

A Clinico Mycological Study of *Tinea Pseudoimbricata*

Abstract

Introduction: *Tinea pseudoimbricata* is a variant of dermatophytosis characterized morphologically by concentric scaly rings resembling *tinea imbricata* with an culture isolate other than *Trichophyton concentricum*. To date, no large case report series is available. **Aim:** To study the clinical profile and the fungus isolated in patients with *tinea pseudoimbricata*. **Materials and Methods:** In this case series, all the patients with *tinea imbricata* with an isolate other than *Trichophyton concentricum* were subjected to a detailed history and clinical examination. Scrapings of the scales were investigated with potassium hydroxide examination and culture in Sabouraud Dextrose Agar enriched with cycloheximide and chloramphenicol. The results obtained were tabulated and analyzed. **Results:** A total of 42 patients fulfilling the above culture criteria were included in the present study. A majority were in the age group of 21–40 years (54.70%) with a male preponderance (M:F = 2:1). All the patients had abused steroids for more than 4 weeks and had multiple site involvement. *Trichophyton tonsurans* (42.8%) was the predominant isolate cultured, followed by *Trichophyton mentagrophytes*. **Conclusion:** Hence, as per our study, *tinea pseudoimbricata* is encountered more often nowadays due to the misuse of topical steroids and to diagnose *tinea pseudoimbricata* culture is mandatory. The morphology of concentric rings is not restricted to *Trichophyton concentricum*, but can occur with other species depending on the clinical scenario.

Keywords: *Tinea pseudoimbricata*, *Trichophyton tonsurans*

Introduction

The easy availability of topical steroids has resulted in their widespread misuse, owing to their anti-inflammatory properties, causing *tinea incognita*. Clinically, *tinea incognita* has less scaly raised margins and may mimic other common dermatological disorders like nummular eczema, rosacea, seborrheic dermatitis, contact dermatitis, lupus erythematosus, etc.^[1] Sometimes, it results in an altered morphology characterized by multiple concentric rings mimicking *tinea imbricata* caused by *Trichophyton concentricum*—*Tinea pseudoimbricata*.^[2] To date, only a few isolated case reports or case series have been published. In this case series, an attempt was made to analyze the clinico-epidemiological and mycological characteristics of *tinea pseudoimbricata*.

Materials and Methods

In this prospective study, all the patients of dermatophytosis morphologically mimicking *tinea imbricata* were considered.

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If the patients had multiple lesions, then those patients with more than 75% lesions having morphology mimicking *tinea imbricata* were included in the study. A detailed history regarding the symptoms, site, progression, application of topical steroids, duration of steroid use, type of the steroid, prescribed by and response to the medications was noted. A detailed dermatological examination was carried out along with laboratory tests such as potassium hydroxide (KOH) and culture in Sabouraud Dextrose Agar enriched with chloramphenicol and cycloheximide. The species were identified based on the colony morphology, pigment production, and microscopic examination of lactophenol cotton blue (LPCB) preparation. All those patients with an isolate other than *Trichophyton concentricum* were included in the study. These cases were treated and followed up for a response. All the cases were investigated with complete blood picture, fasting, and postprandial blood sugars and Enzyme Linked Immuno Sorbent Assay for Human Immunodeficiency Virus 1 and 2 antibodies.

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Results

A total of 42 (12%) patients having a morphology mimicking tinea concentricum were included in the study. The mean age was 24.57 ± 10.34 years. The majority were in the age group of 21–40 years (54.70%) with male preponderance (M:F = 2:1); 31 (73.8%) patients were belonging to the lower socioeconomic status.

Ten patients had used steroids for less than 6 weeks, while 27 (64.20%) patients had applied for a duration ranging from 6 to 12 weeks and 5 (12%) had misused steroids for more than 12 weeks. In 36 (85.7%) patients, topical steroids were prescribed by a pharmacist and in 6 (14.3%) patients, topical steroids were advised by friends. Betamethasone valerate 0.1% was the common steroid prescribed, either as an isolated preparation (19 [45.2%] patients) or as a combination (15 [35.8%] patients). In 8 (19%) patients, potent steroid clobetasol propionate in combination was used.

