

Retrospective evaluation of 104 tinea capitis cases*

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Aim: Tinea capitis is a superficial scalp dermatophyte infection. Tinea capitis is particularly seen during childhood and is not usually seen after puberty. In untreated cases, it can be contagious and can progress to cicatricial alopecia. This study aimed to retrospectively evaluate cases of tinea capitis.

Materials and methods: We evaluated 104 tinea capitis patients presenting to our dermatology clinic between 2007 and 2011.

Results: Of these patients, 38 (36.5%) were female and 66 (63.5%) were male. The median age was 6.41 ± 3.4 years (range: 1–18 years old). The clinical types appearing in descending order were tinea capitis profunda (88.5%), tinea capitis superficial (10.6%), and tinea capitis favosa (1.9%). The most frequently seen transmission route was human-to-human transmission in 23.5% of the patients, followed by animal-to-human transmission in 19.2% of the patients.

Conclusion: Tinea capitis is a commonly seen dermatosis in our region. Patients with tinea capitis usually seek a physician when inflammatory lesions develop. Cases are usually misdiagnosed as eczema or psoriasis by primary care physicians, causing a delay in proper treatment. Tinea capitis can cause hair loss and scar formation, and so early diagnosis and treatment is very important. For the accurate diagnosis and treatment of tinea capitis, required health education programs should be implemented.

Key words: Tinea capitis, child, dermatophyte, public health issue

1. Introduction

Tinea capitis (TC) is the most common scalp dermatophyte infection and is usually seen in children before or during puberty. TC is caused by anthropophilic, geophilic, and zoophilic subtypes of *Trichophyton* and *Microsporum* dermatophytes (1–4). TC has 3 clinical forms: TC superficial (noninflammatory), TC profunda (inflammatory), and TC favosa (favus). Inflammatory TC presents with painful, inflammatory, indurated, and pustular masses that can be accompanied by regional lymphadenopathy (5). Massive follicular destruction and big nodules presenting with pustule and sinus tractions can rarely occur. This acute inflammatory nodule is called a kerion celsi and occurs as a result of intense hypersensitivity reaction to dermatophyte infections (5). If the zoophilic dermatophytes are the causative agent, pustules and deep indurations can occur (6).

TC has been an important public health issue throughout the centuries. The TC that spread to the larger area of Europe was caused by the anthropophilic subtype. In the middle of the 20th century, after discovery of griseofulvin and improvement of hygienic conditions, the

incidence of TC was dramatically reduced. Currently, TC is endemic in several developing countries and is usually caused by a zoophilic agent; however, the incidence of anthropophilic dermatophytes was increased after large waves of immigration (7).

There have been several studies on the prevalence of TC and etiologic agents such as dermatophytes in Turkey, particularly in the East Anatolia region, which has a low socioeconomic level, poor hygienic conditions, and common cattle dealing (5,8). Metin et al. performed a study on the prevalence of TC infection between 1997 and 1998 at our clinic (9). In this study, we investigated TC patients that were admitted to and treated at our clinic between 2007 and 2011.

2. Materials and methods

We retrospectively analyzed 104 patients who were clinically and/or microbiologically diagnosed with tinea capitis between January 2007 and December 2010 and were in the age group of 1–18 years. Age, sex, clinical types, seasonal relationship, transmission routes, family history, results of 20% potassium hydroxide (KOH)

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direct microscopic examination and fungal culture, occurrence of id reaction, other accompanying tinea infections, and pre- and postevaluation treatments were obtained from the charts.

