

A study of Tinea Capitis in Children

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ABSTRACT

Background: Tinea capitis is a superficial fungal infection that predominantly affects the pediatric population. The etiological factors vary from area to area, and the exact occurrence remains obscure. The clinicoepidemiological and mycological aspects of this dermatophytosis were studied in King Abdulaziz Hospital. **Purpose:** To determine the clinicoepidemiological aspects and mycological findings of dermatophytes involved in tinea capitis cases. **Subjects and Methods:** KOH examination, Wood's lamp examination, and fungal culture were performed in 50 clinically diagnosed cases of tinea capitis with patients' age up to 13 years over a period of 8 months. The epidemiological factors associated with the disease were also evaluated. **Results:** Tinea capitis was predominant in the 3–6 and 6–9 years age groups with a male preponderance. Grey patch tinea capitis was the most common variant. KOH positivity was 74%, and *Trichophyton tonsurans* was the most common fungal isolate. **Conclusion:** Tinea capitis is a very common fungal infection in our setting. Early detection and diagnosis is mandatory to prevent its spread in the community as well as the development of scarring alopecia in the affected individual.

Keywords: Dermatophytes, tinea capitis, *Trichophyton tonsurans*.

INTRODUCTION

Tinea capitis is a disease caused by superficial fungal infection of the skin of the scalp, eyebrows, and eyelashes, with a propensity for attacking hair shafts and follicles. The disease is deliberated to be a form of superficial mycosis or dermatophytosis. Numerous synonyms are used, comprising ringworm of the scalp and tinea tonsurans. The incidence of tinea capitis is increasing all over the world^[1]. Dermatophytes are fungi that commonly infect the keratinous tissues of humans and some lower animals. The superficial layers of the epidermis, mainly the stratum corneum, and the keratin rich appendages, for example, the hair and nails of the living host, are invaded by these dermatophytes, where they ultimately proliferate and multiply^[2]. It is a common scalp infection realized in children from developing countries, regularly causing changing degrees of hair loss^[3,4].

Clinical presentation of tinea capitis differs from a scaly non-inflamed dermatosis resembling seborrheic dermatitis to an inflammatory disease with scaly erythematous lesions and hair loss or alopecia that may progress to severely inflamed deep abscesses termed kerion, with the potential for scarring and permanent alopecia. The type of disease elicited depends on interaction between the host and the etiologic agents. Unlike other dermatophytosis that have no age predilection, tinea capitis is primarily seen in the pediatric population, with a

small number of cases also encountered in adults^[5,6].

Etiologically, in tinea capitis, wide differences have been seen in different geographic areas. Changes similarly happen in the etiology in a given area over a period of time^[7]. Even the clinical pattern differs from place to place. Hygiene, immune status of the host, standard of living, use of different antimycotic agents, genetic constitution, climate, immigration patterns, and resistance to different drugs in different districts, and dermatophyte related factors could all play some role in governing the predominant causative species. Tinea capitis is predominantly a disease of preadolescent children. Typical age of onset is between 5 and 10 years^[8]. Tinea capitis accounts for up to 92.5% of dermatophytoses in children younger than 10 years. The disease is rare in adults, although occasionally, it may be found in elderly patients. This study was designed to get an insight into the pattern of tinea capitis and the likely causative dermatophyte strains.

SUBJECTS AND METHODS

The current study was carried out in the outpatient department of dermatology over a period of 8 months from November 2016 to July 2017, after taking clearance from the institutional ethical committee. It was a prospective cross-sectional study in which 50 clinically diagnosed cases of tinea capitis in children up to 13 years of age go to the outpatient department were

involved after obtaining a proper consent from the accompanying person. All the participants were new clinically diagnosed cases of tinea capitis.

A short questionnaire was framed, and the relevant details were acquired from the patient and his/her parents/acquaintances, containing demographic variables, for example, age, gender, and residence. This was followed by a relevant history pertinent to the main complaints (hair loss/ pus discharge from scalp / scaly lesion /scalp swelling), length of the lesions, treatment history, contribution of any other body site, and whether any family member is/was affected. Patients who had received any topical or systemic treatment were excluded from the study. Cutaneous and Wood's lamp investigation were performed to determine the clinical variant of tinea capitis (grey patch, kerion, black dot, or favus). KOH examination of the lesional skin scrapings and hair follicles was then performed to confirm the fungal etiology. Lastly, a fungal culture was acquired to recognize the causative fungal strain.

The sample was collected after proper cleaning of the affected area with an antiseptic solution and allowing it to dry for about 1 minute. The scrapings and the affected hairs were collected, correspondingly, using sterile surgical blade, and fine forceps. Each specimen was collected in autoclaved folded paper with proper labelling and then sent to the laboratory and subjected to culture. The media used for culture was Sabouraud's dextrose agar with chloramphenicol, and Sabouraud's dextrose agar with chloramphenicol and cycloheximide with incubation temperatures of 25–28°C and 30–35°C, respectively. Identification was done by phenotypic methods that included observing the colony obverse and reverse for pigmentation, type of growth, and preparation of lactophenol cotton blue mount from colony for final identification. Furthermore, certain biochemical tests, for example, urease, were also performed as and when required.

