

Single Case

# *Trichophyton erinacei* Onychomycosis: The First to Evidence a Proximal Subungual Onychomycosis Pattern

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## Keywords

Fingernail onychomycosis · Tinea unguium · *T. erinacei* · *Trichophyton erinacei*

## Abstract

*Trichophyton erinacei* is an emerging cause of dermatophyte infections, which are frequently isolated from hedgehogs. Nail infections from *T. erinacei* are rarely reported. We describe the case of a 23-year-old Thai female who had a history of systemic lupus erythematosus with lupus nephritis type III and who developed widespread skin and nail infections caused by *T. erinacei* that were most likely transmitted from a hedgehog. Although the patient did not demonstrate a clinical improvement or mycological cure following systemic itraconazole and fluconazole treatment, she achieved clinical and mycological cures after terbinafine therapy. A drug susceptibility test should be performed in patients with *T. erinacei* infections to facilitate decision-making about antifungal therapy. Here, we are the first to report a case of proximal subungual onychomycosis from a *T. erinacei* infection.

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## Introduction

Nail infections from *Trichophyton erinacei* are rarely reported. We present a case of widespread skin and nail infections caused by *T. erinacei* that was likely transmitted from a hedgehog in Thailand.

## Case Report

A 23-year-old Thai female had a history of systemic lupus erythematosus with lupus nephritis type III for 15 years. She took chloroquine (250 mg/day), prednisolone (15 mg/day), cyclosporine A (25 mg/day), and dapsone (200 mg/day) for the lupus. She presented with a 1-month history of multiple, itchy, scaly erythematous patches on her face and left 4th fingernail dystrophy. She had a history of contact with a hedgehog for 2 weeks. A physical examination revealed multiple, well-defined, scaly erythematous patches with some pustules on her face, forearms, hands, and feet. Proximal subungual white patches were observed on the left 2nd and 3rd fingernails, and onychodystrophy was found on her left 4th fingernail (Fig. 1). A potassium hydroxide examination of her right cheek, left palm, and the left 2nd, 3rd, 4th, and 5th fingernails showed branching septate hyphae with arthrospores. All of the fungal cultures were positive for *T. erinacei* (Fig. 2). The patient was diagnosed with tinea faciei, tinea manuum, tinea corporis, and tinea unguium caused by *T. erinacei*. Despite 4 months of systemic itraconazole and 6 months of fluconazole treatment, she did not exhibit any clinical improvement or mycological cure. However, clinical and mycological cures were achieved following a 4-month course of terbinafine.

## Discussion

*T. erinacei* is a member of the *T. mentagrophytes* complex, a zoonotic dermatophyte which is a very rarely isolated human pathogen [1–6]. It is the most common dermatophyte isolated in hedgehogs, with infection rates of 20–47% [7]. The most usual clinical manifestation is inflamed, pruritic eruptions in the form of pustules on an erythematous base, as seen in our patient [8]. This condition can easily be misdiagnosed as eczema, in which case receiving a corticosteroid may worsen the lesions. The lesions are typically located at the extremities, especially on the hands and wrists [9, 10], but skin infections at other locations (tinea corporis [9], tinea capitis [11], and tinea barbae [12]) have also been reported. However, tinea unguium caused by *T. erinacei* has rarely been reported; indeed, our literature review found only one report, involving 2 patients, from 1962. Both were diagnosed with fingernail onychomycosis from *T. erinacei* (unknown type) [13]. No involvement of the toenails has ever been described in the literature. Finger nail involvement appears to be an important source for the spread of an infection to other skin sites and the cause of multiple-site infections, as was the case with our patient's presentation. Here, we are the first to report a case of proximal subungual onychomycosis from a *T. erinacei* infection.

For the diagnosis, a potassium hydroxide examination from skin scrapings should be performed to detect hyphae. A fungal culture on Sabouraud dextrose agar typically reveals the growth of ivory-colored colonies with a gray, powdery surface; an elevated, cottony center; a brilliant yellow to lemon-colored reverse side; pear-shaped microconidia; and the rare production of spiral hyphae. Urease testing is usually negative, in contrast to *T. mentagrophytes*

[14]. Sequencing of the internal transcribed spacer regions of the ribosomal fungal DNA provides explicit confirmation. However, as the sequencing procedure is costly, it is only performed at relatively few university hospitals, especially in resource-limited countries [1–4].

