white onychomycosis is relatively rare compared to the other types of onychomycosis with distal lateral subungual onychomycosis occurring in approximately 90% of cases [7], while white superficial onychomycosis occurs in 9% of cases and proximal white onychomycosis and candidial onychomycosis occur less than 1% of the time [7]. In addition, proximal white onychomycosis is frequently combined with immune compromise status, like HIV positive individuals [8]. In fact, the incidence of proximal white onychomycosis in the immunocompetent population is 0.3% while proximal white onychomycosis in the HIV-positive population is roughly 15 times greater at 4.2% - 5.0% [7] [8].

Below, a case study of toenail proximal white onychomycosis in an immunocompetent individual is demonstrated. This article utilizes the case to demonstrate classic clinical findings and appropriate workup to elucidate if our patient had a systemic illness that was previously underdiagnosed leading to the development of this condition.

2. Case Study

A 44-year-old male, a veteran of Desert Storm, presents to the Ann Arbor Veteran Affairs hospital clinic with a two-year history of a white discoloration to his left great toe nail. He denies painful symptoms. He has a remote history of dropping a heavy object on the toe over 10 years ago. He denies previous professional advice but self-treatment included over the counter antifungal creams, hydrogen peroxide application, and soaking the nail without success. His past medical history is significant for post-traumatic stress disorder, GERD, bipolar disorder, migraines and hyperlipidemia. He denies any known drug allergies. He medication list includes lamotrigine, fluoxetine and HCTZ/Trimaterene.

On physical exam the veteran is a well appearing Caucasian male. The neurovascular status is intact in both lower extremities. The proximal half of the left hallux nail plate has white onychomycosis (**Image 1**). There is no evidence of inflammation or infection to the surrounding skin or proximal nail fold. Otherwise, remainder of distal nail plate is uninvolved. Blood tests, including HIV, hepatitis C, hepatitis B, liver function studies are taken at the initial visit. Fungal cultures of the left hallux nail plate are taken at the time of the initial visit using a small blade to remove shavings from the proximal aspect of the nail. Initial KOH preparation and screening demonstrated negative results. Upon receipt of tests, all viral assays are negative, LFT's are within normal limits and the preliminary fungal culture confirmed non-dermatophytic mold. This was later confirmed as *Fusarium* species on the final mycology report. The nail culture did not yield any dermatophytic species.



Image 1. Photograph of patient demonstrating white discoloration of the proximal aspect of the nail unit with the distal aspect, including medial and lateral nail folds, uninvolved.

Patient was started on six weeks of oral terbinafine (250 mg/day \times 6 weeks). After the initial six weeks of therapy, liver function tests were within normal limits and another six weeks prescription of oral terbinafine was written. The patient had complete clinical resolution of symptoms following the second course, ninety days in total, of oral antifungal treatment. The final clinical assessment occurred six months after the initial encounter and three months following completion of the ninety-day course of oral terbinafine.

3. Discussion

The prevalence of onychomycosis, all types, is estimated to be around 2% - 13% worldwide [9] and between 11% - 67%, in immunocompromised patients [10]. Specific to proximal white onychomycosis, we see that the majority of cases were reported in patients with AIDS, representing an immunocompromised status. In one study specifically looking at a patient population with AIDS, up to approximately 84% of patients demonstrated proximal white onychomycosis. However, there has only been a select few case reports of proximal white onychomycosis occurring in immunocompetent patients.

In patients with toenail involvement of proximal white onychomycosis, an immunocompromised status was more common as compared to an immunocompetent patient [11]. In a report of two cases demonstrating immunocompetent patients with proximal white onychomycosis, each patient had only fingernail involvement and with one culture growing *Fusarium* species and the other *T. rubrum* with visible hyphae during staining [12]. Several case reports have showed the occurrence of proximal white onychomycosis in immunocompetent individual but with cultures of *Microsporum canis* and various *Fusarium* species being common [13]-[15]. Other articles suggest that *T. rubrum* is the most common cause of proximal white onychomycosis while *T. megninii*, *T. schoeleinii*, *T. tonsurans*, *T. metagrophytes*, and *E. floccosum* are not uncommon. Our patient only cultured a non-dermatophytic mold as the causative organism in the toenail of this immunocompetent individual [11] [16] [17].

Unlike these case studies, our patient's toenail proximal white onychomycosis culture was positive for non-dermatophytic mold growth with *Fusarium* species as the causative agent. Also, our patient's proximal white onychomycosis occurred on the toenail rather than the fingernail in an immunocompetent individual. The toenail was described as having minimal periungual inflammation but white proximal nail discoloration and leukonychia. An article by Tosti *et al.* [18], discovered that 59 of their 1548, or roughly 3.8% patients, had onychomycosis from a causative organism of mold. Specifically, in sixteen cases of proximal onychomycosis, the causative agents were either *Scopulariopsis brevicaulis* (n = 10) and *Aspergillus* species (n = 6) [18], neither of which were seen in our case. Hilmioqui *et al.* [19] showed that molds were detected in 33 (9%) with a majority of the cases involving mold occurring in the toenails (67%). Similarly in their review of 15,000 patients in Canada, Gupta *et al.* [20] demonstrated that the organisms causing toenail onychomycosis were approximately 7.8% non-dermatophyte molds.

As mentioned, the patient presented a case of toenail proximal white onychomycosis. He was neither AIDS nor HIV, HBV, HCV positive, and did not demonstrate diabetes mellitus or any other immune suppressed disease state. As proximal white onychomycosis occurs in only 0.3% of the immunocompetent population [7] [8], our patient is the first reported case of proximal white onychomycosis from non-dermatophytic mold *Fusarium* species affecting the toenail in an immunocompetent individual. The individual was successfully treated with a ninety-day course of oral terbinafine (250 mg/day PO \times 90 days) while monitoring liver function initially and at a six-week time interval during the course.

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