

Tinea Capitis in Patients Attending Zliten Teaching Hospital (North West of Libya)

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Authors' contributions

This work was carried out in collaboration between all authors. Author TMA designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Author HAD managed the analyses of the study and literature searches. Author AMAB managed the literature searches. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/IJTDH/2017/35907

Editor(s):

(1) Bilal Dogan, Department of Dermatology, University of Health Sciences, Istanbul, Turkey.

Reviewers:

(1) Farhana Tahseen Taj, KLE University, India.

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Complete Peer review History: <http://www.sciencedomain.org/review-history/21282>

Original Research Article

Received 2nd August 2017
Accepted 22nd September 2017
Published 7th October 2017

ABSTRACT

Aims: To determine the frequency of occurrence of tinea capitis in determined population, which were patients, sought medical advice at outpatient dermatology clinic of Zliten Teaching Hospital in period of time from October 2014 to April 2016, and to determine the frequency of different clinical types of tinea capitis as well as to find out the causative etiological species.

Study Design: A prospective cross-sectional study was conducted to analyse the data of patients affected with tinea capitis to find out the most affected age and sex. Furthermore, to discover the distribution of different clinical types and the etiology of tinea capitis.

Place and Duration of Study: The study was carried out in outpatient dermatology clinic of Zliten Teaching Hospital in Zliten (North West of Libya) for a period of 19 months, between October 2014 and April 2016.

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Methodology: All patients with tinea capitis from different ages were enrolled in this study. Scrapings from infected scalps were examined under high power of microscope using 20% potassium hydroxide mount and cultured for fungal elements. Statistical Microsoft SPSS 20 was used to analyse the data.

Results: The preschool children were the most susceptible age group to develop tinea capitis, which were 36 child (represented 60% of total), while no sex predilection was detected. The grey patch type was the most frequent clinical type seen in 36 (reperesenting 60%) of all patients, followed by black dot and seborrheic type respectively. The *Microsporum canis* was the most frequent isolated dermatophyte from 16 patients (representing 53.3% of cultures with growth of dermatophytes) followed by *Trichophyton rubrum*, which was cultured from 7 patients (23.3%).

Conclusion: Preschool children were 36 child (60%) and were the most susceptible age group to develop tinea capitis and no sex predilection was detected. The grey patch was the most frequently seen clinical type. *Microsporum canis* was the most frequent etiologic agent causing tinea capitis in Zliten area.

Keywords: *Tinea capitis; dermatophyte fungal infection; preschool children; microsporum species; trichophyton species; North West of Libya.*

1. INTRODUCTION

Tinea capitis is also named ringworm infection of scalp, refers to a dermatophyte infection of hair follicles and shafts of the scalp. It is principally a disease of childhood, commonly affects school-age children and is rarely to appear in adults [1,2]. The dermatophytes are named according to their genera; *Microsporum*, *Trichophyton*, and *Epidermophyton*, which have many species and they can be distinguished from each other, through culture on sabouraud's media, according to their special macroscopic and microscopic characteristics [1]. The most involved dermatophyte species in human skin infections are five *Microsporum* genera, 12 species in the genus *Trichophyton* and only one *epidermophyton* species. Furthermore, most dermatophytes are capable to cause tinea capitis, but certain species e.g. *Microsporum audouinii* (*M. audouinii*), *Trichophyton Schoenleinii* (*T. Schoenleinii*) and *Trichophyton violaceum* (*T. violaceum*) have special affinity to invade hair and cause tinea capitis. On the other hand, *Epidermophyton floccosum* (*E. floccosum*) and *Trichophyton concentricum* (*T. concentricum*) are unable to cause tinea capitis [3,4]. The principal fungi responsible for tinea capitis vary in different parts of the world. Worldwide, most of the patients with tinea capitis were being detected in Africa, Asia, and Southern and Eastern Europe [5]. In the UK, until recent years, most cases of tinea capitis were caused by *M. canis* which usually acquired from cats. In the USA the usual causative organism is *T. tonsurans* whereas in India and Eastern Europe, *T. Violaceum* is found to be the most common species [5].

