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Distal Subungual Onychomycosis of the Fingernails – Successful Treatment with Terbinafine

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ABSTRACT: A 62-year-old man presents with pathologically altered nails on the 3rd, 4th and 5th fingers of the right hand, persistent for many years. Trichophyton rubrum was isolated. The clinical diagnosis is distal subungual onychomycosis, which is the most common clinical form of onychomycosis. Systemic treatment with Terbinafine 250 mg tablets and topical therapy with Ciclopirox nail lacquer were carried through, delivering excellent therapeutic effect. The article discusses the current diagnostic and treatment options for onychomycosis of the hands.

KEYWORDS: fingernails, onychomycosis, Terbinafine, Trichophyton rubrum

INTRODUCTION: Onychomycosis (tinea unguium) is the most common disorder affecting the nail apparatus. It is a fungal infection, caused by dermatophytes, yeasts, or molds. Predisposing factors include advanced age, diabetes, nail trauma, immunosuppression, peripheral vascular disease, interdigital fungal infections, and etc. Toenails are significantly more frequently affected due to the favorable conditions for fungal proliferation and the slower growth of the nail plate. Although less common, fingernails may also be involved. Dermatophytes are the most common causative agents, responsible for 90% of toenail onychomycoses and over 50% of fingernail cases, with Trichophyton rubrum being the primary species involved (12, 16).

CASE REPORT: A 62-year-old man, a metalworker by profession, consulted a dermatologist due to complaints of distorted, crumbling, and discolored fingernails on his right hand, persisting for nearly 20 years. He had undergone multiple times treatment with topical and systemic antifungal agents with unsatisfactory results. Clinical examination revealed deformed, yellowish nails distally on the third, fourth, and fifth fingers of the right hand (Figures 1A, 1B). Distinct subungual hyperkeratosis, initial onycholysis, and punctate depressions on the nail surface were also observed.

Fig. 1A

Fig. 1B

Fig. 1A, 1B: The nails of the 3rd, 4th, and 5th fingers of the right hand at the patient's initial visit.

The general dermatological examination, as well as the nails of the left hands and legs, showed no pathological changes. The patient denied having any other known chronic diseases or use of medications. A microscopic examination with 25% potassium hydroxide of matter, collected from the affected nails revealed the presence of septated hyphae. In order to identify the specific fungal pathogen, a culture was performed on artificial nutrient medium, which isolated Trichophyton rubrum. Prior to getting under way with the treatment, laboratory tests were conducted, including complete blood count, aspartate aminotransferase, alanine aminotransferase,

and gamma-glutamyl transferase, in order to rule out liver dysfunction. All results were within the reference ranges. Oral treatment was initiated with Terbinafine 250 mg, one tablet daily for six weeks, along with topical therapy with Ciclopirox nail lacquer applied on a daily basis.

Fig. 2A

Fig. 2B

Fig. 2A, 2B: The fingernails of the right hand three weeks after the beginning of therapy.

Fig. 3A

Fig. 3B

Fig. 3A, 3B: The fingernails of the right hand six weeks after the initiation of therapy.

By the third week of treatment, the affected nails showed a significantly improved appearance (Figures 2A, 2B). No side effects from the medications were observed, and follow-up liver function tests remained within normal ranges. Two months after completing the 6-week oral antifungal therapy, the treated nails were already indistinguishable from the other fingernails (Figures 4A, 4B).

Fig. 4A

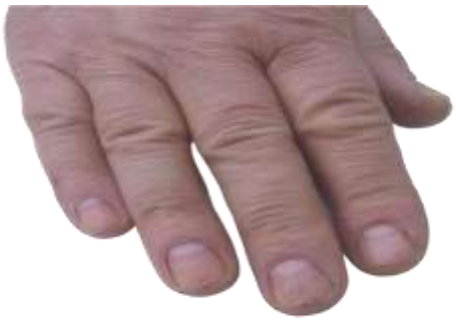

Fig. 4B

Fig. 4A, 4B: The fingernails of the right hand two months after discontinuation of therapy.

