

## Tinea Pseudoimbricata caused by *Trichophyton rubrum*

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Tinea pseudoimbricata, a special subset of tinea incognito, is a cutaneous fungal infection with unusual tinea imbricata-like lesions caused by dermatophytes other than *Trichophyton concentricum*. Here we present a case of tinea pseudoimbricata. An 80-year-old woman presented with mildly pruritic, scaly, annular, erythematous plaques with inner small, annular, polycyclic, or arcuate plaques on the left abdomen and back for 1 month. The lesions enlarged after the application of topical corticosteroids about 2 months previously. A potassium hydroxide test performed on her lesions was positive. Fungal culture, light microscopic findings, and *T. rubrum*-specific real-time polymerase chain reaction confirmed the presence of *T. rubrum*. Thus, we diagnosed tinea pseudoimbricata caused by *T. rubrum* and treated successfully with oral and topical terbinafine.

**Key Words:** Tinea incognito, Tinea pseudoimbricata

### INTRODUCTION

Tinea incognito is a cutaneous fungal infection that often has atypical clinical features and is attributed to the prior use of immunosuppressive agents, usually topical or systemic corticosteroids<sup>1</sup>. Tinea imbricata is a chronic superficial mycosis, and in some regions, it is an endemic superficial mycosis caused by *Trichophyton (T.) concentricum*<sup>3</sup>. Tinea pseudoimbricata is a special form of tinea incognito, which involves dermatophytosis caused by dermatophytes other than *T. concentricum*, showing unusual tinea imbricata-like lesions. This is similarly termed as tinea atypica in Italy<sup>4</sup> and tinea indecisiva in India<sup>5</sup>; however, these different terms with different meanings could confuse health care providers. Here we report a case of tinea pseudoimbricata.

### CASE REPORT

An 80-year-old woman visited our clinic with a complaint of pruritic skin rash on her trunk. She presented with a mildly pruritic annular, erythematous, scaly plaque, measuring 30 cm in diameter, with inner small annular, polycyclic, arcuate plaques on the left abdomen and back (Fig. 1A, 1B) for 1 month. The lesions enlarged after the application of topical corticosteroids administered by a local medical center approximately 2 months ago. In addition, she had hypertension and dyslipidemia.

A potassium hydroxide test performed on the skin lesions was positive, and several fungal hyphae were observed. A specimen obtained from the lesions was inoculated in Sabouraud dextrose agar and cultured at 28°C for 2 weeks, and deep red colonies developed (Fig. 2). Using a light microscope, septate and branched hyphae and teardrop-shaped microconidia were observed, and the presence of *T. rubrum* was finally confirmed via *T. rubrum*-specific real-time poly-

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**Fig. 1.** (A) Annular erythematous scaly plaque measuring 30 cm in diameter on the left abdomen and back (B) A large plaque with inner small annular, polycyclic, or arcuate plaques

merase chain reaction using Real Fungus-ID<sup>®</sup> (Optipharm M&D, Wongju, Korea). Thus, we diagnosed tinea pseudoimbricata caused by *T. rubrum*; further, 3 weeks after using an oral antifungal agent (terbinafine, 250 mg) and a topical antifungal agent (terbinafine), the lesions greatly improved, and there was no evidence of recurrence for 1 year.

## DISCUSSION

Tinea incognito is a dermatophytosis that often has atypical clinical features and is attributed to the prior use of systemic or topical corticosteroids or other immunomodulating agents<sup>1</sup>. In general, tinea incognito may lack the scale and elevated margin, which is typical of dermatophytosis. It tends to be extensive, pruritic, erythematous, and pustular and can be mistaken for other skin disorders, particularly atopic dermatitis<sup>2</sup>.