All the patients had multiple site involvement [Figure 1a and b]. The number of concentric rings ranged from three to five [Figure 2a and b]. Depending on the site of involvement, we observed 24 (57.10%) patients with tinea corporis and cruris, 9 (21.40%) patients with extensive tinea corporis, and 9 (21.40%) patients with tinea corporis and tinea faciale. The other steroid-induced side effects like striae, steroid-induced rosacea, and telangiectasia were also noted. All the patients had a normal blood picture and were negative on ELISA for HIV 1 and 2 antibodies. However, five patients had deranged blood sugars.

All the patients were culture positive, considering the inclusion of cases with growth other than *Trichophyton concentricum*. The predominant fungus isolated was *Trichophyton tonsurans* (18 patients; 42.85%) [Figure 3], followed by *Trichophyton mentagrophytes* [Figure 4] (14 patients; 33.3%), *Microsporum*

audouinii (7 patients; 16.6%), and *Trichophyton rubrum* (3 patients; 7.2%). The KOH positivity among these was 89% (37 patients).

All these patients were prescribed topical ketoconazole 2% cream twice daily for 6 weeks with oral terbinafine at a dose of 250 mg twice a day in adults and 5 mg/kg/day in the pediatric age group for 4 weeks. Thirty-two (76%) patients showed a good response at the end of 6 weeks, while the remaining 10 (24%) patients responded poorly. The poor responders were later initiated on oral itraconazole at 3 mg/kg body weight.

Discussion

Atypical clinical presentation of dermatophytosis due to the application of topical and systemic steroids is referred to as tinea incognito.^[1] Tinea incognito can also mimic tinea imbricata—*Tinea pseudoimbricata*.^[3] *Tinea pseudoimbricata* or tinea indecisiva^[4] is a variant of dermatophytosis, clinically characterized by two or rarely three concentric scaly plaques caused by dermatophytes other than *Trichophyton concentricum*.^[5] The dermatophytes usually isolated are *Trichophyton tonsurans*, *Trichophyton rubrum*, *Trichophyton mentagrophytes*, *Microsporum gypseum*, and *Microsporum ferrugineum*.^[6] It can occur denovo or may be associated with local or systemic immunosuppression due to protein-energy malnutrition, Acquired Immune Deficiency Syndrome, and immunosuppressive drugs. The cases of tinea pseudoimbricata reported to date are depicted in Table 1.^[2-14]

In this series, since all our patients had applied topical steroids, it will be discussed in terms of tinea incognito. The majority of our patients were males, in the age group of 21–40 years, belonging to the lower socioeconomic status often using steroids for a duration of more than 6 weeks, and a similar trend has been noted in the studies of tinea incognito.^[1,15-17] The males of the lower socioeconomic status are more likely to misuse topical steroids as attending hospital may lead to loss of their wages. In line with the other studies, it was the pharmacist who prescribed the steroids to the patients, in the form of a



Figure 1: (a and b) Photograph showing tinea pseudo imbricata with multiple site involvement

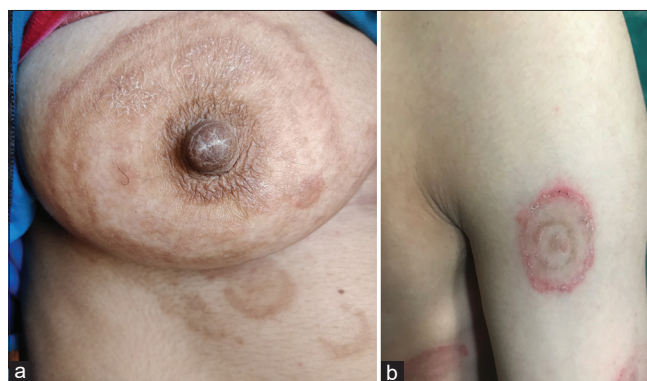


Figure 2: (a and b) Photograph of tinea pseudo imbricata with concentric rings ranging from three to five