In Libya, there are few studies about tinea capitis to determine etiological agents and to know more about susceptible age and sex groups, as well as the prevalent clinical types. In Zliten area (North West of Libya) the etiological causes of tinea capitis were not known. This study was conducted to know more about clinico-epidemiological features of tinea capitis and to know the responsible etiological species.

2. METHODS AND SUBJECTS

2.1 Place and Population of Study

All patients who had visited our outpatient dermatology department of Zliten Teaching Hospital, because of different complaints, were considered study population and were 7011 patients.

2.2 Objectives

This study was conducted to determine etiology of tinea capitis as well as to know the prevalent clinical types and more susceptible age group and gender.

2.3 Methods

A prospective, cross-sectional study was carried out in the time from October 2014 to April 2016. All clinically diagnosed patients, to have tinea capitis, at different ages were included in the study, whereas cases of tinea capitis on treatment were excluded. Sixty cases were diagnosed to have tinea capitis, and the data regarding age, sex, clinical types, and results of KOH were recorded in special form for each

patient. The patients were classified according to clinical type of tinea capitis into inflammatory (kerion) or non-inflammatory (grey patch or black dot). Following cleaning of the affected areas with 70% alcohol, scrapings were taken using a scalpel blade no. 21. A portion of scraped materials was placed on a clean glass slide and drops of 20% potassium hydroxide (KOH) solution were placed over it. A cover slip was put over the material and then the prepared slide was examined under microscope for the presence of spores and hyphae. The rest of the material was inoculated into a labeled petri dishes containing sabouraud's dextrose agar supplemented with chloramphenicol. Then the petri dishes were incubated at 26°C and were observed twice weekly for growth of fungi. They were discarded as negative if there was no growth after 4 weeks. The growths were examined for gross morphological and microscopic characteristics, which were examined with use of lactophenol cotton blue preparation.

2.4 Statistical Analysis

The data of patients were organized and analysed using Statistical Microsoft SPSS system. Descriptive statistics was performed through running frequencies, percentage, means and crosstabulations. Chi-square test with 95% confidence intervals (CIs) was used to compare etiology and clinical type of tinea capitis.

3. RESULTS

Sixty cases were clinically diagnosed as tinea capitis, which accounted for a proportional rate of 0.9%. Those 60 cases were confirmed to have tinea capitis by microscopic examination and culture of scrapings of hairs and scales obtained from infected sites. The mean age of the affected patients was 7.7 years with male to female ratio 1:1. Most frequently affected age group were children less than 13 years of age, and were 54 cases (representing 90% of total). The youngest patient was one year old and oldest patient was 49 years old. The most affected ages were children less than 7 years, which were 36 (representing 60% of all patients) (Fig. 1).

Clinical types were distributed as following, 36 cases (representing 60%) had grey patch type, while, black dot type were recorded in 15 patients (25%), and seborrheic type in 7 patients (11.7%), and Kerion only in 2 patients (3.3%) (Figs. 2 and 3).

Scraping of scaly material and hairs were taken from all patients, fungal elements were found to be positive through microscopic examination and potassium hydroxide mount 20% in 36 patients (representing 60%). For majority of patients, who were suspected clinically to have tinea capitis, culture on sabouraud's dextrose agar medium with antibiotic was done. Culture for fungi showed growth of dermatophytes in