A dramatic response with the use of systemic griseofulvin, itraconazole, or terbinafine, or with only topical antifungals (inadequate), or in a combination of those drugs, has been reported for *T. erinacei* infections [3]. There has only been one report, from 1962, of tinea unguium being caused by *T. erinacei* and being successfully treated with systemic griseofulvin [13]. In contrast, our patient failed to achieve clinical and mycologic cures with both fluconazole and itraconazole therapy. She was subsequently successfully treated, however, with a 4-month course of terbinafine. These results may be explained by the fungistatic effects of fluconazole and itraconazole on *T. erinacei*, whereas systemic terbinafine is a fungicidal agent. A previous study also reported that terbinafine was more effective in eliminating the fungus from infected hedgehogs than itraconazole [15]. The drug susceptibility test should be conducted on patients with *T. erinacei* infections to aid in the planning of an antifungal therapy regimen. If possible, the animals involved should also be treated to eliminate the source of the infections.

*T. erinacei* infection is an emerging disease. Previous studies have revealed an increasing prevalence of infections in household hedgehogs [5]. It was first described in New Zealand, but in recent years, the large majority of reports have been from Korea [8], Japan [9], and Taiwan [2] in Asia. One study reported the case of a Caucasian woman who had been exposed to an elephant in Thailand and developed a *T. erinacei* skin infection on the contact area [6]. However, our study reported the first case of *T. erinacei* skin and nail infections in Thailand that were most likely transmitted from a hedgehog. The prevalence and spread of *T. erinacei* infections in each country should be closely observed. Dermatologists must consider this zoonophilic dermatophytosis if patients have a history of contact with exotic animals, especially hedgehogs.

### Statement of Ethics

Informed consent has been obtained and the study has been done according to the Declaration of Helsinki.

### Disclosure Statement

The authors have no conflict of interest to declare.

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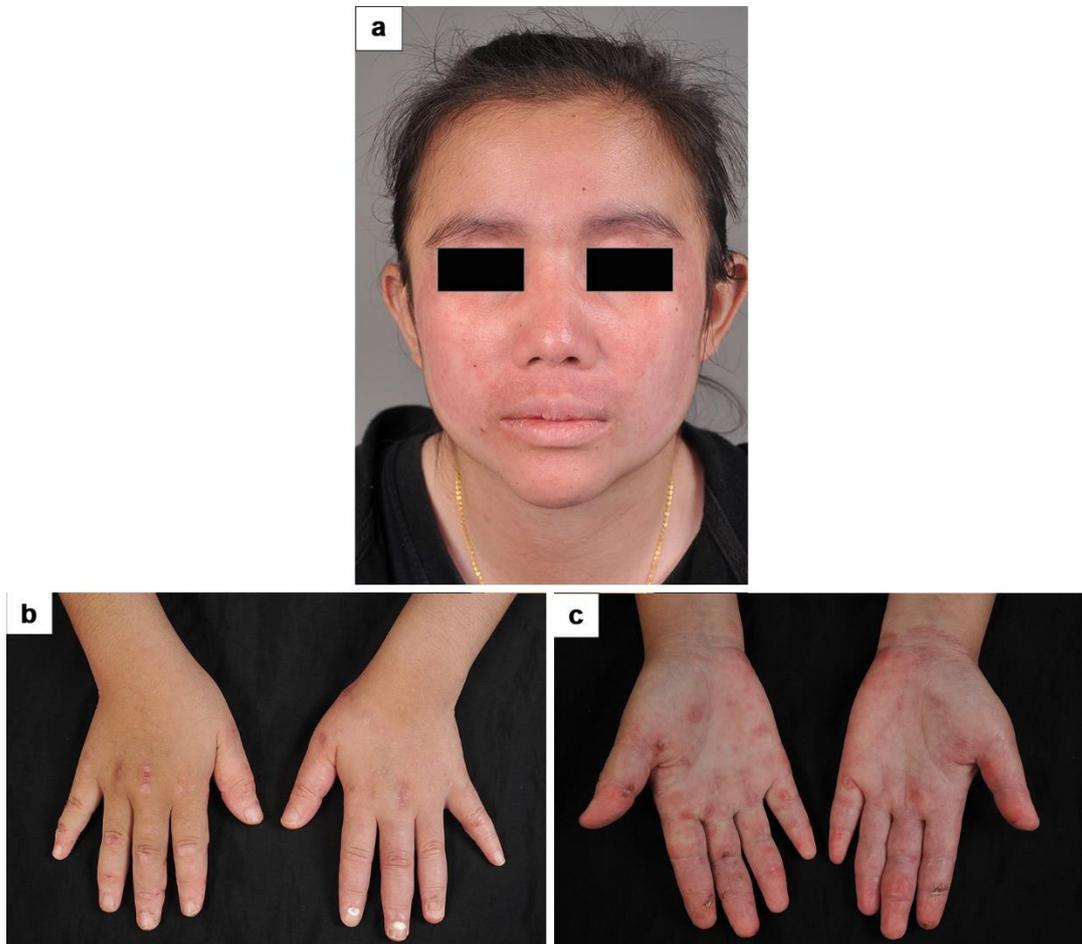
This was an unfunded study.