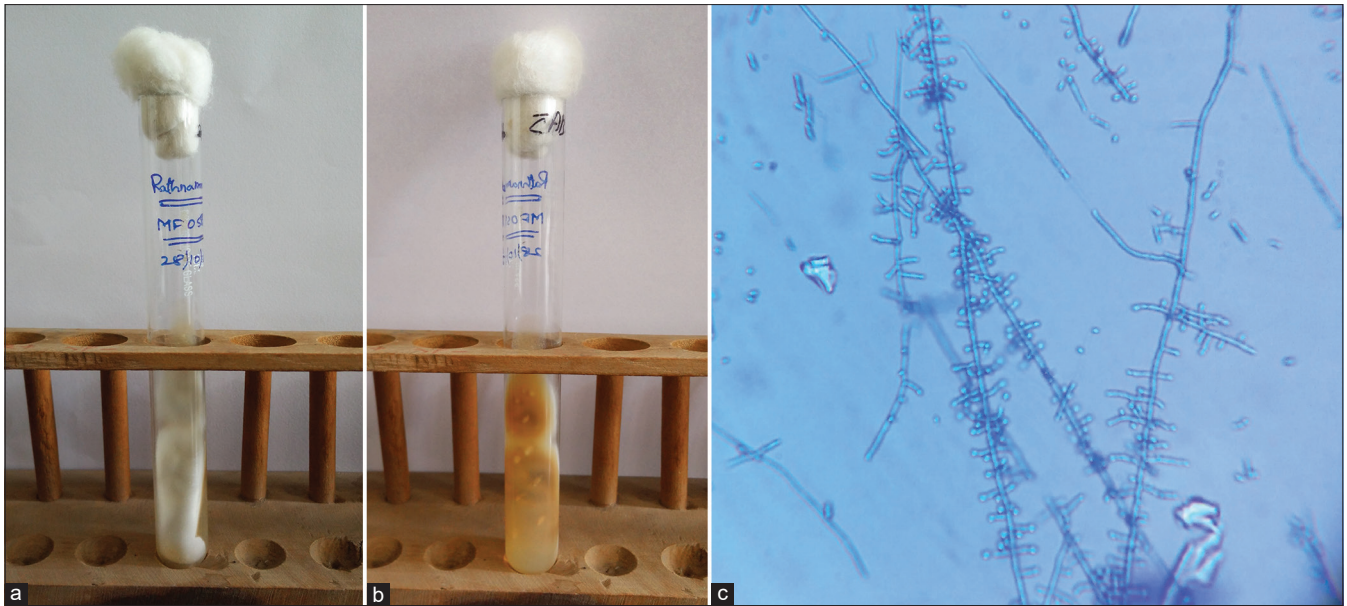


Figure 3: Growth of *Trichophyton tonsurans* pale-white colonies on obverse and yellowish-red on reverse. LPCB mount (40X) showing broad hyphae with numerous pyriform-shaped microconidia borne at right angles to the hyphae