3. Results

Of these patients, 38 (36.5%) were female and 66 (63.5%) were male. The mean age was 6.41 ± 3.4 years (range: 1–18 years). When classified according to their age, 45 patients (43.3%) were in the age group of 1–5 years, 44 patients (42.3%) in the age group of 6–9 years, 12 patients (11.5%) in the age group of 10–12 years, and 3 patients (2.9%) in the age group of 14 years and older. Distribution according to age and sex is shown in Figure 1. The frequency of admission according to seasons, in descending order, was 31 admissions (29.8%) in the summer, 29 (27.9%) in the winter, 23 (22.1%) in the spring, and 21 (20.2%) in the fall. The most common clinical type was tinea capitis profunda (92 patients, 88.5%) (Figures 2a–d). The other clinical types included tinea capitis superficial in 11 patients (10.6%) and tinea capitis favosa in only 2 patients (1.9%). The most frequently seen transmission route was the human-to-human route in 23.5% of the patients, followed by animal-to-human transmission in 19.2% of the patients. Of the patients, 15.4% had a positive family history for tinea capitis. Id reaction was detected in 17 cases (16.4%) (Figures 3a and 3b). Tinea corporis involving the face or trunk was accompanied by TC in 14 patients (13.4%). A KOH direct microscopic examination showed fungal hyphae and spores in 90 patients (86.5%). The direct microscopic examination was negative in 14 patients (13.5%). A culture was performed in 66 patients (63.5%). No culture growth was obtained that might have been related to insufficient technical skills. Patients were treated by other dermatologists before applying to our clinic. Sixteen patients (15.4%) were treated with topical steroids, 17 patients (16.4%) with the combination of topical steroids and topical antifungal medications, and 33 patients (31.7%) with systemic and topical antifungal treatments. The patients were treated with a systemic terbinafine treatment in our clinic. A short-term systemic steroid (0.55–1 mg/kg per day) was administered in 58

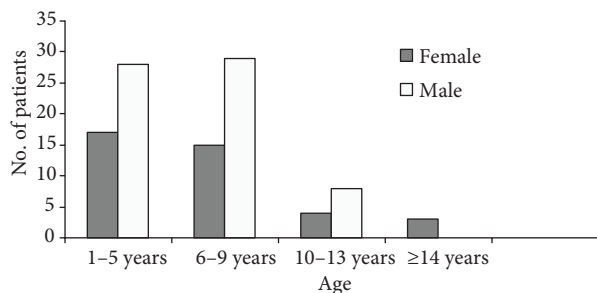


Figure 1. Age and sex distribution of the patients.

