Clinico-mycological profile and trichoscopic findings among pediatric tinea capitis patients: A cross-sectional study from northern India (Haryana)

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ABSTRACT

Background: Tinea capitis (TC) is the most common cause of hair loss in pediatric patients leading to varied manifestations. Essentially, TC is a superficial infection which affects hair shaft, hair follicle, and the scalp. **Aims and Objectives:** The aims of this study were to describe the clinic-mycological characteristics and trichoscopic findings of TC among pediatric patients. **Materials and Methods:** This cross-sectional study was undertaken in Shaheed Hasan Khan Mewati, Government Medical College and Hospital after obtaining approval from the Institutional Ethics Committee. All the pediatric patients of TC enrolled during the study period of 1.5 year (between January, 2020 and June, 2021). Trichoscopy was performed and findings were recorded on a predesigned pro forma. All participants were clinically examined and sample of hair and scalp scrapping was taken for mycological investigation (potassium hydroxide [KOH] and Sabouraud Dextrose Agar culture). **Results:** Among 100 children of TC (M/F = 2.2), gray patch type TC was most common, whereas pustular variant was least common. Trichoscopic findings were seen in all 100 cases with short broken hair being most common. Perifollicular scaling was statistically significant in gray patch TC, black dot, and comma shape in black dot TC and, crock screw hair and thick crust in kerion TC. By combining perifollicular scaling, comma hair, short-broken hair, black dot, and erythema, a sensitivity of 98.8% was achieved. KOH revealed fungal spore/hyphae in 79% patients with ectothrix pattern (56.9%) more commonly than endothrix pattern (34.2%). *Trichophyton violaceum* (25.9%) was the most common species isolated among culture positive patients. **Conclusion:** Trichoscopy could be a simple, valuable, non-invasive, rapid, and easy to perform method for diagnosing tinea capitis in resource poor settings, where mycological culture facility is not available and in situations where delay in treatment can be counterproductive.

Key words: Comma hair; Perifollicular scaling; Short broken hair; Tinea capitis; *Trichophyton* spp.; Trichoscope

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INTRODUCTION

Tinea capitis (TC) is the most frequent causes of hair loss in pediatric patients including alopecia areata, traction alopecia, and trichotillomania.[1] TC is a superficial fungal infection involving hair shaft, hair follicle, and the scalp. It is most commonly seen in the age of 3–7 years, especially in lower socioeconomic strata. Among children, the worldwide prevalence of TC varies from 7.1% to 47.5%, and the incidence in India is 0.5–10%.[1,2] The most frequent clinical presentation is non-inflammatory form, characterized either by "Gray-patch," in which there are

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one or multiple patch of hair loss with diffuse scaling or "black dot" pattern, in which area of hair loss is inundated with small black dots that represent broken hair at the level of follicular orifice. The less common variants are Inflammatory type (kerion, favus, and pustular-like), and mixed pattern associated with gradual onset and extensive involvement.[3]

The disease is primarily caused by dermatophytes in the *Trichophyton* and *Microsporum* genera that invade the hair shaft. In view of epidemiology, it has been found that *Trichophyton mentagrophytes* constitutes a higher percentage in Spain, whereas *Trichophyton tonsurans* constitutes a higher percentage in the UK, Canada, and the USA. Studies from India have shown varied distribution with *Trichophyton* violaceum (88.6%) being the most common etiological agent in North India, *T. violaceum* 16(37.5%) followed by *T. mentagrophyte* 11 (25.5%) in Telangana, and T. tonsurans (61.1%) in Kashmir.[3-5]

Trichoscopy which is rapid, non-invasive, and simple method can aid in the early diagnosis, which otherwise would have been missed with naked eyes. The most commonly reported trichoscopic findings were comma hairs, corkscrew hair, zigzag and "morse code-like" hair.[6] Hence, we conducted this study to further substantiate the trichoscopic findings and their relation with clinico-mycological pattern.