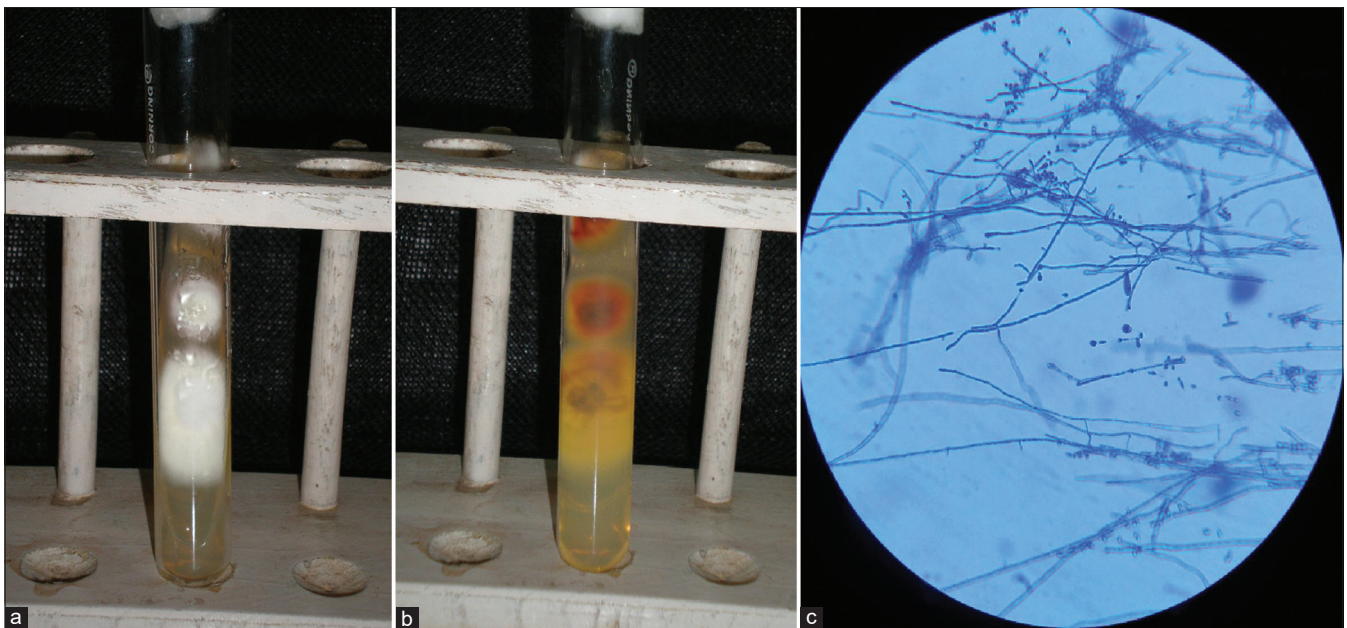


Figure 4: Growth of *Trichophyton mentagrophytes* with white cottony colonies on obverse and yellowish-brown on reverse. LPCB mount (40X) showing hyphae with cluster of microconidia and thin-walled clavate-shaped few macroconidia

triple combination of topical steroids with topical antiviral and topical antifungal. All our patients had multiple site involvement, and in line with the other studies, the trunk was the most common site affected,^[15-17] while in one study by Dutta *et al.*,^[1] the face was the common site affected. In contrast to the other studies, the groin was the next most common site affected in our study. The covered areas are more likely to be misused with the steroids as some of the patients may be reluctant to show the lesions to the doctor. We also noted a higher positivity on potassium hydroxide examination, which was also seen in the other

studies.^[1,15-17] In this series, the culture positivity was 100%, as only the patients having a dermatophyte growth on the culture were included in the study.^[1] In the reported case studies involving tinea incognito, there is a mention about the clinical mimics occurring due to the application of the steroids, but not on atypical morphology like tinea pseudoimbricata. Hence, this study has been focused on tinea pseudoimbricata occurring due to the application of topical steroids. However, in five patients, the morphology may be due to the application of topical steroids with a confounding effect of associated diabetes mellitus.

Table 1: Literature review of the tinea psuedoimbricata cases

Author and year	Number of cases	Organisms isolated	Association
Lee <i>et al.</i> 1987 ^[2]	1	M ferrugineum	Nil
Lim SP & Smith AG 2003 ^[3]	1	T Tonsurans	Renal transplant recipients on oral immunosuppression
Batta K <i>et al.</i> 2002 ^[4]	2	T Tonsurans	Topical steroid and antifungal combination
		T Mentagrophytes	
Mask Bull <i>et al.</i> 2015 ^[5]	1	T Tonsurans	Topical steroids
Ouchi <i>et al.</i> 2005 ^[6]	1	T Tonsurans	Topical steroids
Hoque SR & Holden CA 2007 ^[7]	1	T Tonsurans	Oral and topical steroids
Narang <i>et al.</i> 2012 ^[8]	1	T Tonsurans	HIV infection
Sun PL & Ho HT <i>et al.</i> 2006 ^[9]	1	M Gypseum	Nil
Rao AG & Datta N 2013 ^[10]	2	T Tonsurans	PEM
		T Mentagrophytes	Nil
Verma S & Hay RJ 2015 ^[11]	6	T Rubrum (3)	Topical steroids, topical antibiotic and topical antifungal combination
		T Mentagrophytes (1)	
Sonthalia <i>et al.</i> 2015 ^[12]	1	T Mentagrophytes	Oral and topical steroids
Kumar S <i>et al.</i> 2015 ^[13]	1	T Mentagrophytes	Topical steroids
Gupta V <i>et al.</i> 2017 ^[14]	9	T Mentagrophytes (7)	Topical steroids with or without antifungal
		T Rubrum (2)	