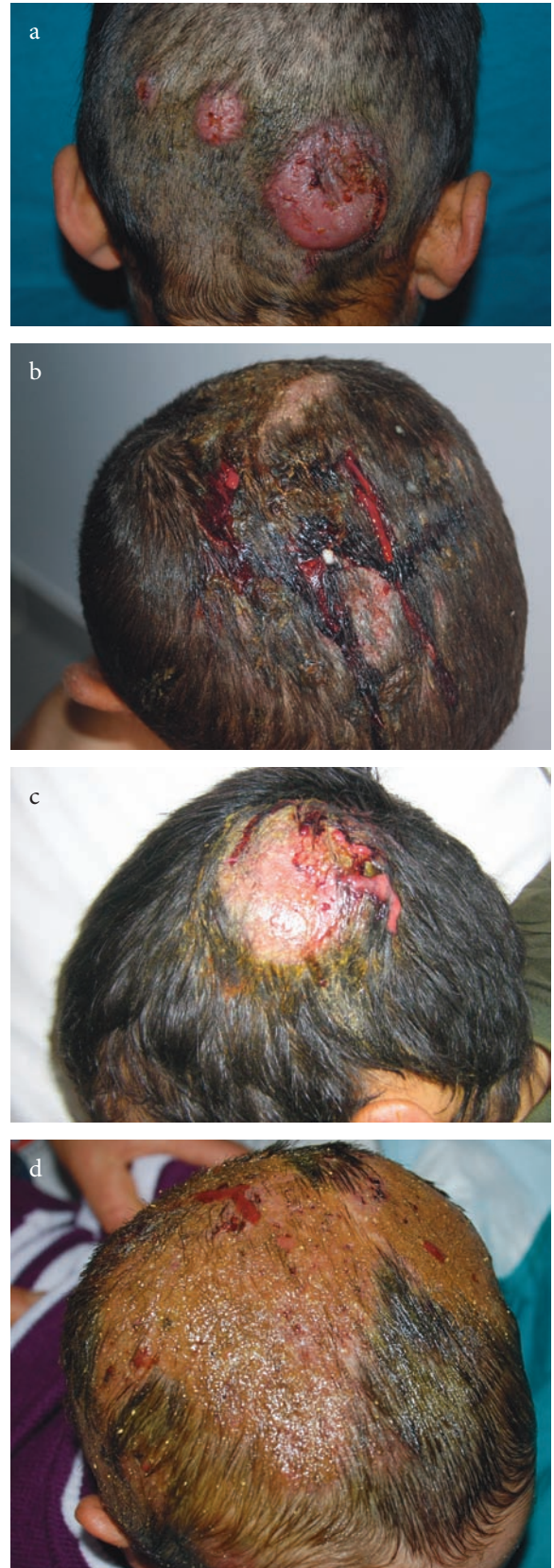


Figure 2. Severe inflammatory kerion on scalp (a–d).



Figure 3. Tinea capitis profunda (a) and id reaction (b).

patients (55.8%) for inflammation and edema. The patients' demographics and clinical features are summarized in the Table.

4. Discussion

TC is most commonly seen at the age of 5–10 years. Epidemiologic studies from North India, Bosnia, Tunisia, Spain, and Turkey showed that patients with TC are usually younger than 10 years old (1,5,7,10–12). Aktas et al. found that most of the affected patients (47.9%) were between 6 and 9 years old (5). In our study, TC was more common in patients less than 10 years old, and the age groups of 1–5 years and 6–9 years had similar frequencies.

Our results were compatible with previous results. TC is usually not seen after puberty, since seborrhea prevents development of TC (1). In a study from Iran, the prevalence of cutaneous mycosis was studied in nonmedical staff of the Medical Center of Ahvaz University Medical School. TC was not identified in any subjects (13). Of our patients, 3 patients were older than 13 years old. The incidence of TC in patients of less than 1 year old is very low. There are few such cases in the literature. A 6-month-old baby presenting with TC was reported from North India (7). The youngest age in our study was 1 year old.

TC is more frequently seen in males; however, there are different views on this issue. Some experts state that TC is more commonly seen in males because TC can spread easily in males due their short hair, which provides a ready host and simple transmission for spores. However, some experts claim that females may have higher risk due to their long pigtail hair (1). The incidence of TC was found higher in males than females in previous studies, such as 68.6% males in Tunisia, 54.2% males in South Kuwait, 56% males in Melbourne, and 59.5% males in Greece (4,11,12,14). One study from Turkey showed that the incidence of TC was 62.5% in males (5). Of the patients with TC in our study, 63.5% of them (66 patients) were males and 36.5% (38 patients) were females, consistent with the previous results.

In our study, 29.8% of the patients were admitted to our clinic during summer. In a study by Metin et al., the patients with TC were more frequently seen in winter and spring (15). The most frequently seen clinical subtype was TC profunda (92 patients; 88.5%), followed by TC superficial (11 patients, 10.6%) and TC favosa (2 patients, 1.9%). The noninflammatory type of TC is more frequently seen than the inflammatory type (1,12,16). In the study from North India, the noninflammatory type was detected in 56.5% of the cases, whereas the inflammatory type was detected in 32.7% of the cases (1). A study from Spain including 818 patients over a 30-year time period demonstrated that 18% of the patients developed the inflammatory type (7). Our results were not consistent with previous results; this might be related to low socioeconomic status, widespread cattle dealing in the region, delay in accessing proper medical treatment, and inappropriate treatment of severe inflammatory cases. One study from Erzurum, Turkey, showed the kerion type in 100% of 48 patients with TC (5). Metin et al. showed that TC was the second most common dermatophyte infection in Van, Turkey, which might be related to low socioeconomic level, poor hygiene, poor health education, widespread cattle dealing, and crowded living conditions (15). The most common type was TC profunda (kerion) in our study, similar to previous studies.

Of the patients, 15.4% had a history of topical steroids. In addition, 33 patients (31.7%) were treated

Table. Demographic and clinical features of patients.

