

Clinicomycological profile of *Tinea capitis* from a tertiary care hospital in North India

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Abstract: *Tinea capitis* (TC) is a common superficial fungal infection seen predominantly in children. The purpose of study was identification of causative fungi in particular reference to clinical pattern and geographic factors. The present study was carried out on total of 100 patients with clinically suspected tinea capitis attending the Dermatology OPD, GMC, Jammu. The specimen was collected from suspected scalp and hair and subjected to microscopy and culture. 56 (56%) patients were in the age group 6-10 yrs, and 61 (61%) were females. Majority of the patients 83 (83%) were the natives of rural area. Black dot type of tinea capitis was the most common clinical presentation 42 (42%). 71 (71%) showed a positive KOH mount on microscopy, Positive growth on fungal culture was seen in 45 (45%) of the patients. *Trichophyton rubrum* was the most commonly encountered fungus, seen in 17 (37.7%) of patients, followed by *T. mentagrophyte* 13 (28.8%), *T. violaceum* 11 (24.4%), *T. tonsurans* 9 (20%), *Microsporum canis* 8 (17.7%) and *Aspergillus* 3 (6.6%). Direct microscopic examination and culture play a very useful role in not only isolation of fungus but also to find out the changing patterns of occurrence of different species and their association with various clinical patterns.

Keywords- Culture, Dermatology, Geographic, Isolation, Microscopy

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I. Introduction

Tinea capitis is a dermatophytic infection of the scalp and hair, especially common in paediatric population. The disease is considered to be a form of superficial mycosis or dermatophytosis. It is mainly caused by fungi of species of genera *Trichophyton* and *Microsporum*. The prevalence of tinea capitis in a particular area depends upon the environmental conditions, personal hygiene and individual susceptibility. Hot humid tropical climates, low socioeconomic status, crowded living condition and poor hygiene contribute to an increased incidence of *Tinea capitis*. It is highly communicable and may reach epidemic proportions especially in overcrowded setup^[1]. It is unreliable to depend on the clinical diagnosis alone to identify the cases of *Tinea capitis*, given the range of the clinical expression and the high numbers of children with mild infections, which are difficult to detect. So, laboratory methods should be used for the diagnosis, whenever possible^[2]. Regardless of great advances in preventing and treating the disease, tinea capitis is still a public health problem, especially in underdeveloped countries. Therefore this study was carried out with the purpose of identification of causative fungi in particular reference to clinical pattern and geographic factors.

II. Material and Methods

This was a hospital based prospective study carried out in Department of Microbiology, GMC, Jammu. All clinically suspected cases of tinea capitis attending the OPD of Dermatology Department over a period of one year from May 2017 to May 2018 were included in the study.

Inclusion criteria: Any patient with clinically suspected tinea capitis.

Exclusion criteria: Any patient with clinically suspected seborrheic dermatitis, bacterial infections of the scalp, scalp psoriasis, alopecia areata or scabies.

Procedure methodology:

A detailed history of the patient was taken. General physical and systemic examination was conducted. The clinical findings of the affected scalp were recorded. The specimen was collected from suspected scalp and hair. The site was disinfected with 70% isopropyl alcohol. Specimen was collected by plucking hair with the roots

intact with the help of tweezers and from scalp by scraping with sterile scalpel. The sample was transported in dark folded paper to department of Microbiology.

KOH Examination

Direct microscopy was done with 20% potassium hydroxide (KOH) for fungal hyphae and spores.

Culture

Cultures were put up on Sabouraud's dextrose agar with antibiotics (chloramphenicol, gentamycin and cyclohexamide) and on the dermatophyte test agar medium. The tubes were incubated at 25-28°C for four weeks and observed regularly for growth before declaring it negative.

The fungal isolates were identified on Sabouraud's dextrose agar on the basis of duration of growth, surface morphology, pigment production on the reverse and microscopic examination in lacto phenol cotton blue preparation. On dermatophyte test media, change in colour from yellow to red indicated growth of dermatophyte.

III. Results

A prospective study was carried out on total of 100 patients with clinically suspected tinea capitis attending the Dermatology OPD, GMC, Jammu.

Out of the 100 suspected cases of tinea capitis, 56 (56%) patients were in the age group 6-10 yrs, and 61 (61%) were females. Majority of the patients 83 (83%) were the natives of rural area. Black dot type of tinea capitis was the most common clinical presentation 42 (42%) followed by grey patch 19 (19%), kerion 14 (14%), dry scaling 4 (4%) and pustules 1(1%). Mixed presentation was seen in 20 (20%) of patients. **(Figure 1)**

Of the total patients, 71 (71%) showed a positive KOH mount on microscopy, whereas 29 (29%) were negative. Positive growth on fungal culture was seen in 45 (45%) of the patients and 55 (55%) of the patients showed no demonstrable growth. **(Figure 2)** Among the patients showing a positive KOH on microscopy (n=71), the pattern of hair invasion was endothrix in 45 (63.38%), ectothrix in 19 (26.76%); endothrix and ectothrix both in 7 (9.85%).

