

## CLINICAL MYCOLOGICAL AND IMMUNOLOGICAL STUDY OF TINEA CAPITIS

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### Summary

Clinically diagnosed and mycologically proved 54 cases of tinea capitis detected at Skin out-patient Department of University Hospital, Banaras Hindu University, Varanasi, during May 1979 to April 1980 were studied.

Tinea capitis was an affliction of prepubertal male children of villages. 'Black dot' type was the commonest variety followed by 'kerion' type which was exclusively seen among rural children. Scaly gray patch type was confined to city children.

No definite source of infection for 'black dot' type was detected. The source of infection in all the inflammatory type of tinea capitis was traceable. The lesions were always multiple.

*T. violaceum* was the commonest etiological fungus. It mostly caused 'black dot' type but inflammatory lesions were also due to them. *T. mentagrophyte* caused 'kerion' type only. *T. tonsurans* and *T. verrucosum* also contributed to inflammatory tinea capitis. *T. rubrum* caused only non-inflammatory type of lesions. *M. nanum* was isolated in 2 cases of non-inflammatory tinea capitis.

No defect in cell-mediated immunity was detected in 'black dot' lesions as well as in scaly type of tinea capitis by phytohaemagglutinin intra-dermal tests.

### Introduction

Most published studies on tinea capitis from different parts of India report that it is rare in the north<sup>1,2,3</sup>

and is endemic in the south<sup>4,5,6</sup>. This is the first report from this part of India. The present work was undertaken to study the problem as seen in a skin Out-patient Department of a Medical Centre that caters for the medical needs of 150 million people of different ethnic and socio-economic groups.

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### Material and Methods

Children who presented with patchy loss of scalp hair, inflammatory lesions, and scaliness of scalp were screened for evidence of tinea capitis by Wood's light examination and 20% KOH wet mount preparation of epilated hairs for spores of ecto/endothrix nature.

The specimens from the lesion collected under aseptic conditions were also subjected to culture on Sabouraud's dextrose agar with 0.05% chloramphenicol and 0.5% cycloheximide slants at 27-31°C for 3 weeks. The genus and species identification were done as per criteria laid down in Manual of Clinical Mycology<sup>7</sup>.

Fiftyfour clinically diagnosed and mycologically proved cases of tinea capitis was seen at Skin Out-patient Department of the University Hospital, Banaras Hindu University, during May 1979 to April 1980. The recorded clinical data included age, sex, history regarding symptoms, duration of illness, spontaneous remissions, recurrence, associated systemic illness, and symptoms related to endocrinopathies if any.

Particulars regarding intrafamilial contact, contact at school, common usage of combs and/or towels, ritual shaving of scalp hair by a common barber and use of oil for hair dressing, contact with pets, and fowls were also taken note of. Morphology of the scalp lesions and evidence of other manifestation of tinea infection was recorded.

Phytohaemoagglutinin 0.1 ml in concentration of 0.1 mg/ml was used for intradermal skin tests on fifteen cases of tinea capitis and an equal number of controls, in an attempt to assess their immunological status<sup>8</sup>.

## Results

Tinea capitis constituted 4.9% of cases of clinically diagnosed and mycologically proved cases of dermatophytosis seen during the period between May 1979 and April 1980.

The majority of patients with tinea capitis were rural male children between seven and twelve years of age. The oldest male patient was eighteen

years of age. Female children were affected equally in the urban and rural group. Further there was no significant clustering of cases in the 7-12 years age group.

One female patient with tinea capitis due to *Trichophyton violaceum* was a thirty six-years old rural female who had no other lesions of tinea. No seasonal variation in the incidence of tinea capitis was noted.

Non-fluorescent 'black dot' type was the commonest clinical variety and constituted 61.1% of cases. 'Kerion' contributed to 18.5%, non-inflammatory scaly 'gray patch' variety accounted for 14.8% and inflammatory type other than 'kerion' formed 5.6% of cases (Table 1). Non-inflammatory tinea faciale and tinea corporis were seen in association with tinea capitis in 14.8% of cases.

