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Trichoscopic Study on Tinea Capitis: A Hospital Based Study

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Abstract

Introduction : Tinea capitis is a common dermatophyte infection of the scalp and hair shaft, most commonly observed in children. Trichoscopy is nonivasive tool which helps in early diagnosis and prompt treatment of tinea capitis.

Objectives : This study was carried out with the aim to describe the trichoscopic features of tinea capitis and to find out its different clinical variants with the aid of trichoscopy.

Materials and Methods : This is a hospital based cross sectional descriptive study conducted from 1st January 2019 to 31st December 2019. All patients clinically diagnosed with tinea capitis were included in the study.

Result : A total of 50 patients with tinea capitis were recruited. The most common age group was found to be 6-10 years (52%) and 27 patients (54%) were female. Majority of the population were students, i.e. 46 patients (92 %). Family history was positive in 38% of cases.

The clinical variants seen were black dots in 20 patients (40%), followed by gray patch in 15 patients (30%), kerion in 8 patients (16%) and combined type (both gray patch and black dots) in 4 patients (8%). The most common trichoscopic feature were black dots in 40 (80%), followed by comma hairs in 38 (76%), corkscrew hairs in 33 (66%), and broken hairs in 24 (48%).

Conclusion : This study highlighted that the use of trichoscopy as non-invasive tool helped in diagnosing the cases of tinea capitis without the use of wood's lamp and laboratory investigations.

Key words: Children; Tinea capitis; Trichoscopy

Introduction

Tinea capitis (TC) is a fungal infection of the scalp, hair follicles and shafts. It is predominantly seen in the pediatric population and common in tropical conditions. The highest incidence is seen in children 3-7 years of age.[1] It is an increasing public health concern throughout the world.[2] In Nepal, the prevalence ranged from 2.6-12.5%.[2-4] The disease is primarily caused by dermatophytes in *Trichophyton* and *Microsporum* genera that invade the hair shaft.[5] In Nepal, the common isolated organisms were *Trichophyton violaceum* (48.71%).[2] The clinical appearance varies from few dull gray, and broken off hairs with a little scaling to severe, painful, and inflammatory mass over the scalp.[6]

Although, potassium hydroxide (KOH) mount and fungal culture is the gold standard for identification of the causative organisms, trichoscopy is a noninvasive tool that provides definitive and earlier diagnostic clue.[7] The objective of the study was to identify the dermoscopic features of TC using dermoscope.

Materials and Methods

This hospital based cross-sectional descriptive study was conducted on OPD patients at a tertiary center in Kathmandu Valley over a period of 1 year (1st January 2019 to 31st December 2019). The demographic data

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regarding age, gender, occupation and duration of the disease were noted. Detailed relevant history and dermatological examination were performed in the patients which included symptoms, past history, personal history, family history and number of lesions.

Trichoscopy (dermoscopic examination of hair) was performed in the cases of TC diagnosed by a registered Dermatologist. The handheld dermoscope (Dermlite DL1) with a high magnification (10 fold magnification), featuring both polarizing lens and non polarizing lens, was used for the trichoscopic (dermoscopic) examination. The clinical photographs and documentations were recorded. We reinforced with KOH and fungal culture in the cases, which were difficult to diagnose clinically with trichoscopy,

A study conducted in department of Dermatology in B.P. Koirala Institute of Health Sciences, Dharan had prevalence of TC as 4.6%.[2] With the formula $n= z^2pq/d^2$, the minimum sample required for the study was 50. All the patients from all age group and both sexes, who were clinically diagnosed with TC in Dermatology OPD were included. Patients using systemic antifungal treatment for TC at least 4 weeks before the presentation were excluded.

Informed and written consent was obtained from all the patients who met the inclusion criteria. In case of children, consent was taken from their parent/ guardian. The consent was also taken for the clinical photographs. The patient's name and other personal information were kept confidential. The ethical clearance was obtained from Institutional Review Committee (IRC).

The collected data was analysed using Statistical Package for Social Sciences (SPSS) version 16. Categorical parameters were expressed as number and frequency. Descriptive statistics such as mean standard deviation were calculated for quantitative data. The association between the clinical variants and trichoscopic findings was done by Chi square test.

Results

The age group of patients ranged from 3 to 32 years with mean age of 8.46 ± 5.44 years. Majority of population belong to 6-10 years age group (52%), followed by 1-5 years age group (30%). The lowest frequency was seen in 21-25 years and 31-35 years age groups (2% in each). Among 50 patients, 27 (54%) were female and 23 (46%) were male.