Of the fungus isolated, *Trichophyton rubrum* was the most commonly encountered fungus, seen in 17 (37.7%) of patients, followed by *T. mentagrophyte* 13 (28.8%), *T. violaceum* 11 (24.4%), *T. tonsurans* 9 (20%), *Microsporum canis* 8 (17.7%) and *Aspergillus* 3 (6.6%). **(Table 3)**

Grey patch type of tinea capitis had predominant ectothrix type of hair invasion 10 (52.63%). In black dot type of tinea capitis, endothrix type of hair invasion was seen in 35 (83.33%). In dry scaling type and kerion, microscopy was negative in most cases (75% and 71.42% respectively) and ectothrix pattern of hair invasion was seen in 3 (21.42%) cases of kerion. **(Figure 4)**

In black dot type of clinical type of clinical presentation, *T. rubrum* and *T. mentagrophytes* was isolated in most cases. In grey patch type, *M. canis* was most commonly isolated. In dry scaling type, the organism isolated was *T.violaceum*. In kerion type and mixed clinical presentation the most common organism isolated was *T. violaceum*. **(Figure 5)**

IV. FIGURES AND TABLES

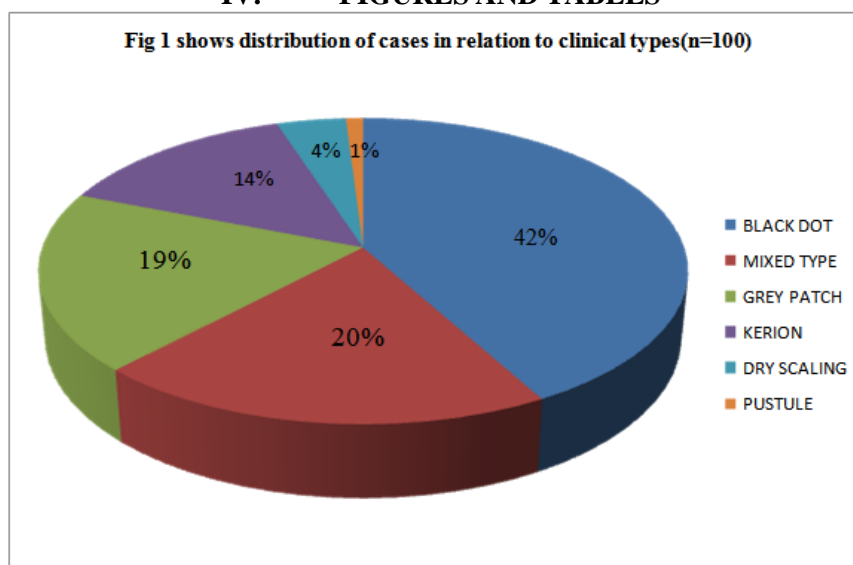


Fig 2 shows distribution of cases in relation to KOH and culture findings(n=100)

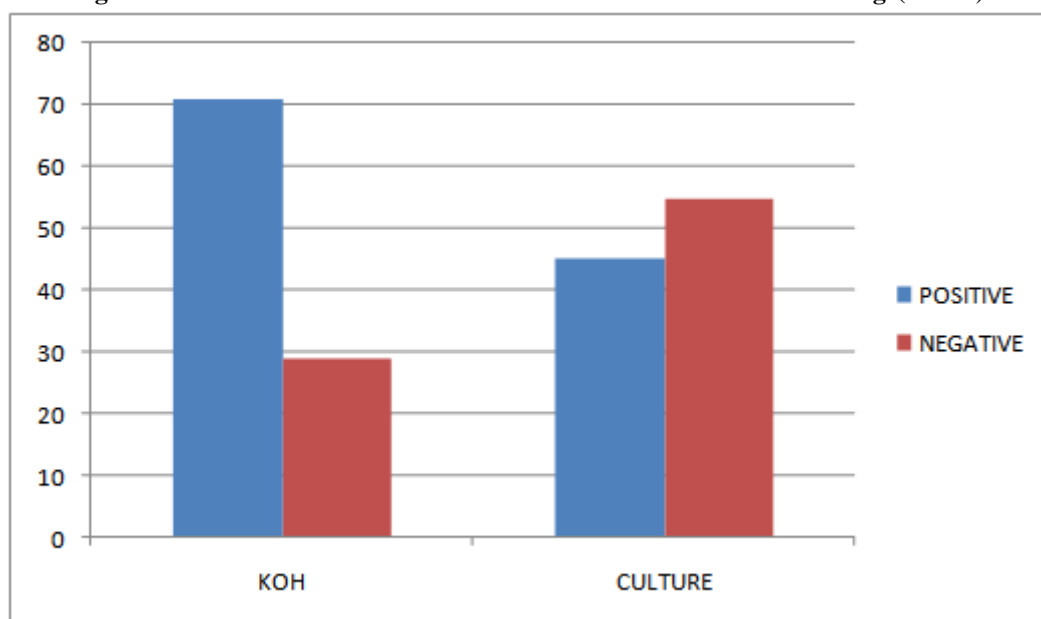


Table 3 shows types of species isolated on culture (n=45)

