

Is Less Diffuse Distinct Borders the Only Key Dermoscopic Feature of Steroid Modified Tinea? A Cross Sectional Observational Study

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Abstract

Background: Steroid-modified tinea (tinea incognito) is an increasingly common consequence of the rampant, unsupervised use of over-the-counter topical corticosteroid-antifungal-antibacterial combination creams in India. Its altered clinical morphology often confounds diagnosis. Existing dermoscopic literature has largely emphasised follicular and hair-shaft changes (comma hairs, morse-code hairs, translucent hairs) as the hallmark clue to steroid modification, but it is unclear how consistently these are found across an unselected clinical cohort.

Aims and Objectives: To analyse the dermoscopic features of steroid-modified tinea in patients attending the dermatology outpatient department of a tertiary care centre, and to identify the most consistently observed feature.

Materials and Methods: A hospital-based, descriptive, cross-sectional study was conducted over 18 months (May 2024-October 2025) at Sathagiri Institute of Medical Sciences and Research Centre, Bengaluru. Patients aged 18-70 years with a clinically suspected diagnosis of steroid-modified tinea and a clear history of prior topical steroid application were evaluated using 10% potassium hydroxide (KOH) microscopy and polarized dermoscopy (ILLUCO IDS-1100). The single most striking dermoscopic feature of the representative lesion in each patient was recorded into one of six predefined categories.

Results: Sixty patients with steroid-modified tinea were evaluated. Irregular, less-distinct diffuse borders were the most frequently recorded feature (23/60, 38.3%), followed by scattered/suppressed scaling (15/60, 25.0%), atrophy/striae (11/60, 18.3%), erythema (5/60, 8.3%), hair-shaft changes such as comma hairs, translucent hairs, broken hairs and black dots (4/60, 6.7%), and micropustules/pustules (2/60, 3.3%). Among patients in whom the source of the topical steroid was documented (n=40), the majority had procured it directly from a medical store without a prescription (24/40, 60.0%), followed by a general practitioner (13/40, 32.5%) and friends or family (3/40, 7.5%).

Conclusion: Contrary to the emphasis placed on hair-shaft changes in earlier literature, these were the least frequent finding in our cohort. Loss of a well-defined, sharp lesion margin, appreciated dermoscopically as an irregular or diffuse border, was the only feature common enough across the cohort to be considered a reliable clue, and may serve as a simple, rapid pointer to topical steroid abuse even when the classical follicular stigmata are absent.

INTRODUCTION

Dermatophytosis has reached epidemic proportions in India over the past decade, now accounting for a substantial share of dermatology outpatient consultations.[1] A major driver of this epidemic is the

widespread, unsupervised availability of potent and super-potent topical corticosteroids, frequently dispensed in fixed-dose combination with an antifungal and/or antibacterial agent. Application of such preparations on a fungal infection alters its classical morphology, giving rise to "tinea incognito" or steroid-modified tinea - lesions that are poorly demarcated, minimally scaly, and often lack the elevated, active, erythematous margin that characterises untreated dermatophytosis.[2,3]

Because the clinical picture is frequently atypical and can mimic eczema, psoriasis, or other inflammatory dermatoses, diagnosis of steroid-modified tinea can be challenging, and confirmatory mycology (KOH microscopy and culture) may also show reduced yield after prior antifungal or steroid use. Dermoscopy has emerged as a rapid, inexpensive, and non-invasive bedside adjunct that can support the diagnosis even when clinical and mycological findings are equivocal.[3,4] Prior dermoscopic studies of steroid-modified tinea have chiefly highlighted changes in the hair shaft and follicle - comma hairs, morse-code (bar-code) hairs, cork-screw hairs, translucent and deformable hairs, black dots, and follicular micropustules - as the principal markers of local immunosuppression and deeper follicular fungal invasion.[2,3,4,5] Background erythema, dilated or polygonally arranged vessels, and diffuse whitish scaling have also been described as accompanying features.[2,6,7]

However, most of these observations derive from case reports or comparative studies of relatively homogeneous lesion morphology (for example, the concentric "ring-within-a-ring" pattern of tinea pseudoimbricata).[2] It remains unclear whether hair-shaft and follicular changes are consistently present across the broader and more heterogeneous spectrum of steroid-modified tinea encountered in routine clinical practice, where lesions occur on both glabrous and non-glabrous skin and steroid potency, duration, and combination vary widely. We undertook this study to characterise the dermoscopic features of steroid-modified tinea in an unselected tertiary-care cohort, and to determine which single feature, if any, was consistently common across the majority of patients.

