A CLINICAL AND MYCOLOGICAL STUDY OF TINEA CAPITIS IN NAGPUR

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Introduction : Tinea capitis is an important disease and has worldwide distribution. Although it does not ordinarily produce much disability or even great discomfort in young girls and women, this simple condition is cosmetically disfiguring. Alopecia is of universal interest and has become very common in India. It has been aptly said, "Ugly is a field without leaves and head without hair." (Counce et al, 1962).

In India ringworm infection of scalp was first described by Dey and Maplestone in 1935. Due to lack of systematic statistical work both clinical and mycological, there seems to be a wide variation in its incidence and different species of causative organisms are incriminated in our country. This study was undertaken to assess the incidence of Tinea capitis in the general population attending the outpatient department of skin diseases in Nagpur Medical College and Hospital and in inmates of an orphanage, where, the patients were in close contact with each other. They were chosen as a close group for study in comparison to the general population.

Material : One hundred clinically suspected cases of Tinea capitis were investigated. 90 cases were from Medical College and Hospital, Nagpur and 10 cases from Shradhanand Anathalaya, Nagpur.

Methods : The following standard methods were used (Ajello and George, 1958).

1. *Wood's light* : All suspected cases were examined under wood's light. Hair with positive fluorescence were plucked and placed in suitable containers and held for study. If there was no fluorescence of hair, scrapings from scalp were collected from clinically suspected area (Moss & McQuown, 1960).

2. *Direct Microscopic Examination* : Infected area was thoroughly cleaned with 70% alcohol. Scrapings from scalp and infected hair were taken and mounted in a drop of 10% KOH with coverslip, heated over bunsen burner for few moments short of boiling. Preparation was examined under low and high power of microscope immediately and after 24 hours. Hair was examined for ectothrix and endothrix infection.

3. *Cultivation* : Scrapings and epilated hair were cultured on a tube of Sabourauds Dextrose agar with antibiotics and kept at room temperature. Tubes were regularly examined at the interval of 3 to 4 days, subculturing when

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contaminants threatened to overgrow suspected pathogens. The cultures were studied for growth rate, general topography and colony texture according to standard methods. (Table No. 1).

TABLE NO. 1

Showing characteristics of the Dermatophytes on culture.

S. No.	Characteristics of Culture		Type of strain
	Gross	Microscopic	
1.	Slow growing moist glabrous, becoming leathery. Finally wrinkled. Surface colour first cream becoming violet to purple. Colour on reverse purple.	Very few irregular macroconidia only irregular mycelium and chlamydospores. Few microconidia borne both laterally.	T. violaceum.
2.	Slow growing moist and glabrous becoming powdery to velvet. Folded Topography Tan colour. Reverse-brown colour.	Mycelium highly irregular, chlamydospores, pectinate bodies and chandeliers.	T. schoenleinii.
3.	Slow growing white thick cottony flat topography. Reverse deep red.	Only branched. septate hyphae occasional. Chlamydospore, nodular bodies and macroconidia.	T. rubrum.
4.	Slow, flat topography Velvety texture, cream colour, Reverse Reddish brown.	Very few macroconidia Rudimentary in structure spindle shaped and numerous chlamydospores and requet hyphae.	M. audonini.

4. *Microscopic Morphology of Culture*: This was done as a routine to observe the macroconidia and microconidia.

5. *Slide Culture technique*: The standard technique was followed. It was possible to observe the undisturbed relationship between reproductive structures and mycelia.

6. *Nutritional tests*: These physiological tests are valuable aid in identification of species which are slow growing and rarely sporulating e. g.

Trichophyton schoenleinii Test media (Casein agar, Thiamine Casein agar' Inositol casein agar, Thiamine-inositol casein agar) were prepared and distributed into 18 x 150 m m test tubes.

Observations : The hundred cases undertaken for mycological investigation were cases clinically diagnosed as alopecia areata, multiple boils over scalp, alopecia with folliculitis and sudden greying of hair.

Hair examined under Wood's light showed fluorescence in 31 cases. Four cases with negative fluorescence in culture were identified as T. rubrum. Under direct microscopic examination thirty five cases showed the presence of fungal elements. 30 cases were endothrix and 5 cases of ectothrix. Mycological culture of 30 cases of endothrix infection, we found that 24 were positive for the species. T. violaecum and 6 cases positive for T. schoenleinii. In the 5 cases of ectothrix infection the incriminated species were T. rubrum in four and Microsporum audouini in one. Further identification by nutritional tests indicated that the three species T. violaecum., T. schoenleinii and T. rubrum grow best in casein thiamine agar. This indirectly acts as identification test. (Table No. 2).

TABLE—2.

