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ORIGINAL RESEARCH

Role of dermoscopy in assisting the diagnosis of KOH positive dermatophytosis - A prospective study

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Abstract

Background: Dermatophytosis is common superficial mycosis with an increase in frequency, severity and relapse rates in recent years. Diagnosis of dermatophytosis is posing difficulties is diagnosis because of partial treatment and steroid abuse. Dermoscopy is an established non-invasive tool which has the potential to aid the clinical diagnosis of various dermatology

Objective: The present study aims to study the dermoscopic findings of various dermatophytosis.

Materials and Method: It was a cross sectional study conducted over a period of 18 months involving 300, KOH positive cases of dermatophytosis which were later evaluated using a dermoscope (Dermlite DL3) with a magnification of 10x.

Results: Out of 300 cases, 217(72.33%) were male and 83 (27.67%) females with a male-to-female ratio of 2.6:1. The mean age in the present study was 26 ± 6.4 years. The most common type was tinea corporis (44.6%) followed by tinea cruris (19%). Common dermoscopic findings of tinea corporis and cruris were white scales in 191(63.6%) followed by red -brown globules in 141(47%) cases. The most frequent findings in Tinea capitis was comma shaped hair 21 (7%) followed by black dots in 11 (3.67%). Onychomycosis showed chromonychia and spike pattern in 46 (15.33%) as the most common dermoscopic findings.

Conclusion: Dermoscopy is a rapid, non-invasive in-vivo technique for diagnosis of tinea infection and may be useful in overcoming the shortcomings of conventional diagnostic methods.

Keywords: Dermatophytosis, Dermoscopy, Tinea, Onychomycosis.

Introduction

Dermatophytes are known to cause superficial mycosis in humans, involving the outermost layer of skin and its appendages such as hair and nails. Dermatophytosis is prevalent worldwide affecting up to 20-25% of the world population and is more frequently encountered in the tropics due to high level of humidity, overpopulation, and poor hygiene. [1][2]

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The increasing number of dermatophyte infections have led to an epidemic-like situation in India with current reported prevalence of 6.09%– 61.5% [3][4]. The emergence of recurrent, chronic, recalcitrant and steroid modified dermatophytosis results into challenges in accurate clinical diagnosis for clinicians. Additionally, similarities to other closely related cutaneous pathologies may pose cumulative diagnostic dilemma.

Diagnostic methods for dermatophytosis like microscopy, culture and histopathology are indispensable tools in making diagnosis precisely but are sometime inconvenient as they are time-consuming, invasive with varying sensitivity and specificity.

Dermoscopy, on the other hand, is a rapid, non-invasive, in-vivo technique for assisting the diagnosis of tinea infections and can prove useful in overcoming the pitfalls of conventional diagnostic methods.

The present study was conducted to evaluate dermoscopic features of KOH mount positive cases of dermatophytosis to aid specific findings for accurate diagnosis.

Materials and Method

A cross sectional study was conducted over a duration of 18 months in a tertiary care centre on 300 KOH positive patients of dermatology after approval of the institutional ethics committee. During the study period, patients diagnosed with dermatophytosis of both genders and all ages, with or without history of treatment were included in the study after taking written informed consent. After clinical examination of the enrolled patients, skin scrapings /nail clippings/ hair strands in clinically diagnosed cases of dermatophytosis were taken for microscopy. Direct microscopic examination was performed using 10% KOH for the skin, 20% KOH for the hair, and 40% KOH for the nails to check for fungal hyphae. The KOH positive patients were then subjected for dermoscopic evaluation.

Dermoscopic features of different clinical variants of dermatophytosis were studied using DermLite DL3 dermoscope with 10× magnification under both polarizing and non polarizing mode. The digital camera linked to the dermoscope recorded pictures for future analysis.

Results

Total 300 patients of KOH positive dermatophytosis were included in the study. Out of 300, 217 (72.33%) were male and 83 (27.67%) were females with a male-to-female ratio of 2.6:1. The most commonly affected age group was between 21– 30 years in 112 (37.33) patients and mean age in the present study was 26 ± 6.4 years. 43 (14.33%) patients had history of disease of less than 1 month while 94 (31.33%) patients had history of disease between 1- 6 months, 82 (27.33%) patients between 6 – 12 months and 81 (27%) patients had duration of dermatophytosis for more than 1 year.