OBJECTIVE

To analyse the dermoscopic features of steroid-modified tinea in patients attending the dermatology outpatient department of a tertiary care centre, and to identify the dermoscopic feature that is most consistently shared across the cohort.

MATERIALS AND METHODS

Study design and setting: This was a hospital-based, descriptive, cross-sectional study. Data were derived from the case records of patients attending the outpatient department (OPD) of Dermatology at Sathagiri Institute of Medical Sciences and Research Centre (SIMSRC), Bengaluru.

Study period: May 2024 to October 2025 (18 months).

Inclusion criteria: Patients aged between 18 and 70 years with a clinical diagnosis of steroid-modified tinea, and a clear history of topical steroid application to the affected site prior to presentation, were included.

Exclusion criteria: Patients already undergoing treatment for dermatophytosis at presentation, and those without a clear history of prior topical steroid application, were excluded.

Assessment tools: A polarized dermoscope (ILLUCO IDS-1100), 10% potassium hydroxide (KOH) mount, and light microscope were used for evaluation.

Procedure: A detailed history, including the duration and pattern of topical steroid use and the source from which the steroid preparation was obtained (general practitioner, medical store, or friends/family),

was recorded for each patient. Skin scraping from the representative lesion was subjected to 10% KOH mount and examined under light microscopy for fungal elements. Polarized, non-contact dermoscopy was performed on the most active/representative lesion in each patient. The single most striking dermoscopic feature was assigned to one of six mutually exclusive, predefined categories: (i) scattered/suppressed scaling, including lesions showing blurring of the inner and outer concentric scaly layers, producing an indistinct "double-edged" scale pattern; (ii) erythema, including prominent telangiectasia, dotted vessels, and serpentine/linear blood vessels, often accompanied by cutaneous atrophy; (iii) hair-shaft changes, comprising scanty perifollicular scaling with altered vellus hair, comma hairs, translucent hairs, and broken hairs; (iv) micropustules/pustules, including follicular micropustules occurring in conjunction with hair-shaft alteration; (v) irregular/diffuse borders, defined as loss of the sharp, clearly raised outer margin, which instead appeared blurred and spread out into the surrounding skin; and (vi) atrophy/striae.

Statistical analysis: Descriptive statistics were used to express the frequency and percentage of each dermoscopic feature and of each steroid source category.

RESULTS

Sixty patients with clinically and mycologically supported steroid-modified tinea were evaluated dermoscopically over the study period.

Irregular or less-distinct, diffuse lesion borders were the single most frequently recorded dermoscopic feature, seen in 23 of 60 patients (38.3%) - more often than any other individual feature. On dermoscopy, these lesions showed loss of the sharp, clearly raised outer margin characteristic of untreated tinea; the border instead appeared blurred and spread out gradually into the surrounding normal skin, without a well-defined line of demarcation.

Scattered or suppressed scaling was the next most common finding (15/60, 25.0%). In several of these lesions the scaling showed blurring of the inner and outer concentric scaly layers, producing an indistinct, "double-edged" scale pattern rather than the crisp, single peripheral collarette of scale seen in untreated tinea. Atrophy or striae were the predominant feature in 11 patients (18.3%), most often noted in intertriginous sites consistent with prolonged application of potent steroids. Erythema was recorded as the predominant feature in 5 patients (8.3%); these lesions characteristically showed prominent telangiectasia, dotted vessels, and serpentine or linear blood vessels superimposed on a background of cutaneous atrophy and erythema.