The study was done according to the ethical board of Umm AlQura university.

RESULTS

The maximum number of children were in the age groups of 3–6 and 6–9 years, containing 30% and 28% respectively, followed in decreasing order by the 9–12, 0–3, and 12+ year age groups [Table 1]. Male cases were 35 in number (70%) whereas females comprised 15 cases (15%). Most of the children came from a rural

background. None of the children had any other affected area other than the scalp. Five cases (10%) had a positive history of similar lesions in their siblings.

Table 1: Age and gender distribution of patients with tinea capitis

Age	Males	Females	Total	%
0-3	6	3	9	18%
3-6	10	5	15	30%
6-9	11	3	14	28%
9-12	7	3	10	20%
12+	1	1	2	4%
Total	35	15	50	100%

The most common clinical variant seen was the grey patch, followed by kerion, black dot tinea capitis, and favus [Table 2].

Table 2: Clinical variants of tinea capitis and their respective KOH and culture positivity

Clinical type	No of cases	Cases with fungal culture positivity	Cases with koh positivity
Grey patch	30	25	23
Kerion	12	10	9
Black dot	7	7	6
Favus	1	1	1
Total	50	43	39

Mycological examination using 10% KOH yielded 74% positivity. Subsequently, fungal culture revealed a positivity of 82%, whereas 18% revealed no growth or growth of some non-dermatophyte fungi such as Penicillium and Candida species.

DISCUSSION

Tinea capitis is a common and significant dermatophyte infection seen commonly in prepubertal children, and hardly in adults. The clinical presentation is quite different ranging from the non-inflammatory lesions to the severe inflammatory variants [9]. The non-inflammatory variants contain grey patch and black dot while the inflammatory lesions contain kerion and favus, which if not quickly treated may outcome in cicatricial alopecia.

In the current study, the disease was found to be more common in boys than girls, which is similar to the results of other studies [10]. Short hair, frequent trimming of hair by contaminated scissors and blades, greater exposure to external environment, and contact with cattle/pets are some predisposing factors that make male children more exposed to obtaining

dermatophyte spores and providing a promising environment for their proliferation. Furthermore, a rustic power of the cases was noted, with cases from country groups far dwarfing the urban cases. Poor clean conditions, powerlessness to recognize the malady from the get-go in its course, utilization of locally situated cures, and absence of sufficient and provoke therapeutic access could be the conceivable components in charge of the provincial transcendence. Accordingly, financial elements impacted the rate of tinea capitis in the examination populace. Utilization of woolen tops amid the long winter months and sharing articles (tops, brushes, towels) could be some conceivable hazard factors for this disease in our group. In addition, the positive family history in 10% of the cases supported the part of fomites and close contact in spreading this contamination in youngsters. The fact that the maximum cases were in the 3–6 and 6–9 year age groups was for each outcomes of many national and international studies. A study done in Rajasthan stated that 85.5% cases were in the 3–10-year age group^[11].

Amid the clinical variations watched, we noticed the grey patch variation to be the most widely recognized, trailed by kerion, black dot, and favus. These outcomes were comparable to the other studies, where grey patch was the most widely recognized variation watched despite the fact that the succession of different variations varied^[12, 13]. On the other hand, another study from Karnataka and other studies revealed black dot to be the most common variant^[11,14]. The outcomes are highly variable from region to region, perhaps because of various infecting strains, environmental factors, and differing host immunity. In our population, variation in the immune response and good immunity of the host might probably be accountable for the predominance of the non-inflammatory variants.

Lastly, with respect to the etiology of tinea capitis, *T. tonsurans* was the most mutual agent followed by *T. rubrum* and *T. violaceum* amid other strains. This is somewhat dissimilar from studies carried out in other studies as well as in Egypt, where *T. violaceum* was found to be the most common causative agent^[11,14,15]. Though, the outcomes are like to those found in some parts of the world, for instance, the UK and USA, where *T. tonsurans* is the most common agent isolated^[16,17]. The outcomes could be because of varieties in the geographical location and climatic components found in the valley, which takes the temperate climate of Europe and America, and differs from the weather in KSA.

A study done in the USA in 1956 demonstrated that the role of *T. tonsurans* was increasing in the pathogenesis of tinea capitis, and in Mexico it was the major culprit, accounting for 90% of the clinical cases. It was also noted that black dot was the most common clinical pattern followed by kerion^[17].

CONCLUSION

Dermatophyte infections are normally seen in the pediatric population, with dissimilarities in the epidemiological features witnessed, clinical type perceived, and the causative strain isolated in different areas of the world. Our study showed that tinea capitis is a common infection in the 3–9-year age group, with males being affected much more than females. Moreover, the infection predominates in the rural communities. Grey patch is the most repeatedly seen clinical variant in children of the region, with *T. tonsurans* being the most common strain isolated.

As a result, an early diagnosis, followed by a sufficient treatment, of the contamination may greatly support in decreasing the transmission of the contamination in the community, and therefore, save many children from unpleasant scarring and non-scarring alopecia.

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