But for one patient with Indian childhood cirrhosis who also had extensive non inflammatory tinea capitis, all were free from systemic disease or overt nutritional disorder. There was no evidence to suggest transmission of infection at school. Evidence was lacking also for any common source of infection in the non-inflammatory scaly type and 'black dot' variety. Intrafamilial transmission was observed in four cases with 'kerion'. On an average a patient suffered for two months before medical attention was sought. Non-inflammatory lesions were rarely itchy. Cicatricial as well as noncicatricial alopecia, and pyogenic infection of scalp were the most common presenting signs. No patient wore any kind of head dress.

Tinea capitis lesions were always multiple even in the 'Kerion' type. No particular region of the scalp was exclusively involved. Personal hygiene was found to be poor. Mustard oil was used for hair dressing. All the

TABLE 1  
Tinea capitis: Clinical types and causative dermatophytes.

Species	Black dot	Kerion	Inflammatory type	Gray scaly patch type
<i>T. violaceum</i>	32	-	2	-
<i>T. mentagrophyte</i>	-	8	1	-
<i>T. rubrum</i>	-	-	-	6
<i>T. tonsurans</i>	-	1	1	-
<i>T. verrucosum</i>	-	1	-	-
<i>T. nanum</i>	-	-	-	2
Total	32	10	4	8

rural children had their hair cut by the same village barber.

Isolation of the etiologic fungus was possible in all cases. *Trichophyton violaceum* contributed to 63%, *T. mentagrophyte* to 16.6%, *T. rubrum* to 11.0%, *T. tonsurans* to 3.7%, *M. nanum* to 3.7% and *T. verrucosum* to 1.85% of the isolates (Table-1).

'Black dot' type infection was exclusively due to *T. violaceum* and it was the causative agent in two cases of inflammatory lesions as well. *T. mentagrophyte* was the main etiological agent in 'Kerion' and *T. tonsurans* and *T. verrucosum* were the other etiological fungi of 'Kerion'. *T. rubrum* and *M. nanum* caused noninflammatory lesions. There was no evidence of compromised cell mediated immunity in patients with 'black dot' type infection as judged by phytohaemoagglutinin intra-dermal tests.

### Discussion

The finding that tinea capitis contributed to 4.9% mycologically proved

dermatophytosis registered in the hospital Out-patient practice neither supports the view that tinea capitis is rare and uncommon in India<sup>9,10,11</sup> nor is in conformity with reports that higher incidence is seen in South India than in the North<sup>12,13</sup>. Present observations may be the result of the easy accessibility of villagers near Varanasi to a good centre of medical care where the disease is inevitably detected. Further, figures based on hospital attendance are bound to differ from those obtained by school surveys<sup>14,15</sup>.

Judging from the present figures there seems to be an upward trend in the incidence of tinea capitis in this region. Sehgal and Shome<sup>16</sup> reported prevalence of 1.2% of tinea capitis and it was 4.9% in the present study.

The observations of increased vulnerability of male children (81.4%), high prevalence in the prepubertal age group (85%) and predominantly rural nature of the disease (81.4%) tie in well with those of earlier workers<sup>17,18,19</sup>.

TABLE 2  
Age and sex-wise distribution of tinea capitis in rural and urban children.

Sex	Rural/ Urban	0-6 Years	7-12 Years	13-18 Years	Beyond 18 Years of age	Total
Male	Rural	3	30	5	-	38
	Urban	2	3	1	-	6
Female	Rural	2	3	-	1	6
	Urban	2	1	1	-	4
Total		9	37	7	1	54

Increased incidence of tinea capitis especially the 'black dot' type in the rural children cannot be ascribed to a common source of infection or closed community living as the occurrence was noted to be widely distributed in space and time. Rather it can be attributed to the endemicity and stability of *T. violaceum* in these villages similar to that of *T. schoenleinii* in Jammu and Kashmir<sup>20</sup>. A definite history of contact with animals was available in all cases of inflammatory tinea capitis. The scaly non-inflammatory type of infection caused by *T. rubrum* was exclusively seen in the city children belonging to low socio-economic status. *M. nanum* contributed to only 3.7% of cases. The predominance of *T. violaceum* infection is in accord with many other reports from India<sup>21, 22</sup>.

The result that there is no defect in the cell-mediated immunity as judged by the phytohemagglutinin intradermal test in the patients with 'black dot' and gray patch tinea capitis contrasts with the observation of Rasmussen et al<sup>23</sup>.