Majority of the study population were students (92 %). The remaining were housewives (6 %) and hotel staff (2 %). Among 46 students, 11 students (24%), 8 male and 3 female, resided in monastery. The most common complaints were hair loss (42.84%) and itching (38.76%).

The duration of lesion was <1 month in 16 patients (32%), 1-6 months in 26 patients (52%) , 7-12 months in two patients (4%), 1-5 years in five patients (10%) and 6-10 years in one patient (2%). Only 6 (12%) patients had similar history in the past. Out of 50 patients, 19 patients (38%) had positive family history of TC.

Among 50 patients with TC, 27 patients (54%) washed their hair twice a week and only 1 patient (2%) washed hair occasionally.

History of sharing of personal belongings was positive in 32 patients (64%). The objects commonly shared were combs, towels and hair accessories such as hairbands, clips etc. Thirty one patients (62%) reported to use of hair oil. Twenty four patients (48%) cut their hair at home and 26 patients (52%) cut their hair at barbers.

Fourteen patients (28%) had solitary lesion, whereas remaining 36 patients (72%) had multiple lesions. A total of 27 patients (54%) had lesions on more than one site on the scalp. Only one patient (2%) had lesion on frontal region of the scalp.

The most common clinical type in the study population was black dot in 20 patients (40%) followed by gray patch in 15 patients (30%). Kerion was seen in 8 patients (16%). Four patients (8%) had combined type (both gray patch and black dot). No cases of favus were detected as shown in Table 1. Others types (6%) that was diagnosed in study population were seborrheic form of TC (1 patient) and glabrous type of TC (1 patient).

The most common trichoscopic feature was BD 40 (80%), followed by CM 38 (76%) and CH 33 (66%). Only 15 patients (30%) had ZH. Morse code-like hair was not seen in any of the patients as shown in Table 2.

On comparing the trichoscopic features with different clinical types of TC, BH was common in gray patch variant. BD, CM, ZH and CH were common in black dot variant. In other trichoscopic features, scales was common in gray patch whereas crusts, erythema and red clods were common in kerion (Table 3).

Discussion

Tinea capitis is a fungal infection or dermatophytosis of the scalp and hair shaft, occurring predominantly in children.[8, 9] The commonly affected age group was found to be between 6 and 10 years. In the study by Oguzkaya et al., TC was predominantly found in prepubertal and school going children, between 6 and 10 years of age.[10] TC was commonly seen in 8-10 years of age in the study conducted by Grover et al. and 4-12 years age group in the study conducted by Basnet et al.[1, 3] Similarly, in the study conducted by Jha et al., 68% patients were below 11 years of age.[2] The peak incidence of TC was seen in children aged 4 to 6 years in a central European study.[11]

In the study by Brasileiro et al., the mean age was 4.7 years.[12] The studies by Chen et al. and Trovato et al. showed higher incidence in 4-7 years age group.[11, 13] In most of the studies, school going children were commonly affected. The reason for children being more

affected is hypothesized to be fungistatic effect of fatty acids in sebum which is less developed in children. Beyond this group, there is decline in the incidence due to onset of puberty and seborrhea.[1] As in young adults, there is presence of fungistatic effects of fatty acids in sebum and there are hormonal changes. There is a higher chance of transmission of disease in children due to close contact with each other.

Among 50 patients in this study, 54% were female and 46% were male. Among 69 patients in the study by Jha et al., 34.8% and 65.2% were male and female respectively with male to female ratio 1:1.9.[2] In the study by Grover et al., 51.4% of patients were female.[1] Male and female were 36.4% and 63.6% respectively in the study by Basnet et al.[3] Male preponderance was seen in the study by Kundu et al.[14] In the study by Moto et al., 59.3% were male and 40.7% were female.[15] The reason for higher incidence in girls could be due to the tradition of keeping long hair, use of occlusive pomades and tight braiding of the girls' hair.[1, 3, 11] The reason for high rate in male could be shorter hair, uncleaned scissors at barbers, sharing of combs and heavy mingling with friends without being conscious of personal hygiene.[15]

In our study, the common symptoms were itching and hair loss comprising 25% of study population. In the study conducted by Basnet et al., common symptoms were itching (96.1%), scaling (81.4%) and hair loss (32.4%).[3] In the study done by Amer et al., 75% patients had itching and scaling.[16] The duration of symptoms in the patients was found to be 1 to 6 months in 52% of cases. Mean duration of disease was 17 weeks in the study conducted by Brasileiro et al.[12] In our study, 38% had positive family history. Similarly, family history was positive in 29% of patients in the study by Jha et al.[2] The factors responsible for higher percentage as compared to other study could be overcrowding, close contact between siblings and low socioeconomic status which increases the transmission of the fungus.

