

A Case of Tinea Pseudoimbricata by *Trichophyton tonsurans*

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Tinea imbricata is a unique dermatophytosis caused by *Trichophyton concentricum*, observed endemically in subtropical to torrid zones. It is characterized by development of impressive concentric rings on the trunk or limbs. And few dermatophytosis cases mimicking this disease are reported as "tinea pseudoimbricata". Herein, we report a case of tinea pseudoimbricata caused by *T. tonsurans* with multiple concentric annular erythemas. The common clinical manifestations of *T. tonsurans* infection are tinea capitis and tinea corporis. However, tinea imbricate-like lesions are very rare. Fungal culture and microscopic findings confirmed a *T. tonsurans* infection in this case. The patient was treated with topical isoconazole and additional oral terbinafine.

Key Words: Tinea pseudoimbricata, *Trichophyton tonsurans*

INTRODUCTION

Tinea imbricata is a unique dermatophytosis caused by *Trichophyton(T) concentricum*. It is observed endemically in subtropical to torrid zones and characterized by concentric scaly rings on the trunk or limbs¹. The term tinea imbricata is restricted to *T. concentricum* infection, but other dermatophytosis may mimic this disease as "tinea pseudoimbricata". It can be caused by *T. mentagrophytes* and *T. rubrum* infection in regions other than tropical countries².

T. tonsurans is an anthropophilic dermatophyte transmitted through human contact. It is globally distributed and is most prevalent in the United States, Canada, Mexico, and some European countries. The common clinical manifestations of *T. tonsurans* infection are tinea capitis and tinea corporis. However, few cases of patients with compromised immunity showed development of concentric annular erythemas¹.

This study reported a case of tinea pseudoimbricata caused by *T. tonsurans* in South Korea.

CASE

A 60-year-old man presented with multiple scaly erythematous to purpuric concentric patches on both the lower extremities (Figs. 1A, 1B, 1C) visited our clinic 1 month ago. Nails and scalp were observed to be unaffected. He was administered oral antihistamines and applied a topical agent mixed with diflucortolone valerate and isoconazole nitrate at a local medical center, but the lesions gradually enlarged. He was then transferred from the local medical center to rule out erythema gyratum repens. Although he was on medication for hypertension, there were no recent medication changes. He had no abroad travel history. No other internal disease or abnormal results were observed during medical examination.

KOH mount of scale and fungal culture were performed at the right calf. KOH mount revealed multiple hyphae on specimen. White velvety colonies with fine granules and concentric furrows were observed after incubation at 25°C for 2 weeks on Sabouraud's dextrose agar. The colonies appeared

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Fig. 1. Multiple concentric erythematous scaly patches on lower extremities

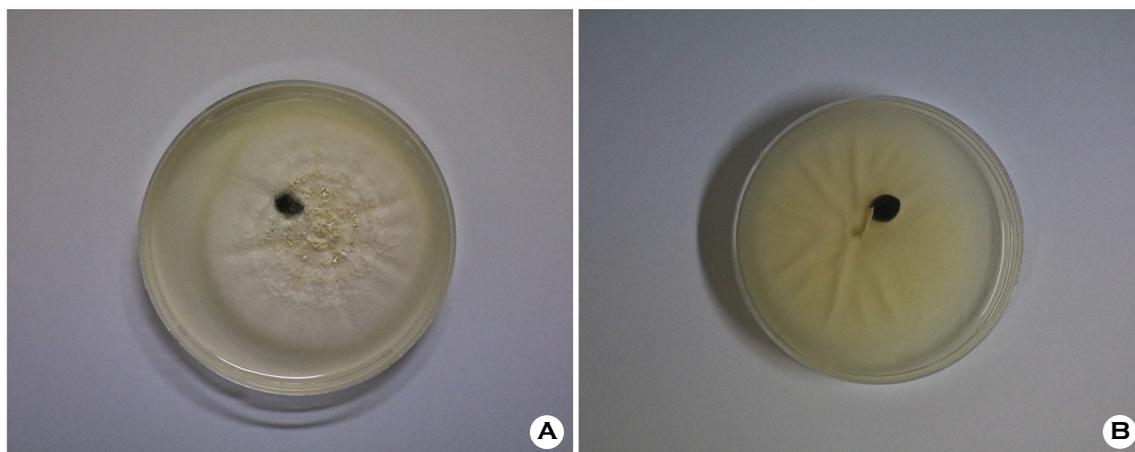


Fig. 2. (A) On Sabouraud dextrose agar after incubation at 25°C for 2 weeks, fungal culture showed white velvety colonies with fine granules and concentric furrows. (B) The color of the colony was yellow-white on the reverse side.

yellowish white on the reverse side (Figs. 2A, 2B). Microscopic examination of the culture revealed pear-shaped microconidia and roller-shaped macroconidia. These findings confirmed a *T. tonsurans* infection. The patient was finally diagnosed with tinea pseudoimbricata caused by *T. tonsurans* and started treatment with topical antifungal agent in addition to oral administration of terbinafine. He visited our clinic again after 2 weeks with improved skin lesions and post-inflammatory hyperpigmentation (Figs. 3A, 3B).