#### References

1. Kandhari KC and Sethi KK : Dermatomycosis in Delhi area, Indian Med Assn 1964, 42 : 324.
2. Kalra SL, Mohapatra LN and Gugnani HC : Etiology of dermatomycoses in Delhi, Indian Res 1964, 52 : 553.
3. Hajini GH, Kandhari KC, Mohapatra LN and Bhutani LM : Tinea capitis in North India, Sabouraudia, 1970, 8 : 170.
4. Klokke AH and Durairaj P : The causal agents of superficial mycoses isolated in rural areas of South India, Sabouraudia, 1967, 5 : 153.
5. Kamalam A and Thambiah AS : Tinea capitis in Madras, Sabouraudia, 1973, 11 : 106.
6. Das Gupta LR, Agarwal SC and Bedi BMS: Tinea capitis in Pondicherry (South India), Sabouraudia, 1975, 13 : 38.
7. Conant NF, Smith DL, Baker RD and Callaway JL : Mycology of Dermatomycoses, Manual of Clinical Mycology, 3rd Edition, W B Saunders Company, Philadelphia, 1971, p 595.
8. Blaese RM, Weiden P, Oppenheim JJ and Waedmann TA : Phyto-haemagglutinin as a skin test for the evaluation of cellular immune competence in Man, Lab Clin Med, 1973, 81 : 538.
9. Nair VG : Ringworm in Visakhapatnam, J Indian Med Assn, 1942, 11 : 368.
10. Banerjee AK, Rao A and Chakraborty AN : Observations on the incidence of Dermatophyte infection, Bull Calcutta Sch Trop Med, 1958, 6 : 9.
11. Mankodi RC and Kanvinde MS : Fungus infections of the scalp and hair, Indian J Dermat Vener, 1968, 34 : 186.
12. Gokhale BB and Pandhye AA : Tinea capitis. A study of 102 cases, 1 July 1958 to June 1961 at Sasoon Hospital, Poona, India. Indian J Dermat Vener 1965, 31 : 1.
13. Desai SC and Bhatt MLA : Dermatomycosis in Bombay, A study on the incidence, clinical features, incriminating species of Dermatophytes and their epidemicity, Indian J Med Res, 1961, 49 : 662.
14. Kamalam A and Thambiah AS : Trichophyton violaceum infection in an Indian School, Int J Dermatol, 1967, 15 : 136.
15. Kamalam A, Nanjappa Chetty G, Balasubramanian N, Chandrasekar N and Thambiah AS: Tinea capitis in a Moslem School, Indian J Med Res, 1979, 70 : 41.
16. Sehgal VN and Shome SK : Dermatomycosis in Varanasi. A clinical and Mycological study, Indian J Dermatol, 1973, 18 : 25.
17. Rahim GF : A survey of fungi causing Tinea capitis in Iraq, Brit J Dermatol, 1966, 78 : 213.
18. Jagtap P, Grover S, Junnarkar RV : A clinical and mycopathological study of Tinea capitis in Nagpur, Indian J Dermat Vener, 1972, 38 : 21.

19. Blank F and Mann SJ : Trichophyton rubrum infections according to age, anatomical site, distribution and sex, Brit J Dermatol, 1975, 92 : 171.
20. Ghosh LM : An analysis of 50,000 cases in the out-patient Department of Tropical School of Medicine, Calcutta, during 5 years from 1942-1946, Ind Med Gazett, 1948, 83 : 43.
21. Dutta SB, Ramana Rao PV : Mycological aspects of Dermatormycosis in Hyderabad, Indian Pathol Bacteriol, 1970, 13:30.
22. Das Gupta LP, Sharma KB and Fernandez D : Superficial mycoses in Pondicherry, Indian J Pathol Bacteriol, 1973, 16 : 41.
23. Rasmussen J E and Razzque A : Trichophyten reactions in children with Tinea capitis, Arch Dermatol, 1978, 114 : 371.

TRUE or FALSE

Immunological studies on rosacea consistently show basement zone (BZ) positivity suggesting antibodies against altered collagen of Type 4 present in the sub-basal lamina in contact with the corium ; thus indicating an immunological etiopathogenesis of the disease.

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