Hair-shaft changes - comprising scanty perifollicular scaling together with follicular micropustules and altered vellus hair, comma hairs, translucent hairs, and broken hairs - classically emphasised in the existing literature as the hallmark of steroid-modified tinea, were the predominant finding in only 4 patients (6.7%). Micropustules or pustules, similarly occurring in conjunction with follicular and hair-shaft alteration, were the least frequent predominant finding, seen in 2 patients (3.3%) (Table 1, Figure 1).

Notably, no single feature was present in a majority of patients; the diffuse/irregular border was nonetheless the only feature approaching this threshold and was more than twice as common as the classical hair-shaft signs.

Among the patients in whom the source of the topical steroid could be documented (n=40), the majority had obtained it directly over-the-counter from a medical store without any medical prescription (24/40,

60.0%), while 13 (32.5%) had been prescribed the steroid by a general practitioner, and 3 (7.5%) had used a preparation suggested by friends or family (Table 2).

Table 1: Frequency of dermoscopic features in steroid-modified tinea (n=60)

Dermoscopic feature	Number	Percentage
Irregular / less-distinct diffuse borders	23	38.3%
Scattered / suppressed scaling	15	25.0%
Atrophy / striae	11	18.3%
Erythema	5	8.3%
Comma hairs, translucent hairs, broken	4	6.7%
Micropustules / pustules	2	3.3%
Total	60	100%

Table 2: Source of the topical steroid preparation (n=40)

Source of topical steroid	Number	Percentage
Medical store (over-the-	24	60.0%
General practitioner	13	32.5%
Friends / family	3	7.5%
Total	40	100%

RESULTS



Suppressed scaling

(a) Suppressed/scattered scaling



Erythema

(b) Erythema



Comma hairs, translucent hairs, broken hairs, black dots

(c) Comma/translucent/broken hairs, black dots



Micropustules/Pustules

(d) Micropustules/pustules



Figure 1: Representative clinical and polarized dermoscopic images of steroid-modified tinea showing (a) suppressed/scattered scaling, (b) erythema, (c) comma hairs, translucent hairs, broken hairs and black dots, (d) micropustules/pustules, (e) irregular/diffuse borders, (f) atrophy, and (g) striae.

DISCUSSION

The over-the-counter availability and irrational use of fixed-dose steroid-antifungal-antibacterial combination creams have exacerbated the epidemic of tinea incognito in India, often resulting in under-reported and misdiagnosed disease.[1] Given its atypical clinical presentation, accurate diagnosis of steroid-modified tinea requires a high index of suspicion, particularly in chronic, treatment-refractory dermatitis with a history of steroid use. Standard diagnostic tools such as KOH microscopy, fungal culture, and periodic acid-Schiff-stained biopsy remain essential, but can yield false-negative results once the fungal burden has been reduced by prior treatment; more advanced techniques such as polymerase chain reaction, MALDI-TOF mass spectrometry, and fluorescent microscopy offer improved sensitivity but remain restricted by cost and availability. In this context, dermoscopy provides a simple, rapid, and inexpensive bedside method to support the diagnosis.[3,4]

Existing dermoscopic literature on steroid-modified tinea has largely converged on follicular and hair-shaft changes as the defining clue. Sonthalia et al. described a case of axillary tinea incognito in which polarized dermoscopy revealed perifollicular scales and casts, black dots, broken and bent deformable hairs, morse-code hairs, comma and cork-screw hairs, and translucent hairs, together with dotted vessels and telangiectasia.[4] In a larger comparative study of 60 patients (30 with untreated tinea and 30 with steroid-modified tinea), Gadekar et al. found that peri-follicular scaling, follicular micropustules, involvement of vellus hair, yellow hair, morse-code hair, and transparent hair were all significantly more frequent in the steroid-modified group, whereas diffuse erythema with peripheral whitish scaling characterised untreated tinea.[3] Singal et al., studying the concentric-ring variant of steroid-modified tinea (tinea pseudoimbricata), reported background erythema and peripheral whitish scales in all patients, dilated tortuous vessels in three-quarters, and micropustules and brown hemorrhagic spots in the majority, again emphasising an inflammatory and follicular dermoscopic pattern.[2] Similar

follicular and hair-shaft signs have also been highlighted in facial tinea incognito and in broader reviews of dermatophytosis dermoscopy.[5,6,7]