The clinical appearance of scalp lesion substantially helps in diagnosis, which can be further supported by mycological tests either by direct 10–20% potassium hydroxide (KOH) examination of tonsured hair/scalp scraping, or by isolation of the dermatophyte on Sabouraud Dextrose Agar (SDA) media. Result of culture isolation may take up to 4–6 weeks which would delay diagnosis and may lead to complications such as secondary bacterial infection and cicatricial alopecia. Hence, an early diagnosis, with the help of scalp trichoscopy, is important to start treatment and to prevent risk of horizontal transmission and complication like permanent hair loss.

Aims and objectives

The aims of this study were as follows:

1. To evaluate trichoscopic, clinical and mycological findings in patients of Tinea capitis.
2. To corelate between trichoscopic and clinical findings in patients of Tinea capitis.

MATERIALS AND METHODS

This is a cross-sectional study conducted from January 2020 to June 2021, after obtaining ethical clearance from the Institutional Ethical Committee (IEC no.=EC/OA-39/2019). Those children presenting with alopecia patches on scalp suspecting of TC underwent clinical evaluation, scalp dermoscopic examination (trichoscopy), and mycological investigations (KOH and SDA culture).

A purposive sample of 100 children aged 3–16 years was planned and study subjects were included in study after taking patient's attendant/relative informed consent. Children presenting with patchy hair loss and easy pluckable hair with or without any associated inflammatory changes underwent further detailed history and clinical examination. Clinical pattern of TC was noted as non-inflammatory black dot, gray patch, seborrheic dermatitis type, inflammatory (pustular, kerion, or favus) or mixed infection (any combination of the above). Patients presenting with non-infective hair loss such as alopecia areata, trichotillomania, or any congenital hair loss; or history of any topical (1 month) or systemic antifungal (6 weeks) therapy for TC were excluded from the study.

Along with clinical photography, trichoscopy (scalp dermatoscopy) was done on patchy hair loss. It was performed with help of USB video dermatoscope: polarizer Dino-lite^{R}5MP edge series, model AM7515MZT having magnification between ×20 and ×200. The most frequently observed trichoscopic findings were noted, captured, and corelated with clinical findings.

For mycological examination, plucked hair or scales from the edge of patchy hair loss were collected and processed in mycology laboratory. A 10% KOH mount was prepared and examined under microscope for arthroconidia or hyphae (ectothrix, endothrix, or mixed type). Furthermore, a culture on SDA was done and incubated at 30°C, which was examined regularly for any growth until 4 weeks before declaring negative.

The data were analyzed using the Statistical Package for the Social Sciences software version 25.0. The quantitative data were presented as mean and standard deviation and categorical data were presented as number and percentage. The categorical variables were analyzed using Chi-square test at significance level of 5%, thus and association was considered significant if the $P<0.05$.

RESULTS

A total of 100 children with suspected TC were enrolled in the study. The mean age of affected children was 7.12±2.91, majority were in category of 8–10 year of age. The male: female proportion was 2.2:1.

The duration of lesions ranged from 3 to 13 weeks with median ± IQR 4.00 (3.3, 12.0). The number of lesion(s) ranged from 1 to 3 with median ± IQR 2.0 (1.0, 2.0). The most common symptom presented by children was hair loss (100%) followed by scaling (84.7%) and pruritus (72.6%).

Among various clinical sub-types of TC, non-inflammatory (64%) was more common followed by inflammatory (36%). The individual clinical pattern observed was gray patch (48%) followed by black dot (28%), kerion (14%), and seborrheic variant (7%), and the least common was the pustular variant (3%). No case of favus was seen in the present study.

The trichoscopic findings were found in all 100 patients of TC. The most common trichoscopic signs seen were perifollicular scales and short broken hair in 90% and 89%, respectively, followed by perifollicular scales in 80%, black dots in 62%, comma shaped in 58%, erythema in 52%, corkscrew hairs in 35%, zigzag shaped hair in 24%, bar code like hair in 12%, translucent hair in 8%, and thick crust in 5% only. The statistically significant association was ascertained using Chi-square test among various clinical subtype of TC and trichoscopic findings: In gray patch type TC, perifollicular scaling (P=0.014); in black dot type TC, black dot (P=0.025) and comma shape (P=0.010); in kerion type TC, corkscrew hair (P=0.008), and thick crust (P=0.0001) (Table 1).