In the present study, 54% of patients washed their hair twice a week followed by 30% who washed their hair once a week. Decreased personal hygiene and poor environmental sanitation also increases the rate of transmission.

In our study, 62% of the patients used hair oil which was slightly less than in the study by Grover et al. (78%).[1] Basnet et al. in another study found that mustard oil was used in 54.7% of patient from urban areas and 87.8% from rural areas which, is in concordance to the findings in our study. In contrary, in the study done by Kundu et al., only 22% of patients with TC used hair oil.[14]

Our study revealed 30% of patients shared their combs and the same percentage of patients shared their towels. In the study conducted by Grover et al., sharing of combs and hair accessories was seen in 62% of patients.[1] According to Jha et al., use of common combs and beds were found in 90 and 93% respectively.[2] Basnet et al. found the use of common combs in 83% patients from urban areas and 59.2% from rural areas.[3] In our study, 52% of patients cut their hair at barbers and 48% at home. According to Basnet et al., 71.1% patient from urban area cut their hair at barbers shop and 71.4% patient cut their hair at home in rural areas.[3] Most of our patients (72%) had multiple lesions. In the present study, the most common type of TC was black dot (40%) followed by gray patch (32%). In contrary, gray patch was the most common clinical type (52.2%) and 86% in the study by Jha et al and Kundu et al respectively.[2, 14]

Most of the studies conducted in Nepal revealed the most common organisms as *T. violaceum* which, causes the endothrix type of TC like gray patch and black dot.[2, 3] Favus is caused by *T. schoenleinii* and the organism is found sporadically in countries like South Africa and Ethiopia.[6]

According to our study, the most common trichoscopic features were BD (80%), followed by CM (76%). In contrast to our study, other studies reported higher prevalence of scales and BH. In the present study, the common findings of BD in the study population could be due to the fact that we had a comparatively higher proportion of black dot TC in our cohort. The reason could also be the difference in prevalence of infecting organisms.

The limitation of our study is TC was diagnosed clinically, KOH mount and fungal culture were performed only in doubtful cases. The reason for nonvisualization of MH in our study could be the magnification of trichosope as in most of other studies, it was visualized in high magnification. We did not evaluate the sensitivity and specificity of various trichoscopic findings in the diagnosis of TC. As this is a hospital based study, our study may not be representative of general population. An early diagnosis and treatment of TC helps to prevent transmission. We believe our study will serve as a benchmark for future studies on trichoscopy. We recommend the use of a trichoscope as a supplement for diagnosing TC.

Conclusion

This study established the role of trichoscopy in diagnosing TC. We observed higher frequency of BD, CM, and CH in our population with TC. Presence of these findings in a suspected case of TC helped decrease the need of KOH and fungal culture and form a basis to start the treatment without having to wait for mycological confirmation. Therefore, trichoscopy had utility not only in diagnosis of TC, but also in categorising patients to different clinical subtypes and hence narrowing down the etiological agents in a given case.

APPENDIX

Table 1: Clinical types of TC

Clinical Types	Number of patients	Percentage (%)
Gray patch	15	30
Black Dot	20	40
Kerion	8	16
Combined type (Gray patch + Black dot)	4	8
Others	3	6
Total	**50**	**100**

Table 2: Trichoscopic features of TC

Trichoscopic features	Number of patients	Percentage (%)
Broken hairs (BH)	24	48
Black dots (BD)	40	80
Comma hairs (CM)	38	76
Corkscrew hairs (CH)	33	66
Zigzag hairs (ZH)	15	30
Others	**34**	**68**

Note: The results do not add upto 100% since patient had more than one trichoscopic features.