Our findings diverge from this emphasis. In our unselected cohort, hair-shaft changes - scanty perifollicular scaling with follicular micropustules and altered vellus hair, comma hairs, translucent hairs, and broken hairs - were the predominant dermoscopic finding in only a small minority of patients (6.7%), and micropustules in fewer still (3.3%), considerably lower proportions than reported in the largely follicular-pattern-driven literature above. This discrepancy may partly reflect differences in study design: several prior reports selected for concentric-ring morphology or non-glabrous, hair-bearing sites where hair-shaft signs are inherently more conspicuous, whereas our cohort included lesions across a broader range of body sites and steroid exposure profiles, with only the single most prominent dermoscopic feature recorded per patient rather than an exhaustive multi-feature inventory.

A further group of patients showed blurring of the inner and outer concentric scaly layers, producing an indistinct, "double-edged" scale pattern rather than the crisp peripheral collarette typical of untreated tinea, while another subset showed prominent telangiectasia, dotted vessels, and serpentine/linear blood vessels superimposed on atrophic, erythematous skin - vascular and atrophic changes attributable to the direct cutaneous effects of chronic potent topical steroid application rather than to the fungal infection itself. Instead, the feature most consistently observed across our cohort - present in well over a third of patients and more common than any other single sign - was loss of the sharp, clearly raised outer border, which instead appeared blurred and spread out into the surrounding skin. This is biologically plausible: potent topical corticosteroids locally suppress the host inflammatory response at the advancing edge of the dermatophyte colony, blunting the raised, actively scaling, erythematous margin that is otherwise the clinical and dermoscopic hallmark of untreated tinea.[2,3]

Since no single feature was present in a majority of our patients, and the classical follicular/hair-shaft signs were comparatively uncommon, we propose that dermoscopic assessment of border definition may be a more broadly applicable first clue to steroid modification in routine practice than an isolated search for hair-shaft changes, which - although highly specific when present - showed low sensitivity in our series. This does not diminish the diagnostic value of hair-shaft dermoscopy; vellus hair involvement in particular has been proposed as an indicator for the need for systemic antifungal therapy.[3,8] Rather, our data suggest that an ill-defined, diffuse border should not be overlooked as a subtle but frequent pointer to steroid modification, especially when the more specific follicular stigmata are absent.

The pattern of steroid procurement in our cohort - with three in five patients obtaining the preparation directly from a medical store without any medical prescription, and less than a third from a qualified general practitioner - reaffirms the well-documented, pharmacy-driven misuse of topical corticosteroid-antifungal combination creams in India.[1] This reinforces the need for regulatory measures restricting over-the-counter dispensing of such combinations, alongside continued clinical vigilance and patient education.

Limitations: This was a single-centre study with a modest sample size. Only the single most striking dermoscopic feature was recorded per patient rather than a comprehensive multi-feature inventory, which may under-represent co-existing signs and precludes a fully quantitative comparison with the non-steroid-modified tinea group. The source of the topical steroid could be documented in only 40 of the 60 patients, and this information, like the overall steroid-use history, was subject to recall bias. A larger, multicentric study with systematic multi-feature scoring and comparison against a matched untreated-tinea control group would help validate and extend these observations.

CONCLUSION

In this cross-sectional study of steroid-modified tinea, an irregular or less-distinct diffuse lesion border - rather than the hair-shaft changes emphasised in prior literature - emerged as the only dermoscopic feature common enough across the cohort to be considered a reliable, near-universal clue. Incorporating assessment of border definition into the routine dermoscopic evaluation of tinea, particularly in settings with rampant over-the-counter steroid misuse, may improve the detection of steroid-modified tinea even in patients who lack the classical follicular or hair-shaft stigmata.

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