	No. of patients (n = 104)	Percentage
Female	38	36.5
Male	66	63.5
Clinical type		
Tinea capitis profunda	92	88.5
Tinea capitis superficial	11	10.6
Tinea capitis favosa	2	1.9
Admission according to season		
Summer	31	29.8
Winter	29	27.9
Autumn	23	22.1
Spring	21	20.2
Transmission route		
Contact with infected animals	20	19.2
Contact with infected patients	24	23.1
Family history	16	15.4
Id reaction	17	16.4
Accompanied by tinea corporis infection	14	13.5
Direct microscope examination (with KOH)	90	86.5
Previous treatments		
Topical steroid lotion	16	15.4
Topical steroid and topical antifungal	17	16.4
Systemic and topical antifungal	33	31.7
Given Treatment		
Systemic terbinafine	46	44.2
Systemic terbinafine and systemic prednisolone	58	55.8

with systemic and topical antifungal medications, and 17 patients (16.4%) were treated with the combination of topical steroid and antifungal medications (systemic and/or topical). TC should be treated with systemic antifungal agents since topical antifungal agents do not penetrate hair follicles. Topical treatment can only be administered as an adjunctive therapy. Since 1950, griseofulvin has been the gold-standard therapy for TC. Griseofulvin is effective for dermatophytes and has a long-term safety profile. However, the requirement of a long duration of treatment is a main disadvantage of griseofulvin. After the emergence of new oral antifungal medications such as terbinafine, itraconazole, and fluconazole, the use of griseofulvin has been reduced. These agents require shorter duration of treatment, but they are more expensive than griseofulvin. The treatment of TC should be stopped when new hair comes out or culturing becomes negative (17).

In our study, 19.2% of the patients had a history of contact with infected animals, and 23.1% of them had a history of contact with infected humans. However, it was not possible to detect the subtype of dermatophytes

(zoophilic, anthropophilic, or geophilic) because there was no cultural growth due to technical insufficiency. Aktas et al. showed 27% infected animal contact in their study, close to our results (5). In a study from North India, 27% of patients had infected animal contact (1). In another study from Madagascar, 96% of the patients had contact with animals, 100% had history of an infected friend, and 70% had positive family history (2). In our study, 15.4% had positive family history. Zarea et al.'s study including 121 patients showed that 7 patients had positive family history and 35 patients had contact with infected animals (11).

A KOH direct microscopic examination is an easily performed, accurate, and widely used test for the diagnosis of dermatophytes. The positivity of the direct microscopic examination was shown as 100% in Aktas et al.'s study, 89.8% in the study from Spain, and 82.3% in the study from India (1,5,7). Zarea et al. found 110 positive direct microscopic results from 129 patients' examinations (11). The positivity rate was 86.5% in our study, consistent with previous results.

The studies on culture results have shown variability. Prohic's study from Bosnia found that cultures were 90.4% positive for *M. canis* and 2.4% positive for *T. schönleinii* (10). Razzaq et al.'s study from South Kuwait including 371 patients showed that cultures were 62.5% positive for *M. canis* and 19.3% positive for *T. violaceum* (12). In another study from Kuwait performed by Nawaf et al., 41.5% of patients had positive cultures for *T. violaceum* and 27.4% had positive cultures for *M. canis* (16). Grover et al. from North India showed that *T. violaceum* was detected in 88.6% of the positive cultures (1). *M. langeronii* was detected in 100% of the positive cultures in a study from Madagascar including 27 patients (2). In a study from Diyarbakır, Turkey, *T. violaceum* was detected in 43.6% of the cultures and *M. canis* in 37.9% of the cultures (8). The previous study from our center performed by Metin et al.

demonstrated that *T. verrucosum* was the most commonly isolated agent from cultures (9). *T. violaceum* was the most commonly isolated agent in a study performed in Ceyhan, Adana, Turkey (18), and *M. canis* was the most common agent in the study done in Erzurum, Turkey (5). Unfortunately, we could not provide any data on cultural growth due to technical insufficiency.