Total No. of cases (Positive Culture)	Type of Species	Type of infection	Wood's light.	Nutritional Test.			
				Casein Agar	Thiamine Casein Agar	Inositol Casein Agar.	Thiamine-Inositol Casein Agar.
24	T. violaceum	Endothrix	Greyish white	+	+ + + +	—	—
6	T. schoenleinii	Endothrix	Grey	+ + + +	+ + + +	+ + + +	+ + + +
4	T. rubrum.	Ectothrix	No. fluorescence	+ + + +	+ + + +	—	—
1	M. audenini	Ectothrix	Greenish	N o t		d o n e	

Of the 35 positive cases, 28 were from general population, seven from Shradhanand anathalaya. The age and sex incidence is given in Table No. 3. Associated symptomatology and diseases are enumerated in Table No. 4.

TABLE NO. 3.

Showing age and sex incidence.

Cases	Age under 13 yrs.		Age above 13 years.	
	Male	Female	Male	Female
Medical College Hospital, Nagpur : 28/90	6	8	11	3
Shradhanand Anathalaya : 7/10	3	4	—	—

TABLE NO. 4.

Showing Tinea Capitis with associated conditions.

Associated condition	No. of cases.
Hypovitaminosis	4
Hypovitaminosis and Rickets	2
Hypovitaminosis and Marasmus	1
Psoriasis	3
Hansen's disease	1
Tinea barbae	2
Tinea versicolor	1
Total	14

Discussion : From the present work, it is obvious that tinea capitis is not rare in Nagpur and its surrounding urban area. Contributory factor for the spread of tinea capitis is poverty, living in poor hygienic condition and personal bad habits such as using unclean combs, caps etc. Vanbreuseghem in 1957 has pointed out that one of the factors may be protein deficiency or avitaminosis. Our clinical observations are in agreement with the above views as seen specially in the children from Shradhanand Anathalaya a fairly closed community. Amongst the 35 positive cases, 23 were children, while only 12 were adults. In four families of low socio-economic group more than one member was affected. Incidence was highest in age group of 5-10 years. Desai et al (1961) also mentioned about family incidence in four out of 13 families in children of 5-10 years of age group. English (1957) has pointed out the importance of cross infection. In the children the most susceptible age appears to be 5-10 years. Obviously something important must be happening at this stage to scalp and hairs. Human scalp hair undergo various changes from infancy to old age Thus the elasticity and tear resistance increases from childhood to adulthood and than declines. (Trotter and Duggins, 1948). It has been noted that cystein content of hair increases with age (Todo-kono and Ugani, 1930). The possible effect of male and female sex hormones on human scalp hair in relation to fungus infection has been considered. Rothman and his colleagues (1947) attempted to corelate the presence of fungicidal substances in the post pubertal sebum with the relative immunity of the adult scalp to ringworm infection. It was suggested that the increased excretion of sebum after puberty might account in part for the rarity of adult ringworm.

The ringworm of the scalp caused by T. violaceum shows scaling and areas of patchy alopecia due to brittle and fractured hairs. The fracture occurs because of the invasion of the hair shaft by mycelium and localisation and sporulation of the organisms inside the hair. The mode of invasion is known as endothrix. In an occasional case a chance collapse of hair follicle occurs with deposition of organism in the dermis. This gives rise to aninflammatory response in the dermis resulting in pus formation which is clinically seen in areas of boggy

folliculitis. The feature of disease T. schoenleinii was typical which is known as 'Favus' with peculiar mousy odour.

The most common lesion on clinical observation was a whitish scalp lesion. The most common pathogen isolated was T. violaceum which was responsble for 24 cases out of 35. The other cases were due to T. schoenleinii, 4 cases were due to T rubrum and one case was due to M. audouini. Scrutiny of work by various workers in different parts of India indicates that T. violaeum is the commonest pathogen. (Table No 5)

Showing comparison with other series

S. No.	Species	Kalra (Delhi)	Desai (Bombay)	Mankodi (Ahmedabad)	Gokhale (Poona)	Present (Nagpur)
1.	T. violaceum	4	33	15	70	24
2.	T. tonsurans	2	2	3	20	–
3.	T. schoenleinii	–	3	–	4	6
4.	T. rubrum	1	5	1	–	4
5.	T. mentagrophyte	2	2	1	1	–
6.	M. audonini	–	–	–	2	1
7.	M gypseum	4	–	–	1	–
1	M. canis	–	–	–	4	–
Total		13	45	20	102	35

With the nutritional tests it was observed that T. schoenleinii gave luxurient growth in all medias i. e. casein agar and casein-thiamine agar, Inositol casein agar, Thiamine inositol casein agar, while T. violaceum grew well in only casein thiamine agar. This further helps in identification of dermatophytes.

SUMMARY

One hundred clinically suspected cases of Tinea capitis were studied. Out of these cases 35 positive cultures were further studied mycologically. Four pathogens T violaceum, T. schoenleinii, T. rubrum and M. audonini were isolated. They were further identified by various methods.

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