The predictive sensitivity of various trichoscopic signs varied from 35% to 89%. The sensitivity (95% confidence interval of mean) of individual trichoscopic features for diagnosing TC was short-broken hair 53.1% (43.1–63.0), comma hair 57.1% (47.2–66.9), cork-screw hair 32.7% (23.3–42.0), black dot 82.7% (75.1–90.2), and perifollicular scaling 46.9 (36.9–56.8). By combining perifollicular scaling, comma hair, short-broken hair, black dot, and erythema, a sensitivity of 98.8% was achieved.

Mycological examination of hair roots under 10% KOH revealed fungal spores/hyphae in 79% patients with ectothrix pattern in 45 (56.9%), endothrix in 27 (34.2%), and mixed (both endo- and ectothrix) in 7 (8.9%). In 21 patients, KOH examination gave false negative result. The clinical presentation and type of invasion of hair shaft are tabulated in (Table 2).

Culture was positive in 58% patients, and dermatophytes isolated were *T. violaceum* in 22 (37.9%), *T. mentagrophytes* in 15 (25.9%), *T. tonsurans*in 14 (24.2%), and *Trichophyton rubrum* in 7 (12.0%). *Microsporum* spp. was not found in any of children. The clinical type of TC and species present in them is tabulated in Table 3.

DISCUSSION

Dermatophystosis is a superficial fungal infection which infects and survives on dead keratin of skin, hair, and

Table 1: Different trichoscopic features present among clinical sub-types of tinea capitis

Clinical type of tinea capitis → / Trichoscopicsigns ↓	Gray patch (n=48/100)	Black dot (n=28/100)	Kerion (n=14/100)	Seborrheic variant (n=7/100)	Pustular (n=3/100)	Total
Short broken hair	44	25	13	6	1	89
Perifollicularscales	53*	20	11	6	0	90
Black dot	32	28*	0	2	0	62
Comma shape hair	22	28**	6	2	0	58
Erythema	19	17	11	3	2	52
Corkscrew hair	12	8	12*	2	1	35
Zigzag shape	8	5	7	3	1	24
Bar code	5	2	3	2	0	12
Translucent hair	4	2	0	1	1	8
Thick crust	0	0	4**	0	1	5
	*P=0.014	*P=0.025 **P=0.010	*P=0.008 **P=0.0001			

Table 2: Type of hair invasion seen in clinical sub-types of tinea capitis

Clinical	Ectothrix (n=45)	Endothrix (n=27)	Both (n=7)	Negative (n=21)
Gray patch (n=48)	32 (66.6%)	9 (18.7%)	2 (4.1%)	5 (10.4%)
Black dot (n=28)	8 (28.5%)	12 (42.8%)	3 (10.7%)	5 (17.8%)
Kerion (n=14)	2 (14.2%)	3 (21.4)	1 (7.1%)	8 (57.1)
Seborrheic (n=7)	3 (43%)	2 (28.5%)	-	2 (28.5%)
Pustular (n=3)	-	1 (33.3%)	1 (33.3%)	1 (33.3%)

Table 3: Mycological species present among clinical sub-types of tinea capitis

Clinical subtypes of TC / Organism	Gray patch (n=48/100)	Black dot (n=28/100)	Kerion (n=14/100)	Seborrheic variant (n=7/100)	Pustular (n=3/100)
Trichophyton violaceum	13	9	0	0	0
Trichophyton mentagrophytes	6	3	5	1	0
Trichophyton tonsurans	8	4	0	1	1
Trichophyton rubrum	0	0	5	1	1
No growth	21	12	4	4	1

nails affecting more than 20–25% of world population.[7] Clinically, it has been named according to affected anatomic location such as tinea corporis (body surface) and TC (scalp). Although it occurs majorly among adults in recent time, there are studies reporting rise in cases among children, especially in developing countries due to poverty, overcrowding, and lack of awareness.[8,9]

Few epidemiological studies done among pediatric population in African countries found TC as most common superficial fungal infection among the children,[10,11] whereas Indian study found it to be third most common type of dermatophytic presentation with a prevalence rate of 8–11%, which could be attributed due to geographical differences of climatic conditions and hair care practices.[8,12]