Most common dermoscopic findings in tinea corporis and tinea cruris were diffuse erythema in 66 (22 %) cases, white scaling in 191 (63.67 %) cases, brown- black globules in 144 (47%) cases, dotted vessels in 82 (27.33%) cases, translucent vellous hair in 72 (24 %) cases and follicular micropustules in 12 (4 %) cases. Hair changes like translucent vellus hair were more consistent in cases of tinea cruris (66.67%) compared to tinea corporis (25.37%).

Most frequently observed dermoscopic features of tinea capitis in 21 cases were comma shaped hair in 14 (4.67%) cases followed by black dot in 11 (3.67%) cases and broken hair in 9 (3%) cases. More specific findings of tinea capitis were recorded less frequently and were cork screw hair in 5 (1.67 %) cases, zig zag hair in 3(1%) cases and morse-code hair in 1 (0.33%) case.

Most frequently accounted onychoscopic finding in tinea unguium were chromonychia and spike pattern in 46 (15.33%) cases each. Other findings were subungual hyperkeratosis or

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ruin aspect in 42 (14%) cases, longitudinal striae 26 (8.67%) cases and distal irregular termination in 39 (13%) cases.

In 30 cases of tinea manuum and tinea pedis, dermoscopic findings observed were white scales with localized skin furrows in 27(9%) and dotted vessels and faint diffuse erythema in 8(2.67%) cases each.

Frequency of distribution of various dermatophytosis is given in table 1.

Table 1: Distribution of various types of dermatophytosis

Sr.No.	Type of Dermatophytosis	Number of Patients/ Percentage
1	Tinea corporis	134(44.67%)
2	Tinea cruris	57(19%)
3	Tinea capitis	21(7%)
4	Tinea manuum	12(4%)
5	Tinea pedis	18(6%)
6	Tinea ungiumn	58(19.33%)
Total		300(100%)

Table 2: Dermoscopic findings of dermatophytosis

Dermoscopic Findings	Number of Patients/Percentage
Diffuse erythema	66(22%)
Scales	191(63.67%)
Red- brown- black globules	141(47%)
Dotted vessels	82(27.33%)
Follicular micropustules	12(4%)
Translucent vellous hair changes	72(24%)
Hair changes	
Broken hair	9(3%)
Black dots	11(3.67%)
Comma shaped	14(4.67%)
Cork screw hair	5(1.67%)
Zig zag hair	3(1%)
Morse code hair	1(0.33%)
Nail changes	
Chromonychia	46(15.33%)
Subungual hyperkeratosis	42(14%)
Spike pattern	46(15.33%)
Longitudinal striae	26(8.67%)
Distal irregular termination	39(13%)

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Figure 1: Dermoscopy of tinea corporis showing diffure erythema , scaling with red globules and translucent vellous hair

Figure 2: Dermoscopy of tinea capitis showing broken hairs, black dots and comma shaped hair

Discussion

In the present study, male 72.33% outnumbered female 27.67% with a male-to-female ratio of 2.6:1. Data of our study correlated with findings from an Indian study on 1530 patients by Ramanath K et al in which male (67.43%) were affected more than females (32.57%).[5] The most commonly affected age group was between 21– 30 years in 112 patients (37.33) in present study , Kumar et al also reported majority (32.2%) of the patients belonged to the age group of 21-30 years followed by 31-40 years 22.8%.[6] We observed most patients had disease of longer duration of 1- 6 months(31.33%) followed by 6 – 12 months(27.33%) patients of more than 1 year. Agrawal et al reported maximum number of cases (62.5%), had disease for longer than 3 months.[7] Bindu et al reported tinea corporis (54.6%) was the commonest clinical type followed by tinea cruris (38.6%) which correlates with the findings noted in the present study where tinea corporis was the most common clinical pattern in 44.67% cases followed tinea cruris in 19% cases.[8]

Diffuse erythema in the present study was seen in 34.55 % cases, the erythema was prominent in early lesions and later was associated or replaced with hyperpigmentation and scaling. Erythema is not a specific finding but can help differentiate early lesions from late.

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Bhat et al [9] reported diffuse erythema in 100% cases of tinea corporis, this variation may be because of the duration of disease presentation, treatment history or possible relationship with Fitzpatrick skin type.