### Author Contributions

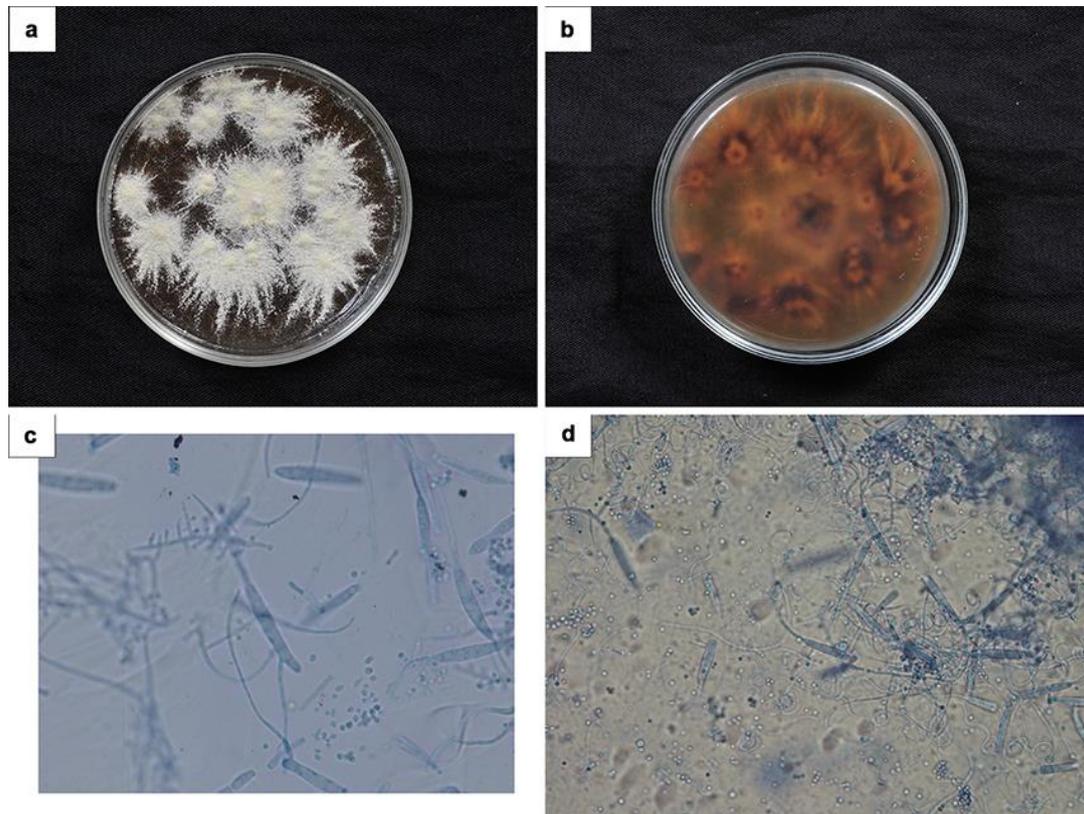
All authors are responsible for and significantly participated in writing the manuscript.

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**Fig. 1.** **a** Multiple, well-defined, scaly erythematous patches with some pustules on the face. **b, c** Multiple, well-defined, scaly erythematous patches and plaques on both hands; and proximal, subungual, white patches on the left 2nd and 3rd fingernails, with onychodystrophy on the left 4th fingernail.



**Fig. 2.** **a, b** Colonies are white, flat, powdery, and downy to fluffy, with a brilliant lemon-yellow reverse. **c, d** Numerous, large, clavate microconidia are borne on the sides of hyphae. The macroconidia are smooth-walled, two- to six-celled, clavate, variable in size, with terminal appendages.