Clinically, TC is divided into non-inflammatory and inflammatory types. In non-inflammatory, clinical types are gray patch, black dot, and seborrheic variant, whereas inflammatory types are kerion, pustular, and favus.[12] The gray patch type presents with well-defined patches of gray lusterless hair with multiple broken stumps, whereas black dot type manifests as patchy alopecia having black dots and diffuse scaling on scalp. Kerion presents with boggy swelling on scalp studded with pustules and broken hair and is usually associated with posterior cervical or occipital lymphadenopathy.[13]

In the present study, the boys were found to be more commonly affected with the disease as compared to girls with male: female ratio of 2.2:1 which is similar to other studies conducted in North India.[5,14] Relatively lower male preponderance was reported in studies conducted by Ayaya et al.,[11] and Kalla et al.,[15] 2:1 and 1.8:1, respectively and higher in study conducted by Kundu et al.,[16] 2.8:1. The higher prevalence in males could be associated with the fact that boys have more external exposure owing to outdoor activities, frequent trimming of hair with contaminated scissors and blades, and tend to have lower personal and hair hygiene practices as compare to girls.[5]

Majority of the children, in the present study, were in the age group of 8–10 years followed by in category of 5–7 years which are similar to fewer studies done in the past on TC and differed from another study, where majority (51.51%) of cases were in the age group of 11–15 years which could be attributed due to poor personal hygiene in preadolescent age group.[8,17,18] Moreover, in teenagers, the incidence declines due to onset of puberty and seborrhea (due to fungi static properties of short and medium chains of fatty acids).

In the present study, the non-inflammatory cases (64%) were more common as compare to inflammatory cases (36%), which is similar to earlier reports and studies.[2-4] Among all study participants, gray patch (48%) was the most common finding followed by black dot (28%), kerion (14%) (Figure 1), seborrheic variant (7%), and the least common was the pustular variant (3%). The most common clinical variant, that is, gray patch is being reported with almost same frequency in other studies, but the sequence of other clinical variants was variable.[5,19] Few studies reported black dot variant to be the most common clinical presentation which is not in concordance to the present study finding.[3,15]

Trichoscopy which is video dermoscopy of hair and scalp has emerged as non-invasive, *in vitro* and rapid diagnostic modality for TC. Comma hair was the first trichoscopic finding described by Slowinska et al.,[20] in 2008 and corkscrew by Hughes et al.,[21] in 2011, in which author suggested could be a variant of comma hair in black patients. Various other trichoscopic findings suggestive of TC have been reported are perifollicular scaling (95%), short-broken hair (74–100%), zigzag hair (25–50%), black dot (13–65%), i-hair, and Morse code hair (16–26.5%).[22-24]

In the present study, perifollicular scaling was found to be statistically significant trichoscopic finding in gray patch type, which could be due to ectothrix invasion is more common in gray patch. Kumar et al.,[23] also found same trichoscopic finding to be significantly present in gray patch TC. Another study conducted on 24 patients with TC showed that infection caused by ectothrix agents was responsible for abnormalities in hair color, infection caused by endothrix agents was

Figure 1: Kerion (inflammatory tineacapitis): inflamed, boggy swelling studded with pustules.

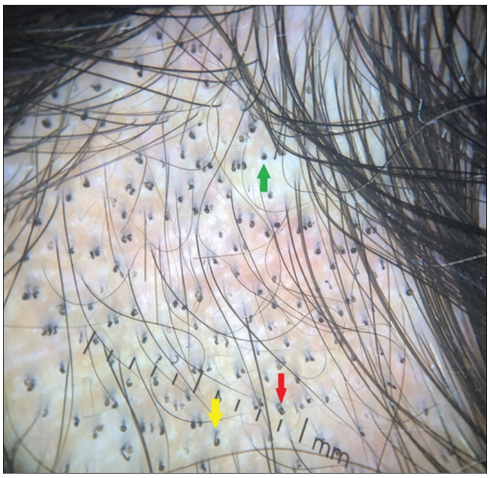

Figure 2: Trichoscopic findings of alopecia patch at 35x magnification. (green arrow= black dot, yellow arrow= comma hair, red arrow= corkscrew hair).

responsible for abnormalities in hair shape, and finally infection caused by both ectothrix and endothrix agents presents as a mixed dermoscopic pattern.[22] In the present study, black dot which was the second most common type of TC showed, black dot and comma shape trichoscopic findings depicted in Figure 2 to be statistically significant (Table 3). Kumar et al.,[23] found four trichoscopic findings to be statistically significant: horse shoe, perifollicular scales, black dot, and comma shape hair, in black dot TC.

