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 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.

**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...
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...
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 hyporeactivity\(^9\). 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 immunosuppression\(^8\). 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 responses\(^10\). 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 formation\(^7\).

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 isonazazole 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

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

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The authors declare that there is no acknowledgment.

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.

REFERENCES