The red globular lesions are present in the initial stages corresponding to the extravasation of red blood cells, and hemosiderin which later appears darker due to deposition of melanin as an inflammatory response. [10] The dermoscopy of skin lesions revealed red to brown -black coloured globules in 141(73.82%) of 191cases of both tinea corporis and cruris, whereas Bhat et al reported the brown spots only in 20% cases of tinea corporis.[9]

Scales under dermoscope is related to disease activity. In the current study, presence of scales on dermoscope was the most consistent finding of skin lesions present in all cases of tinea corporis and cruris (100%) similar to findings noted by Bhat et al in all cases of tinea corporis and cruris .[9] Lekkas et al reported peripheral scaling and randomly distributed dotted vessels to be strong indicators of tinea infection . [11]

Micro-pustules are pale globules signifying the presence of neutrophilic micro-abscess around hair follicles in the epidermis in the initial stages and were seen in 12 (6.28%) cases of tinea corporis and cruris whereas Gadekar et al reported follicular micropustules in 13% cases without history of steroid use and 40% cases with history of steroid use. [12]

Hair changes observed were hypopigmented terminal hairs and translucent vellus hair in 72(37.7%) of tinea corporis and cruris. Ankad et al reported hair changes in 16.66% cases.[13] Involvement of vellus hair in dermatophytosis has both prognostic and therapeutic implications as it denotes the fungal load and indicates the need of systemic antifungals.[14]

The most frequently noted nail pattern on dermoscopy was spiked pattern in 46 (79.31%) of 58 cases of tinea unguium which refers to the indentations at the proximal edge of involved nail plate due to proximal invasion of the nail bed by dermatophytes. Longitudinal striae appear due to nail plate invasion by fungal hyphae and were seen in 26 (44.83%) of 58 cases of tinea unguium .Distal thickening and indentations of nail plate called as distal irregular termination were observed in 39 cases (67.24%), subungual hyperkeratosis in 42 (72.41%) and chromonychia in 46 (79.31%) out of 58 cases of tinea unguium .

Kayarkatte MN et al reported similar findings with spiked pattern in 86.4%, distal irregular termination in 81.8% and longitudinal striae in 25% cases and chromonychia of the nail plate and subungual hyperkeratosis were seen in 85.2% of 88 cases of onychomycosis.[15] Kayathi et al reported longitudinal riding in 49.1% cases as the most common pattern followed spiked pattern (43.16%) and distal irregular termination (34.6%) in 234 cases of onychomycosis [16] Makar et al in a study of dermoscopic features onychomycosis reported spike pattern ,distal irregular termination and ruin appearance as the three most common findings accounting for 41.66%, 25%, and 20.83% in KOH positive cases repetitively. [17]

Common hair findings in the present study from scalp lesions were comma shaped hair 66.67%, black dots 52.38%, broken hair 42.86%, corkscrew hair 23.81% and morse code hair 4.76% cases. According to a systemic review of 326 studies by Waśkiel-Burnat et al the most characteristic trichoscopic findings of tinea capitis were comma hairs (51%), corkscrew hairs (32%), morse code-like hairs (22%) and zigzag hairs (21%). [18]

Comma hairs are slightly curved due to cracking and bending of hair shafts infested with hyphae.[19] Comma hair observed in current study was seen in 14 (66.67%) out of 21 cases of tinea capitis compared to 58% cases of tinea capitis studied by Dalal et al. [20] The transverse incomplete fractures of the hair shaft leads to corkscrew or zigzag hairs and complete fracture, broken hairs that may be observed.[21] Kumar et al reported black dots in 82.65% cases as the most frequently finding compared to 52.38% in the present study and cork screw hairs and zig zag hairs in 32.56% and 15.30 % cases respectively compared to 23.81% and 14.29% cases respectively in our study .[22]

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Morse code hair is identified as horizontal white bands on hair fibre due to centrifugal destruction of keratinous layer and was reported only in 2.04% cases by Kumar et al compared to 4.76% cases in the present study. [22] Comma shaped hairs, zigzag shaped hairs, or corkscrew hairs are characteristic trichoscopic features of tinea capitis whereas black dots and broken hairs are not disease specific as they may also be seen in alopecia areata, trichotillomania, lichen planopilaris, discoid lupus erythematosus, and seborrheic dermatitis.[23]

Conclusion

Dermatophytic infections are prevalent in India and diagnosis of them is made by direct microscopic examination with KOH and fungal cultures; however, these conventional methods are complex, time-consuming and requiring trained personnel and mycological tools. Dermoscopy is a non-invasive and rapid method for evaluation of skin microstructure to strengthen the clinical diagnostic accuracy. The present study highlights the dermoscopic features of various dermatophytosis which can aid the clinical diagnosis and has significant advantage in early detection and treatment. The features may also help in assess the response of treatment and identification of recalcitrant cases to initiate appropriate treatment.

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