Comma hair observed in current study was seen in 58% cases, but was reported in only 13% of cases by Brasileiro et al.[25] Formation of comma hair was hypothesized due to cracking and bending of hair shafts infested with hyphae.[25]

Among Kerion cases (Inflammatory type of TC), crust and corkscrew hair were found to be statistically significant trichoscopic finding, whereas Kumar et al., found that black dot and erythema were significantly present.[23]

A study conducted by Dhaille et al.,[24] suggested that even a single trichoscopic feature is predictive of TC and reported that the sensitivity of a single trichoscopic feature for the prediction of TC varied from 22.6% to 83%. The present study reported relatively higher range of predictive sensitivity of individual trichoscopic signs which varied from 35% to 89%, whereas Kumar et al.,[23] reported individual predictive sensitivity ranges from 32.7% to 82.7%. In contrast to single trichoscopic feature to diagnose TC, Brasileiro et al.,[25] suggested that a combination of six trichoscopic features (short broken, black dot, comma, corkscrew, zigzag hair, and perifollicular scaling) were essential to make the diagnosis of TC. The present study also found that the combination of four features (perifollicular scaling, black dot, short broken hair, and comma hair) was sufficient for diagnosing TC with a 93.5% sensitivity and if erythema feature is added as an additional finding in above four features then higher predictive sensitivity of up to 98.8% is seen. Similar predictive sensitivity of 98.97% was reported with four trichoscopic features (short broken hair, comma hair, black dot, and perifollicular scale) by Kumar et al.,[23] so for diagnosing a case of TC with the help of trichoscopy, it is better to look for combination of features rather than relying on a single trichoscopic feature.

On microscopic examination of KOH wet mount, ectothrix pattern was more commonly observed as compared to endothrix and mixed pattern which could be due to more clinical cases of gray patch type in the present study. However, few studies found, endothrix pattern more than the ectothrix, but their predominant clinical presentation was also different from the present study.[3,16] The percentage positivity of KOH examination is reported to be variable in different studies ranging from 76% to 91% which was 79% in the present study.[3,5,16]

Culture on SDA was positive in 58% of cases which were lower than study conducted by Singal et al.,[26] which showed 66% culture positivity whereas almost same percentage as of the present study was reported by Gajula et al.[4] Among all species grown on culture, *T. violaceum* is the most common followed by *T. menatgrophyte and T. tonsurans. T. violaceum* has been isolated and reported as predominant species causing TC in various studies conducted across South Africa, U.K, Nepal, and Pakistan and even from India.[3,4,26-29] However, *T. tonsurans* and *Trichophyton verrucosum* were major prevalent strains reported in other studies.[5,11,30] This difference in pattern could be attributed due to varying environmental factors and differing host immunity. None of culture in the present study was positive for *Microsporum* spp., whereas it was found in significant number (34%) of TC cases in a study done by Singal et al.[26]

Limitations of the study

The association between trichoscopic features and etiological species could not be established due to higher culture negative cases (42%) and absence of *Microsporum* spp. among culture positive cases. Hence, further studies are advocated to substantiate the trichoscopic-mycological association.

CONCLUSION

The clinic-mycological profile of tinea capitis patients helps in understanding the behavior of etiological species and pattern of presentation. Along with that, the knowledge of various trichoscopic features of TC could also help a physician to diagnose and start appropriate treatment at earliest before mycological tests reports. Although mycological culture is confirmatory test for diagnosing TC reporting may take up to 4 weeks, delaying treatment which could lead to spread of infection among other children.