As per the review of literature, only 28 cases of tinea pseudoimbricata have been reported to date [Table 1]. Three of these 28 cases were apparently normal, while the rest had immunosuppression either due to systemic disorders, oral drugs, or topical glucocorticosteroids. The causes of systemic immunosuppression noted in the five cases were drugs (post-renal transplant immunosuppressive drugs or oral glucocorticoids),^[3,7,12] HIV infection,^[8] and protein-energy malnutrition.^[10] The rest of the cases (22 patients) were due to local immunosuppression induced by the application of topical glucocorticoids either singly or in combination with topical antifungal.^[4-7,11-14] Similarly, all our patients had abused topical steroids, while in five patients, associated systemic immunosuppression due to deranged blood sugars was noted which is not seen in the cases reported to date.

The concentric ring effect seen on tinea imbricata is due to the intermittent suppression of fungal growth, and hence, the scaling followed by successive fungal regeneration.^[18] The key pathogenic factor in tinea imbricata is blunted cell-mediated immunity, as indicated by the depressed delayed hypersensitivity reaction to the trichophytin antigen.^[19] A similar immunosuppressed milieu is created by the application of topical steroids, which results in alternating activation and inactivation of the fungal genes, corresponding to similar host immune response leading to concentric rings of scaling.^[5] Though the classical clinical morphology of tinea imbricata is in the form of concentric rings, Trichophyton concentricum can also produce other clinical morphologies like lamellar, lichenified, plaque like, annular, depending on the site, duration, and symptoms.^[18] Hence, it may be proposed that, subject to the clinical scenario, a morphology mimicking tinea imbricata can be induced by the dermatophytic species other than Trichophyton concentricum.

The data obtained from the cases of tinea pseudoimbricata reported to date were compiled and compared with the present study. Of the 28 cases reported to date, 26 isolates were obtained with the most common isolate among all reports being Trichophyton mentagrophytes (12 isolates), followed by Trichophyton tonsurans (7 isolates), Trichophyton rubrum (5 isolates), and one isolate of Microsporum gypseum and Microsporum ferrugineum each. Trichophyton tonsurans was the fungus commonly isolated in the cases reported outside India, while Trichophyton mentagrophytes is the predominant isolate in India. In contrast, we obtained a predominant isolate of Trichophyton tonsurans followed by Trichophyton mentagrophytes, Microsporum audouinii, and Trichophyton rubrum.

Trichophyton tonsurans is an anthropophilic dermatophyte, capable of maintaining an asymptomatic carrier state which leads to the persistence of fungus. This gets subsequently activated on the application of topical glucocorticoids, which causes local immunosuppression.^[20] Similarly, Trichophyton rubrum also maintains a reservoir in the vellus hairs. Also, the arthroconidia of Trichophyton mentagrophytes forms long fibril-like structures that attach the fungus to the tissue surface leading to the persistence of fungus.^[13]

Accordingly, the ring within the ring effect occurs due to two factors:

1. Local immunosuppression (due to topical steroid misuse)
2. Persistence of the fungus in the stratum corneum.

With the persistence of the fungus, when the local immune responses are suppressed by the application of topical glucocorticoids, the fungal genes are activated

resulting in regeneration, thereby initiating another zone of host-induced inflammatory response. This process may repeat multiple times if the topical steroids are applied intermittently resulting in multiple concentric rings of scaling and inflammation.^[5]

Conclusion

To summarize, the misuse of topical steroids may result in altered morphology, i.e., tinea pseudoimbricata, which can be differentiated from tinea imbricata by the isolation of organisms other than *Trichophyton concentricum*. The term steroid-modified tinea is more apt than tinea incognito.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Nil.