Table 3: Trichoscopic features in different clinical types of TC

Trichoscopic features	Clinical types				
	Gray patch (n = 15)	Black dot (n = 20)	Kerion (n = 8)	Combined types (n = 4)	Others (n = 3)
BH	8 33.3%	7 29.2%	7 29.2%	2 8.3%	0 0%
BD	10 25%	19 47.5%	6 15%	4 10%	1 2.5%
CM	11 28.9%	15 39.5%	6 15.8%	4 10.5%	2 5.3%
CH	7 21.2%	20 60.6%	2 6.1%	3 9.1%	1 3%
ZH	3 20%	8 53.3%	1 6.7%	2 13.3%	1 6.7%
Others					
Scales	12 44.4%	7 25.9%	2 7.4%	2 7.4%	4 14.8%
Crusts	0 0%	0 0%	6 85.7%	1 14.3%	0 0%
Erythema	0 0%	0 0%	6 85.7%	1 14.3%	0 0%
Diffuse hyperpigmentation	0 0%	2 50%	1 25%	0 0%	1 25%
Red clods	1 14.3%	1 14.3%	4 57.1%	1 14.3%	0 0%
Brown and yellow clods	1 20%	1 20%	2 40%	1 20%	0 0%
Pustules	0 0%	0 0%	1 100%	0 0%	0 0%

Figure 1: Black dots on the scalp

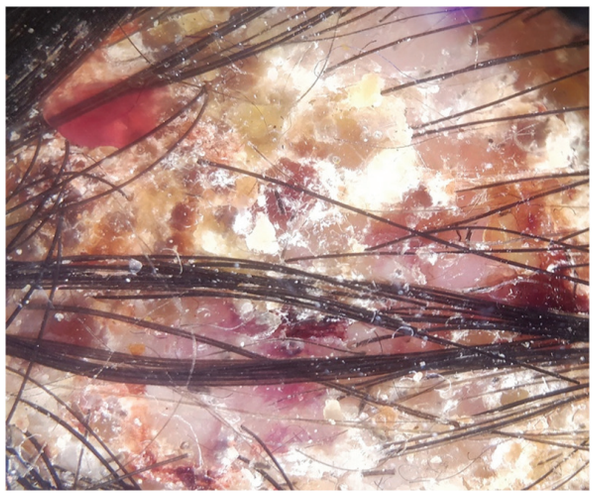

Figure 2: Trichoscopy (x10) of kerion showing yellowish and hemorrhagic crusts

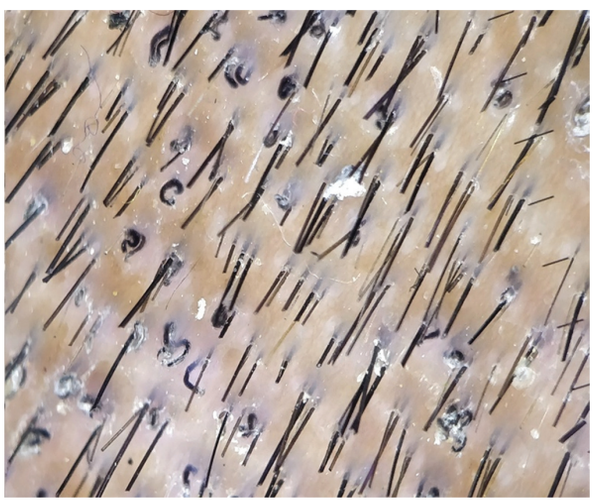

Figure 3: Trichoscopy (x20) showing CM (green triangle), ZH (white arrow) and scales (blue arrowhead) with hyperpigmentation on background

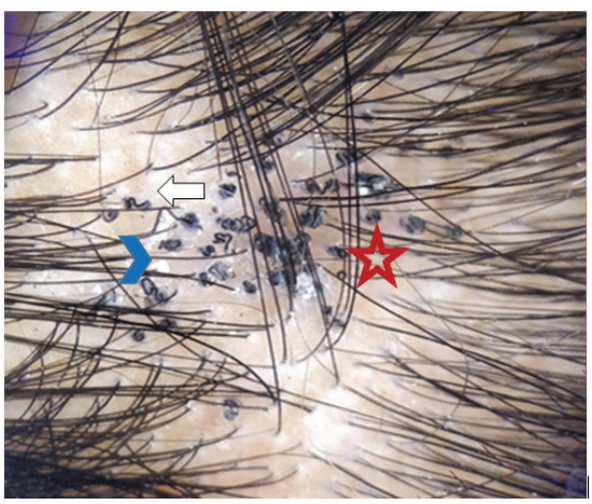

Figure 4: Trichoscopy (x10) showing CH (red star), ZH (white arrow) and scales (blue arrowhead)

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