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REFERENCES

1. Leiva-Salinas M, Marin-Cabanas I, Betlloch I, Tesfasmariam A, Reyes F, Belinchon I, et al. Tineacapitis in schoolchildren in a rural area in Southern Ethiopia. Int J Dermatol. 2015;54(7): 800-805.
   https://doi.org/10.1111/ijd.12691
2. Pai VV, Hanumanthayya K, Tophakhane RS, Nandihal NW and Kikkeri NS. Clinical study of tineacapitis in Northern Karnataka: A three-year experience at a single institute. Indian Dermatol Online J. 2013;4(1):22-26.
   https://doi.org/10.4103/2229-5178.105461
3. Grover C, Arora P and Manchanda V. Tineacapitis in the pediatric population: A study from North India. Indian J Dermatol Venereol Leprol. 2010;76(5):527-532.
   https://doi.org/10.4103/0378-6323.69078
4. Gajula N, Vumma N, Vontela R and Kalikota A. A clinico-epidemiological study of tineacapitis in children attending a tertiary care hospital in Karimnagar. Indian J Paediatr Dermatol. 2019;20(4):332-337.
   https://doi.org/10.4103/ijpd.IJPD_119_18
5. Bhat YJ, Zeerak S, Kanth F, Yaseen A, Hassan I and Hakak R. Clinicoepidemiological and mycological study of tineacapitis in the pediatric population of Kashmir valley: A study from a tertiary care centre. Indian Dermatol Online J. 2017;8(2):100-103.
   https://doi.org/10.4103/2229-5178.202279
6. Ekiz O, Sen BB, Rifaioğlu EN and Balta I. Trichoscopy in paediatric patients with tineacapitis: A useful method to differentiate from alopecia areata. J Eur Acad Dermatol Venereol. 2014;28(9):1255-1258.
   https://doi.org/10.1111/jdv.12246
7. Havlickova B, Czaika VA and Friedrich M. Epidemiological trends in skin mycoses worldwide. Mycoses. 2008;51(4):2-15.
   https://doi.org/10.1111/j.1439-0507.2008.01606.x
8. Dash M, Panda M, Patro N and Mohapatra M. Sociodemographic profile and pattern of superficial dermatophytic infections among pediatric population in a tertiary care teaching hospital in Odisha. Indian J Paediatr Dermatol. 2017;18(3):191-195.
   https://doi.org/10.4103/2319-7250.206047
9. Jain A, Jain S and Rawat S. Emerging fungal infections among children: A review on its clinical manifestations, diagnosis, and prevention. J Pharm Bioallied Sci. 2010;2(4):314-320.
   https://doi.org/10.4103/0975-7406.72131
10. Koussidou-Eremondi T, Devliotou-Panagiotidou D, Mourellou-Tsatsou O and Minas A. Epidemiology of dermatomycoses in children living in Northern Greece 1996-2000. Mycoses. 2005;48(1):11-16.
    https://doi.org/10.1111/j.1439-0507.2004.01067.x
11. Ayaya SO, Kamar KK and Kakai R. Aetiology of tineacapitis in school children. East Afr Med J. 2001;78(10):531-535.
    https://doi.org/10.4314/eamj.v78i10.8963
12. Gandhi S, Patil S, Patil S and Badad A. Clinicoepidemiological study of dermatophyte infection in pediatric age group at a tertiary hospital in Karnataka. Indian J Paediatr Dermatol. 2019;20(1):52-56.
    https://doi.org/10.4103/ijpd.IJPD_35_18
13. Singal A and Grover C, editors. Comprehensive Approach to Infections in Dermatology. New Delhi, India: Jaypee Brothers Medical Publishers; 2016. p. 85-115.
14. Wani MM, Kamili QA, Chisti M and Masood Q. Trends of tineacapitis in population attending dermatology department of a tertiary health care facility in Kashmir. JK-Practitioner. 2006;13:131-133.
    https://doi.org/10.4103/2229-5178.202279
15. Kalla G, Begra B, Solanki A, Goyal A and Batra A. Clinico-mycological study of tineacapitis in desert district of Rajasthan. Indian J Dermatol Venereol Leprol. 1995;61(6):342-345.
16. Kundu D, Mandal L and Sen G. Prevalence of tineacapitis in school going children in Kolkata, West Bengal. J Nat Sci Biol Med. 2012;3(2):152-155.
    https://doi.org/10.4103/0976-9668.101894
17. Silveira-Gomes F, De Oliveira EF, Nepomuceno LB, Pimentel RF, Marques-da-Silva SH and Mesquita-da-Costa M. Dermatophytosis diagnosed at the Evandrochagas institute, Pará, Brazil. Braz J Microbiol. 2013;44(2):443-446.
    https://doi.org/10.1590/S1517-83822013005000049
18. Kotian S and VN. TineaCapitis: A clinicomycological profile. Nat J Lab Med. 2016;5(4):MO01-MO05.
    https://doi.org/10.7860/NJLM/2016/21542:2154
19. Kumar AG and Lakshmi N. Tineacapitis in Tirupati. Ind J Pathol Microbiol. 1990;33(4):360-363.
20. Slowinska M, Rudnika L, Schwartz RA, Kowalska-Oledzka E, Rakowska A, Sicinska J, et al. Comma hairs: A dermoscopic marker for tineacapitis: A rapid diagnostic method. J Am Acad Dermatol. 2008;59(5 Suppl):S77-S79.