DISCUSSION: Onychomycosis is an infection of the nail apparatus caused by fungi (dermatophytes, non-dermatophyte yeasts, and molds), with a prevalence of approximately
4% in the general population. In individuals over the age of 60, the frequency may reach 30– 40%. It manifests with nail discoloration, onycholysis, and thickening of the nail plate. All components of the nail apparatus could potentially be affected. Onychomycosis caused by dermatophytes (tinea unguium) is the most common form, accounting for approximately 90% of toenail infections and 75% of fingernail infections (5, 10, 11, 12). The most frequently isolated dermatophytes are Trichophyton rubrum and Trichophyton mentagrophytes. Other dermatophyte species include Epidermophyton floccosum, Microsporum, Trichophyton verrucosum, etc. Non-dermatophyte molds account for around 10% of onychomycotic infections. The most commonly involved genera in infections of the nail apparatus include Aspergillus, Scopulariopsis, Fusarium, Acremonium, Syncephalastrum, Scytalidium, Paecilomyces, Neoscytalidium, Chaetomium, Onychocola, and Alternaria.

Yeast infections are relatively rare. When present, Candida albicans is the causative agent in approximately 70% of cases, and usually in patients with immunodeficiency (5, 6, 17). The simplest and most cost-effective method for rapid diagnosis is direct microscopy of a native specimen using 10–30% potassium hydroxide. For identification of the specific pathogen, culture on nutrient medium is required, with Sabouraud agar being the most commonly used. In recent years, PCR (Polymerase Chain Reaction) technologies are stepping in the etiological diagnosis of onychomycosis, offering higher sensitivity and specificity compared to the aforementioned methods (17, 18, 20). Based on the route of fungal invasion, onychomycosis is classified into five clinical types, although patients often present with a combination of these types. The presented case shows the most common clinical type, distal lateral subungual onychomycosis, caused by Trichophyton rubrum, which is also the most frequent pathogen associated with this clinical form of onychomycosis. Given the extent of nail involvement and the absence of known comorbidities, oral antifungal treatment with Terbinafine was initiated. Terbinafine possesses a wide spectrum of antifungal activity, but is particularly effective against dermatophytes (8). Numerous studies have demonstrated that its clinical cure rate (complete nail clearance) and mycological cure rate (negative microscopy and culture) are higher compared to other oral antifungals, making it the first-line systemic antimycotic agent for onychomycosis. Terbinafine undergoes first-pass hepatic metabolism and is eliminated through the kidneys, therefore, it should be administered cautiously in individuals with hepatic or renal impairment. The recommended dosage of Terbinafine for fingernail onychomycosis in adults is 250 mg once daily for 6 weeks. In children, Terbinafine is not officially approved but is used off-label. The suggested dose for fingernail onychomycosis in children under 25 kg is 125 mg once daily for 6 weeks (1, 3, 7, 14, 19). Other options for oral treatment include the antifungals Itraconazole and Fluconazole, which also have activity against dermatophyte infections. Itraconazole is used in patients who do not tolerate Terbinafine, in yeast and mold onychomycoses, and in diabetic patients, as it has minimal renal excretion. The U.S. Food and Drug Administration (FDA) recommends pulse therapy for fingernail onychomycosis with Itraconazole at a dose of 200 mg twice daily for one week, followed by a three-week drug-free interval, and then another one-week course of 200 mg twice a day.

For Fluconazole, the approved treatment regimen for fingernail onychomycosis is 150 mg once weekly. However, this requires a significantly longer treatment duration and more rigorous monitoring of liver function parameters (1, 3, 4, 9, 13, 15, 20).

Topical therapy is used in all forms of the disease, either as monotherapy or in combination with systemic antifungals. Monotherapy is appropriate only in early diagnosed cases, such as proximal or distal onychomycosis, or in patients with serious comorbidities where systemic antifungal treatment is not advisable due to potential side effects.

Topical agents are available in the form of lacquers and solutions and are applied to the nails on a daily basis. Commonly used agents include the antifungals Amorolfine, Ciclopirox, Efinaconazole, and Naftifine, as well as adjunctive agents such as urea and propylene glycol. In the case presented, the topical antifungal Ciclopirox was used. Studies have shown that combining Terbinafine with Ciclopirox lacquer results in significantly higher rates of mycological eradication compared to Terbinafine monotherapy (2, 3). In recent years, laser treatment using CO_2, diode, and Nd:YAG lasers has been an alternative to the traditional antifungal therapy. However, this method is expensive, often associated with pain, and usually requires multiple sessions, which is why it is not considered a first-line method of treatment.

Nowadays, dermatologists increasingly proceed to a combination of all three lines of treatment in advanced cases of onychomycosis - topical, systemic, and laser therapy. This approach is believed to have a synergistic effect, potentially resulting in enhanced fungicidal activity (18, 21).

CONCLUSION: A case of successful mycological eradication in a patient with a 20-year history of subungual onychomycosis was presented. In such persistent long-term cases, provided there are no contraindications, the combined use of systemic and topical therapy after identification of the fungal pathogen is recommended.

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