**Fig. 2.** Deep red colonies developed in Sabouraud dextrose agar at 28°C for 2 weeks.

Tinea pseudoimbricata, a special subset of tinea incognito, has morphological similarity to tinea imbricata. Tinea imbricata is a chronic superficial mycosis caused by *T. concentricum* with a characteristic pattern of concentric and/or annular plaques, erythema, and scales, with a restricted geographical distribution in the South West Pacific, Southeast Asia, and Central and South America<sup>3</sup>. The term "imbricata" is derived from the Latin word "imbrex" and refers to overlapping roof tiles. Cases clinically simulating tinea imbricata but caused by species other than *T. concentricum* have been labeled as "tinea pseudoimbricata", which is similarly termed as tinea atypica in Italy<sup>4</sup> and tinea indecisiva in India<sup>5</sup>. The terms "atypica" and "indecisiva" may have originated from atypical and indecisive concentric lesions, respectively, of superficial mycosis caused by species other than *T. concentricum*. Considering the origins of each term, "tinea pseudoimbricata" would be the most specific term referring to these mycotic infections other than tinea atypica and tinea indecisiva<sup>6</sup>. Tinea pseudoimbricata is usually caused by *T. tonsurans*, *T. mentagrophytes*, *Microsporum (M.) gypseum*, and *M. ferrugineum*. Moreover, this tinea imbricata-like or a "ring-within-a-ring" appearance has been rarely reported, secondary to topical corticosteroid misuse, or some form of underlying immunosuppression, such as protein-energy malnutrition, HIV infection, or immunosuppressive therapy following transplantation. Because tinea pseudoimbricata has a specific morphology and implicates underlying immunosuppressive status far more than tinea incognito, authors and clinicians can distinguish these terms<sup>5</sup>.

During dermatophytic invasion, digestion of keratin by the fungus is associated with the secretion of multiple proteases, which play their particularly specialized roles in colonizing and degrading keratinized host structures during infection.

**Table 1.** Tinea pseudoimbricata cases reported in South Korea

Case	Sex/ Age	Location	Morphology	Pathogen	Treatment
1987	M/9	Right forearm	7~8 concentrically arranged rings of scales forming an annular patch with polycyclic borders	<i>M. ferrugineum</i>	Topical bifonazole and ciclopirox for 3 weeks, then oral griseofulvin for 1 month
2000	M/19	Right forearm	Concentrically arranged rings of scales forming a patch	<i>T. rubrum</i>	Oral itraconazole for 2 weeks
2006	M/7	Right thigh	A solitary, 5.0 × 5.0 cm sized, well-defined erythematous patch with concentrically arranged rings of scales	<i>T. verrucosum</i>	Oral terbinafine and topical itraconazole
2008	F/69	Right forearm	A solitary, 5.0 × 5.0 cm sized, well-defined erythematous patch with concentrically arranged rings of scales	<i>T. verrucosum</i>	Oral terbinafine and topical itraconazole
<b>Present case</b>	<b>F/80</b>	<b>Left abdomen and back</b>	<b>Annular erythematous scaly plaque (30-cm diameter) with inner small, polycyclic, or arcuate plaque</b>	<b><i>T. rubrum</i></b>	<b>Oral and topical terbinafine</b>

Abbreviations: M, male; F, female

The host's defense mechanism depends on both innate and acquired T-cell-mediated immune systems. In genetically susceptible populations of endemic areas, multiple concentric rings of tinea imbricata are hypothesized to result from negative delayed-type hypersensitivity to *T. concentricum* cytoplasmic antigens and T-lymphocyte hyporeactivity. A ring effect observed in cases of topical corticosteroid misuse may be explained by the fact that although the host reaction occurs in response to actively metabolizing fungal cells, the fungal cells are initially only partly inhibited. When the host's local immune responses decline below a certain threshold, the fungal genes are activated again and initiate another host-induced inflammatory response; this is repeated many times, resulting in several concentric rings of inflammation, which clinically manifest as annular erythema and scaling<sup>6</sup>.

A total of five cases, including this one, that presented with several concentric rings of tinea imbricata after using topical corticosteroids have been reported in South Korea (Table 1)<sup>7-10</sup>. Most of these cases occurred in the extremities, except for the present case, and the pathogens were *T. rubrum* in two cases, *T. verrucosum* in another two cases, and *M. ferrugineum* in only one case. All cases were well treated with topical and oral antifungal agents.

## 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 or her images.

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