Conflicts of interest

There are no conflicts of interest.

References

- Dutta B, Rasul ES, Boro B. Clinico-epidemiological study of tinea incognito with microbiological correlation. *Indian J Dermatol Venereol Leprol* 2017;83:326-31.
- Lee KH, Lee ES, Kang WH, Lee S. An unusual clinical manifestation of tinea corporis caused by *Microsporon Ferrugineum*. *Korean J Dermatol* 1987;25:383-8.
- Lim SP, Smith AG. Tinea pseudoimbricata: Tinea corporis in renal transplant recipient mimicking the concentric rings of tinea imbricata. *Clin Exp Dermatol* 2003;28:331-4.
- Batta K, Ramlogan D, Smith AG, Garrido MC, Moss C. Tinea indecisive may mimic the concentric rings of tinea imbricata. *Br J Dermatol* 2002;147:384.
- Mask-Bull L, Misii RP, Tarbox MB. America's first case of tinea pseudoimbricata. *Am J Dermatol Venereol* 2015;4:15-7.
- Ouchi T, Nagao K, Hata Y, Ottuka T, Inazumi T. Trichophyton tonsurans infection manifesting as multiple concentric annular erythemas. *J Dermatol* 2005;32:565-8.
- Hoque SR, Holden CA. Trichophyton tonsurans infection mimicking tinea imbricata. *Clin Exp Dermatol* 2007;32:345-6.
- Narang K, Pahwa M, Ramesh V. Tinea capitis in the form of concentric rings in HIV positive adult on antiretroviral treatment. *Indian J Dermatol* 2012;57:288-90.
- Sun PL, Ho HT. Concentric rings: An unusual presentation of tinea corporis caused by *Microsporon gypseum*. *Mycoses* 2006;49:150-1.
- Rao AG, Datta N. Tinea corporis due to Trichophyton mentagrophytes and Trichophyton tonsurans mimicking tinea imbricata. *Indian J Dermatol Venereol Leprol* 2013;79:554.
- Verma S, Hay RJ. Topical steroid-induced tinea pseudoimbricata: A striking form of tinea-incognito. *Int J Dermatol* 2015;54:e192-3.
- Sonthalia S, Singhal A, Das S. Tinea cruris and tinea corporis masquerading as tinea indecisive: A case report and review of the literature. *J Cutan Med Surg* 2014;18:1-6.
- Kumar S, Kamra N, Mahajan BB. Tinea pseudoimbricata due to Trichophyton mentagrophytes: A rare case report. *J Pak Assoc Dermatol* 2015;15:151-3.
- Gupta V, Bhatia R, Sondhi P, Mahajan R. 'Ring-within-a-ring' appearance: Morphological clue to topical steroid abuse in dermatophytosis. *J Eur Acad Dermatol Venereol* 2017;31:e2-3.
- Arun B, Remya VS, Sheeba PM, Kokkayil P. Mycological study on incidence of tinea incognito in a tertiary hospital. *Med Int Med J* 2015;2:649-51.
- Kim WJ, Kim TW, Mun JH, Song M, Kim HS, Ko HC, et al. Tinea incognito in Korea and its risk factors: Nine year multicentre survey. *J Korean Med Sci* 2013;28:145-51.
- Ansar A, Farshchian M, Nazeri H, Ghaisian SA. Clinico epidemiological and mycological aspects of tinea incognito in Iran: A 16 year study. *Med Mycol J* 2011;52:25-32.
- Manson P. Notes on Tinea imbricata, an undescribed species of body ring worm. *Med Rep (China)* 1878;16:1-11.
- Hay RJ, Reid S, Talwat T, Macnamara K. Immune responses of patients with tinea imbricata. *Br J Dermatol* 1983;108:581-6.
- Salci TP, Salci MA, Marcon SS, Salineiro PHB, Svidzinski TIE. Trichophyton tonsurans in a family microepidemic. *Ann Bras Dermatol* 2011;86:1003-6.