In conclusion, TC is a commonly seen dermatosis in our region. Patients with TC usually present to a physician when inflammatory lesions develop. Patients are usually misdiagnosed with eczema or psoriasis by primary care physicians, causing a delay in proper treatment. TC can cause hair loss and scar formation, and so early diagnosis and treatment is very important. For the accurate diagnosis and treatment of TC, required health education programs should be implemented.

References

- Grover C, Arora P, Manchanda V. Tinea capitis in the pediatric population: a study from North India. *Indian J Dermatol Venereol Leprol* 2010; 76: 527–532.
- Carod JF, Ratsitorahina M, Raheirimandimby H, Hincky Vitrat V, Ravaolimalala Andrianaja V, Contet-Audonneau N. Outbreak of tinea capitis and corporis in a primary school in Antananarivo, Madagascar. *J Infect Dev Ctries* 2011; 5: 732–736.
- Bennassar A, Grimalt R. Management of tinea capitis in childhood. *Clin Cosmet Investig Dermatol* 2010; 3: 89–98.
- Frangoulis E, Athanasopoulou B, Katsambas A. Etiology of tinea capitis in Athens, Greece -- a 6-year (1996–2001) retrospective study. *Mycoses* 2004; 47: 208–212.
- Aktas E, Karakuzu A, Yigit N. Etiological agents of tinea capitis in Erzurum, Turkey. *J Medical Mycology* 2009; 19: 248–252.
- Corting CH. Fungal infections. In: Braun-Falco O, Burgdorf WHC, Plewig G, Wolf HH, Landthaler M, editors. *Braun Falco's Dermatology*. 3rd ed. Berlin: Springer; 2009. pp. 205–239.
- del Boz J, Crespo V, Rivas-Ruiz F, de Troya M. A 30-year survey of paediatric tinea capitis in southern Spain. *J Eur Acad Dermatol Venereol* 2011; 25: 170–174.
- Akpolat NO, Akdeniz S, Elci S, Atmaca S, Ozekinci T. Tinea capitis in Diyarbakir, Turkey. *Mycoses* 2005; 48: 8–10.
- Metin A, Subaşı Ş, Bozkurt H, Çalka Ö. Tinea capitis in Van, Turkey. *Mycoses* 2002; 45: 492–495.
- Prohic A. An epidemiological survey of tinea capitis in Sarajevo, Bosnia and Herzegovina over a 10-year period. *Mycoses* 2008; 51: 161–164.
- Zaraa I, Hawilo A, Aounallah A, Trojjet S, El Euch D, Mokni M, Osman AB. Inflammatory tinea capitis: a 12-year study and a review of the literature. *Mycoses* 2013; 56: 110–116.
- Razzaq AAA, Sultan AO, Basmiah AM, Aftab A, Nabel N. Prevalence of tinea capitis in southern Kuwait. *Mycoses* 2007; 50: 317–320.
- Mahmoudabadi AZ, Izadi B. Prevalence of cutaneous mycoses among workers. *Turk J Med Sci* 2011; 41: 291–294.
- McPherson ME, Woodgyer AJ, Simpson K, Chong AH. High prevalence of tinea capitis in newly arrived migrants at an English-language school, Melbourne, 2005. *Med J Aust* 2008; 189: 13–16.
- Metin A, Berktaş M, Güzeoğlu M, Delice İ, Subaşı Ş. [Fungal diseases in Van and its territory]. *Van Tıp Dergisi* 1998; 5: 136–140 (article in Turkish with English abstract).
- Nawaf AM, Joshi A, Zaki A, Nour-Eldin O, Al-Sheltawy M, El-Adawy I, Sharma AK. Tinea capitis among children and adolescents in the Farwaniya region of Kuwait. *J Dermatol* 2003; 30: 904–909.
- Kakourou T, Uksal U. European Society for Pediatric Dermatology. Guidelines for the management of tinea capitis in children. *Pediatr Dermatol* 2010; 27: 226–228.
- Gümüşay T, Ilkit M. Epidemiology of tinea capitis in Ceyhan district, Adana in Çukurova region, Turkey. *Mycoses* 2006; 49: 346–349.