Species isolated	Number	Percentage
T. rubrum	17	37.7%
T. mentagrophyte	13	28.8%
T. violaceum	11	24.4%
T. tonsurans	9	20%
M. canis	8	17.7%
Aspergillus	3	6.6%

Table 4 shows correlation between clinical type and pattern of hair invasion on microscopy [n (%age)]

Clinical type	Endothrix	Ectothrix	Endothrix+Ectothrix	Negative
Black dot(n=42)	35(83.33%)	3(7.14%)	-	4(9.52%)
Grey patch (n=19)	-	10(52.63%)	2(10.52%)	7(36.84%)
Kerion (n=14)	1(7.14%)	3(21.42%)	-	10(71.42%)
Dry scaling(n=4)	-	-	1(25%)	3(75%)
Pustules(n=1)	-	1(100%)	-	-
Mixed presentation(n=20)	9(45%)	2(10%)	4(20%)	5(25%)

Table 5 shows the species identified correlation with clinical type of tinea capitis

CLINICAL TYPE	SPECIES ISOLATED								
	M. canis	T.viola ceum	T.rubrum+ T.menta	Aspergillus	T.rubrum	T.menta	T.tonsur ans	M.canis +T.men t	M.canis +T.rubrum
BLACK DOT	1	2	6	-	3	-	4	-	2
GREY PATCH	3	-	2	2	-	1	-	-	-
KERION	-	4	-	-	1	-	2	-	-
DRY SCALING	-	1	-	-	-	-	-	-	-
PUSTULE	-	-	-	-	-	-	-	-	-
MIXED	1	4	3	1	-	-	1	1	-

V. DISCUSSION

Tinea capitis is not a reportable disease, but because of its contagious nature, an early diagnosis is important in order to control transmission of the disease. This also prevents possible scarring and permanent hair loss. The peak incidence of *tinea capitis* was observed in age group 6-10 yrs (56%) while the least incidence was seen between 15-20 yrs (1%). These findings are consistent with the findings of Kalla G et al³ and Fathi HI et al⁴. This may be because 8-10 yrs age group included school going children which are at higher risk of transmission of disease because of close contact with one another.

There was a female preponderance in this study as 61% of the patients were females. This was consistent with studies by Ellabis MS et al⁵ and Ali J et al⁶. This may be attributed to the fact that females usually have long, tight braided hairs with a high moisture content, which is favourable for the germination of spores.

As regards to the demographic profile, majority of the patients (83%) in this study were natives of rural area. Similar findings were noted in studies by Ali-Shtayeh MS et al⁷ and Bose et al⁸. This may be due to the unhygienic, crowded living conditions and also contact with animals is quite common in rural areas.

Black dot (42%) was the most commonly encountered clinical type in this study followed by Grey patch (19%) and kerion (14%). These findings were similar to studies by Kalla G et al³. An interesting finding in this study was the presence of mixed presentation in 20% of the cases which was similar to study by Grover C et al⁹.

In this study, the KOH positivity rate was 71% which was comparable with earlier study by Yazdanfar A et al¹⁰. Endothrix pattern (63.38%) of hair invasion was more common in the present study as seen by Kalla G et al³. Mixed pattern of hair invasion was seen in 9.85% patients which may be due to mixed presentation of tinea capitis which is common in this study.

In this study, 45% of cases were positive for dermatophytes on culture comparable to studies by Kumar V et al¹¹ and Ali J et al⁶ (47%, 50%). *Trichophyton rubrum* was the commonest species isolated in this study. As *Trichophyton rubrum* is a common isolate of tinea corporis, a significant positive history of tinea corporis in patients and family members may explain this finding.

It was observed that in grey patch type of tinea capitis, the most common organism isolated was *M. canis* followed by *T. rubrum* and *T. mentagrophytes* (Aldayel M et al¹²). Two different fungus isolated from a patient with only one clinical type of tinea capitis was observed in this study (22%), this may explain different fungus may lead to similar clinical presentation or these patients have subclinically other types of tinea capitis also.

VI. Conclusion

This study concludes that tinea capitis is common in our hospital setting. Infected hair serves as a chronic reservoir of infection, which can give rise to repeated mycotic infections of the skin. Direct microscopic examination and culture play a very useful role in not only isolation of fungus but also to find out the changing patterns of occurrence of different species and their association with various clinical patterns. A public health surveillance programme aiming early identification of cases and measures to promote good hygiene and living conditions can help in the prevention and control of this infectious disease.

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