A Case of Tinea Pseudoimbricata Due to *Trichophyton tonsurans* Induced by Topical Steroid Application

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Abstract

Tinea imbricata and tinea pseudoimbricata are variant types of tinea corporis characterized by annual-ring-shaped erythema. Although the skin lesions manifest similar symptoms, these two diseases are classified based on causative fungi. The former is caused by *Trichophyton concentricum*, an anthropophilic dermatophyte, and the latter is caused by dermatophytes other than *T. concentricum*, commonly zoophilic fungi such as *Trichophyton mentagrophytes* complex. Here, we report a 27-year-old Japanese male diagnosed with tinea pseudoimbricata attributed to *Trichophyton tonsurans*, an anthropophilic dermatophyte. We suspected that application of steroid ointment caused the annular pattern of his skin lesions. After three months use of topical luliconazole cream, treatment was finished. We also summarize the knowledge about tinea pseudoimbricata through previous reports with bibliographical consideration.

Key words: annual-ring-shaped erythema, tinea corporis, tinea imbricata, tinea indecisiva, tinea pseudoimbricata, *Trichophyton tonsurans*

Introduction

Tinea corporis is a common dermatophytosis, typically presenting as annular erythema with scales. Although tinea corporis is usually easy to diagnose clinically, it is sometimes difficult to make a diagnosis only by inspection because it can exhibit a wide variety of clinical features, and there are many diseases that require differentiation. Therefore, even in cases where the possibility of tinea corporis is very low, if it cannot be completely ruled out, potassium hydroxide (KOH) direct microscopic examination is performed.

On the other hand, fungal culture is also important in the treatment of dermatophytosis. Identifying the causative fungal species is useful when considering effective treatments when refractory to initial treatment.

We report a case of tinea pseudoimbricata that exhibited annual-ring-shaped erythema and produced *Trichophyton tonsurans* in culture.

Case report

A 27-year-old male had an eruption on his abdomen six months before he visited our hospital. He had consulted his previous doctor and was prescribed topical steroids, but the eruption spread. So, he was referred to our department. He had no medical history and no history of contact sports for the last five years, but his younger brother was doing judo.

The patient presented with annual-ring-shaped erythema and multiple red papules on the trunk (Fig. 1a). Physical examination revealed the erythema to be covered with scales (Fig. 1b).

KOH direct microscopic examination demonstrated septate hyphae.

Plate culture isolated from the scaly erythema on Sabouraud’s dextrose agar yielded brownish-white and velvety colonies with mahogany-red reverse (Fig. 2a). Slide culture shows large numbers of pear-shaped microconidia and a chlamydospore in the substrate filament (Fig. 2b). The isolate was preserved as IFM 65404 at the Medical Mycology Research Center.
Fig. 1. Clinical features.
a: Annual-ring-shaped erythema and multiple red papules on the abdomen.
b: Erythema covered by scales. Almost all of the red papules are follicular papules.

Fig. 2. Cultural characteristics of *Trichophyton tonsurans* isolate.
a: Plate culture shows brownish-white and velvety colonies with mahogany-red reverse.
b: Slide culture shows large numbers of pear-shaped microconidia and a chlamydospore in the substrate filament.
Research Center, Chiba University. The colonies were identified as *T. tonsurans* based on the morphological characteristics and sequence of internal transcribed spacer of the ribosomal RNA gene regions.

We diagnosed this case as tinea pseudoimbricata. As the patient declined oral medicine, we started topical luliconazole cream once a day. The erythema became pigmented and healed in approximately three weeks; however, the red papules remained. Therefore, we administered benzoyl peroxide gel in combination, and the papules rapidly improved. Topical treatment was completed in approximately three months, and no relapse of eruption was observed thereafter. After treatment was finished, it was found that *T. tonsurans* was the causative fungus, so it was suspected that he was infected by his younger brother who was doing judo. However, due to the COVID-19 pandemic, consultations have been suspended, and detailed interviews regarding the infection route have not been made to date.

**Discussion**

Tinea imbricata is a superficial dermatophytosis caused by *Trichophyton concentricum*, which presents with concentric or annular plaques of erythema and scales covering the hairless surface of the skin\(^{11}\). This dermatomycosis is usually reported in the subtropics and tropics\(^{11}\). Our case presented with tinea-imbricata-like annual-ring-shaped erythema; however, *T. tonsurans* was isolated in culture. Lim et al. reported a case of tinea pseudoimbricata, which was tinea corporis caused by a fungus other than *T. concentricum*, and followed a clinical course like that for tinea imbricata\(^5\). It is not clear why tinea pseudoimbricata presents such a clinical picture. However, Hay et al. reported that the majority of tinea imbricata patients lack a delayed hypersensitivity response to *T. concentricum*\(^5\). In tinea pseudoimbricata, local or systemic immunosuppression seems to be essential for pathogenesis, and like tinea imbricata, weak immune response to pathogens seems to be the key to explain the appearance of ‘ring-within-a-ring’ or multiple concentric ring lesions.

According to the PubMed database, there are 39 previous case reports of tinea pseudoimbricata and tinea indecisiva (synonymous with tinea pseudoimbricata)\(^2,4-13\). The characteristics of these cases and our case are compared in Table 1. Most patients had eruptions on the trunk, extremities, and vulva, and almost all had a history of topical steroid application, but there was also a small number of immunosuppressed patients whose symptoms were caused by other diseases or drugs. In fungal culture, *Trichophyton mentagrophytes*, which is a zoophilic fungus, was the most commonly isolated species.

There are also regional differences in the causative fungi. Baah et al. reported that *T. tonsurans* was the most common cause of tinea corporis and tinea pseudoimbricata in the United States\(^12\). In Japan, although the incidence of *T. tonsurans* infection among contact sports athletes using topical steroids is gradually increasing\(^4\), tinea corporis caused by *Trichophyton rubrum* or *Microsporum canis* was the most common based on epidemiological investigation\(^15\).

Our case was typical in that eruption on the trunk was observed and there was a history of topical steroid application, but the isolation of *T. tonsurans* in culture is rare. Given that various fungi can cause tinea pseudoimbricata, fungal culture is considered essential for its treatment and estimation of infection routes.

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**Conflicts of interest**

The authors declare no conflict of interest associated with
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