DISCUSSION

The term "imbricata" is derived from the Latin word *imbrex* and refers to overlapping roof tiles. Tinea imbricata is a distinct superficial mycosis caused by *T. concentricum* with a characteristic pattern of concentric annular plaques of erythema and scales. The disease has a restricted geographical distribution in South-East Asia, South Pacific, Central, and South America. Cases clinically resembling tinea imbricata but caused by



Fig. 3. After 2 weeks, he visited our clinic again with improved skin lesions and post-inflammatory hyperpigmentation.

species other than *T. concentricum* are reported as "tinea pseudoimbricata" or "tinea indecisiva"³. Tinea pseudoimbricata

has been reported to be caused by *T. tonsurans*, *T. rubrum*, *T. mentagrophytes*, *Microsporum audouinii*, and *Microsporum gypseum*³⁻⁸.

It has been stated in the literature that the development of concentric rings is due to a negative, delayed-type hypersensitivity to the *T. concentricum* cytoplasmic antigen and T-lymphocyte hyporeactivity⁹. Immunosuppression plays a central role in the development of both tinea pseudoimbricata and tinea imbricata. Secondary to topical corticosteroid misuse, or some form of underlying immunosuppression such as protein-energy malnutrition, HIV infection, or immunosuppressive therapy following transplantation can be a cause of immunosuppression⁸. A previous study conducted in Papua New Guinea reported that 52% of individuals with tinea imbricata (35/68) failed to develop a delayed-type hypersensitivity reaction despite demonstrating normal immediate-type hypersensitivity responses¹⁰. This implies that individuals with tinea imbricata have deficient cellular immunity.

The process of characteristic lesions is estimated as follows in the immunosuppressed host. From the primary fungal infection site, digestion of keratin by multiple fungal proteases and inflammatory reactions occurs in the host's skin. The hair follicles present in the lesions act as a central storage for fungus in the entire process. When the host's systemic or local immunity decreases, secondary and tertiary circular patches progress and make characteristic lesions from each storage, resulting in a ring within a ring formation⁷.

There have been no reports of tinea imbricata, whereas six cases of tinea pseudoimbricata are found in South Korea, including this one (Table 1)⁴⁻⁸. There are two cases of *T. verrucosum*, two cases of *T. rubrum*, and one case of *Microsporum ferrugineum*. All cases were treated with systemic antifungal agents like oral terbinafine with or without topical antifungal agents regardless of species of fungus. There was no case reporting "successful treatment with only topical antifungal agent".

In this case there was no improvement even after applying a mixture of diflucortolone valerate and isoconazole nitrate. The patient showed improvement with additional oral terbinafine.

It is recommended to perform an immediate KOH mount of scale and fungal culture in patients with a ring within a ring formation of skin lesions for fungal infection. Laboratory tests and medical examinations should be followed to check the immune status of the patient. For patients with these lesions, it is likely to be accompanied by a local or systemic immunosuppression. Therefore, it would be helpful to use systemic antifungal agents in combination with topical agents.

Table 1. Tinea pseudoimbricata cases reported in South Korea

Author	Age/Sex	Infection site	Treatment	Fungus
Lee et al. (1987) ⁴	9/Male	Right forearm	Topical bifonazole and ciclopirox, Oral griseofulvin	<i>Microsporium ferrugineum</i>
Roh et al. (2000) ⁵	19/Male	Right forearm	Oral itraconazole	<i>Trichophyton rubrum</i>
Lim et al. (2006) ⁶	7/Male	Left thigh	Oral terbinafine, Topical lanoconazole	<i>Trichophyton verrucosum</i>
Kang et al. (2008) ⁷	69/Female	Right forearm	Oral terbinafine, Topical lanoconazole	<i>Trichophyton verrucosum</i>
Kwon et al. (2020) ⁸	80/Female	Left abdomen and back	Oral terbinafine, Topical terbinafine	<i>Trichophyton rubrum</i>
Present case	60/Male	Both legs	Oral terbinafine, Topical isoconazole	<i>Trichophyton tonsurans</i>

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CONFLICT OF INTEREST

In relation to this article, we declare that there is no conflict of interest.

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PATIENT CONSENT STATEMENT

The patient provided written informed consent for the publication and the use of his images.

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