https://doi.org/10.1016/j.jaad.2008.07.009

21. Hughes R, Chiaverini C, Bahadorian P and Lacour JP. Corkscrew hair: A new dermoscopic sign for diagnosis of tineacapitis in black children. Arch Dermatol. 2011;147(3):355-356.
https://doi.org/10.1001/archdermatol.2011.31
22. Bourezane Y and Bourezane Y. Analysis of trichoscopic signs observed in 24 patients presenting tineacapitis: Hypotheses based on physiopathology and proposed new classification. Ann Dermatol Venereol. 2017;144(8-9):490-496.
https://doi.org/10.1016/j.annder.2016.12.012
23. Kumar P, Pandhi D, Bhattacharya SN and Das S. Trichoscopy as a diagnostic tool for tineacapitis: A prospective, observational study. Int J Trichol. 2020;12(2):68-74.
https://doi.org/10.4103/ijt.ijt_30_20
24. Dhaille F, Dillies AS, Dessirier F, Reygagne P, Diouf M, Baltazard T, et al. A single typical trichoscopic feature is predictive of tineacapitis: A prospective multicentre study. Br J Dermatol. 2019;181(5):1046-1051.
https://doi.org/10.1111/bjd.17866
25. Brasileiro A, Campos S, Cabete J, Galhardas C, Lencastre A and Serrão V. Trichoscopy as an additional tool for the differential diagnosis of tineacapitis: A prospective clinical study. Br J Dermatol. 2016;175(1):208-209.
https://doi.org/10.1111/bjd.14413
26. Singal A, Rawat S, Bhattacharya S, Mohanty S and Baruah MC. Clinico-mycological profile of tineacapitis in North India and response to griseofulvin. J Dermatol. 2001;28(1):22-26.
https://doi.org/10.1111/j.1346-8138.2001.tb00081.x
27. Mills CM and Philpot CM. Tineacapitis in South Wales-observations in change of causative fungi. Clin Exp Dermatol. 1994;19(6):473-475.
https://doi.org/10.1111/j.1365-2230.1994.tb01249.x
28. Jha BN, Garg VK, Agrawal S, Khanal B and Agarwalla A. Tineacapitis in Eastern Nepal. Int J Dermatol. 2006;45:100-102.
https://doi.org/10.1111/j.1365-4632.2004.02343.x
29. Jahangir M, Hussain I, Khurshid K and Haroon TS. A clinicoetiologic correlation in tineacapitis. Int J Dermatol. 1999;38(4):275-278.
https://doi.org/10.1046/j.1365-4362.1999.00652.x
30. Perez-Tanoira R, Marin I, Berbegal L, Prieto-Perez L, Tisiano G, Cuadros J, et al. Mycological profile of tineacapitis in school children in rural Southern Ethiopia. Med Mycol. 2017;55(3):262-268.
https://doi.org/10.1093/mmy/myw061

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