Onychomycosis

Evaluation, Treatment Options, Managing Recurrence, and Patient Outcomes

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KEYWORDS

• Onychomycosis • Efinaconazole • Tavaborole • Laser • Toenail
• Trichophyton rubrum • Mycosis • Tinea pedis

KEY POINTS

- Onychomycosis is a common disease that requires effective management to prevent progression to a severe and debilitating condition.
- Confirming the diagnosis of onychomycosis is paramount especially before starting a systemic medication.
- Onychomycosis can be managed with either topical or systemic agents, and new topical agents afford better options to tailor appropriate therapy for our patients.
- Combination therapy (topical and systemic) may be an important consideration in more difficult to treat patients. Prophylaxis with topical agents may help prevent disease recurrence.
- Treatment of coexisting tinea pedis is critical and a number of strategies may be used to minimize the long-term consequences of the disease.

INTRODUCTION

Onychomycosis is a common superficial fungal infection of the nails leading to discoloration, nail plate thickening, and onycholysis. Mycotic nail disease is the most common nail pathology worldwide, reaching all cultures and ethnicities. Onychomycosis is increasing, accounting for up to 90% of toenail and at least 50% of fingernail infections.[1] The most common etiology in the United States is owing to dermatophytes, typically *Trichophyton rubrum* and *Trichophyton mentagrophytes*.[2] In Europe, *T rubrum* is the chief agent followed by *T mentagrophytes* and *T interdigitale*.[3,4] Nondermatophyte molds and yeasts also play a role with varying frequency.

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Because the initial diagnosis is predicated on the nail's appearance, the diagnostic gold standard is direct microscopy (potassium hydroxide [KOH]) and fungal culture. However, visual nail plate changes are used to classify onychomycosis,[5] including distal subungual (also known as distal lateral subungual onychomycosis [DLSO], the most common form), proximal subungual, superficial white, and total dystrophic.[6]

Onychomycosis occurs in 10% of the general population, 20% of individuals 60 years and older, and 50% of individuals over 70 years.[6] Peripheral vascular disease, immunologic disorders, and diabetes mellitus correlate with the increased prevalence in older adults. The risk of onychomycosis is 1.9 to 2.8 times greater in persons with diabetes mellitus, and in patients with HIV infection prevalence rates range from 15% to 40%.[6] Other predisposing factors include older age, sex (male > female), genetic predisposition, tinea pedis (interdigital or moccasin types), peripheral arterial disease, smoking, nail trauma, inappropriate nail hygiene, and family background of onychomycosis and hyperhidrosis.[6]

Adult patients constitute the bulk of those seeking treatment, but there are increasing numbers of pediatric cases, possibly owing to increasing childhood obesity and pediatric diabetes. With prevalence ranging from 0% to 2.6% worldwide, pediatric onychomycosis is relatively rare compared with adults, but still one of the most common nail disorders in children.[7] DLSO is the most common type seen in children, followed by proximal subungual and white superficial. The most common pathogen is *T rubrum*.

In the last several years, novel treatments and considerations regarding the diagnosis and management of onychomycosis have arisen. This review discussed emerging conservative and surgical methods to treat the disease.

PATIENT EVALUATION

To evaluate a patient presenting with nail dystrophy, the practitioner should begin by completing a thorough history and physical evaluation. With treatment options ranging from systemic to surgical, knowledge of medical history, current medications, and family history will aid in the differential diagnosis and formulating the treatment plan. Key questions include: how long have you had the nail changes, is it painful, has it affected your quality of life? Daily shoe gear choices, work and athletic activities, and the home and work environments will all assist treatment plan selection. Level of immunosuppression, vascular status, and the ability to take oral or apply topical medication should be taken into account. Discussion and examination of any other skin rashes or conditions should be completed, because psoriasis and eczema can mimic mycotic nails.

Visual assessment is imperative. Since the Zaias classification was proposed in 1972, modifications have been proposed and published to reflect the wide array of dermatophytes, nondermatophyte molds, and yeasts as well as the complications of various patterns occurring in the same nail or other inflammatory diseases copresenting with mycosis.[8] Nail plate changes include DLSO where the invasion begins at the hyponychium and disturbs the distal nail bed; proximal subungual, where invasion begins proximally; superficial white, where the upper surface of the nail plate is first attacked[8]; total dystrophic, which describes total nail plate involvement and surrounding periungual tissue; and endoynx, which describes distal nail plate attack resulting in a deeper penetration of hyphae.

In addition, the physician should determine how many toenails are involved on 1 or both feet, percent involvement of the nail, any biomechanically aggravating factors that could contribute to nail dystrophy (adductovarus fifth digit, hammertoe, or hallux abductovarus), and the presence of tinea pedis interdigitally or plantarly.