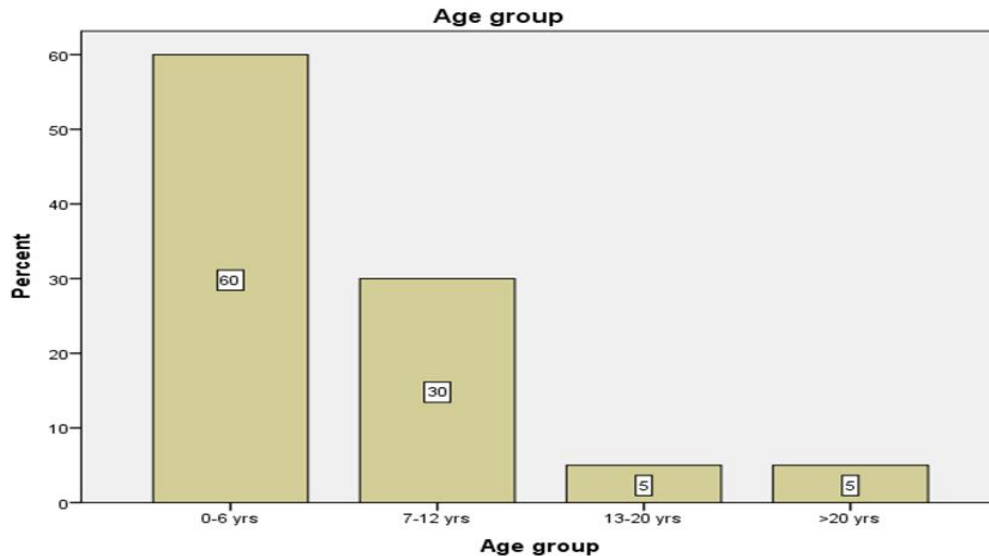


Fig. 1. Distribution of tinea capitis in different age groups

30 patients (50%). The predominant isolated etiologic agent was *M. canis*, which was cultured from 16 patients (representing 53.3% of total cultures with grown dermatophytes). *T. rubrum* was cultured from 7 patients (23.3%). (Figs. 4,5,6,7). The less frequently isolated dermatophytes were *T. verrucosum*, *T. tonsurans*, *T. soudanense*, *M. audouinii*, and *M. gypseum* (Fig. 8).

affected patients were children less than 14 years and 10 years of age respectively [7,8]. The main isolated organism in Benghazi and Tripoli (Libya) was *T. violaceum* [8,9]. Our study showed that the majority of patients were children less than 13 years old, and this consistent with results of Benghazi study as well as with results of study performed in Sfax hospital in Tunisia [8,10]. An almost equal number of males and females were affected in our study, and this finding concurred with previous study by Singal et al. [11] from North India. However, the prevalence of tinea capitis in Egypt and Kuwait were more among males than females [12,13].



Fig. 2. Black dot type of tinea capitis



Fig. 3. Boggy swelling of scalp with hair loss in a child with kerion

4. DISCUSSION

Tinea capitis is a common superficial fungal infection worldwide, particularly among pre-pubertal children in age group of 5-15 years [6]. In Zliten and Benghazi (Libya), tinea capitis was found to represent 25.5% and 45% of all superficial fungal infections, and most of the



Fig. 4. Radiating whitish colonies of *M. canis* (anterior surface)



Fig. 5. *M. canis* colonies (reverse side), showing golden yellow colour with central orange brown pigmentation

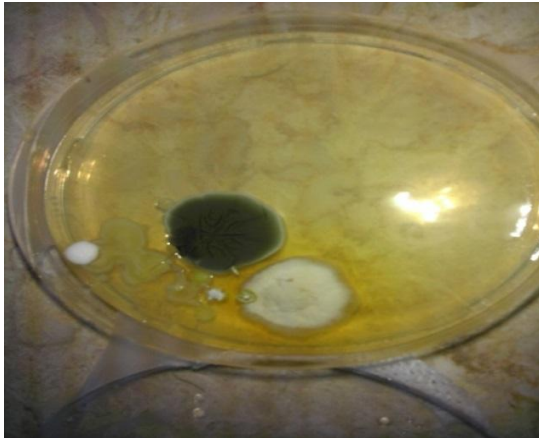


Fig. 6. Colonies of *T. rubrum* with whitish cottony colour (anterior side)

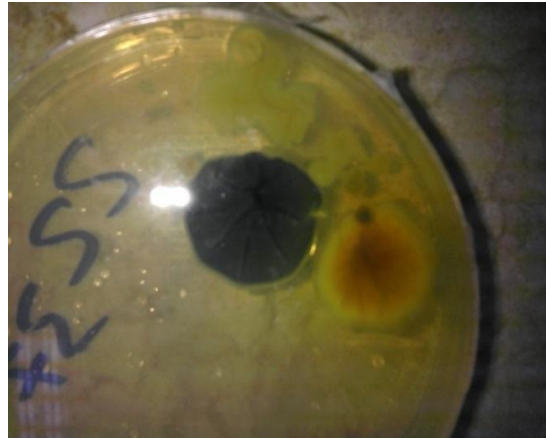


Fig. 7. *T. rubrum* colony showing yellowish periphery and reddish brownish discoloration of center (Reverse side)

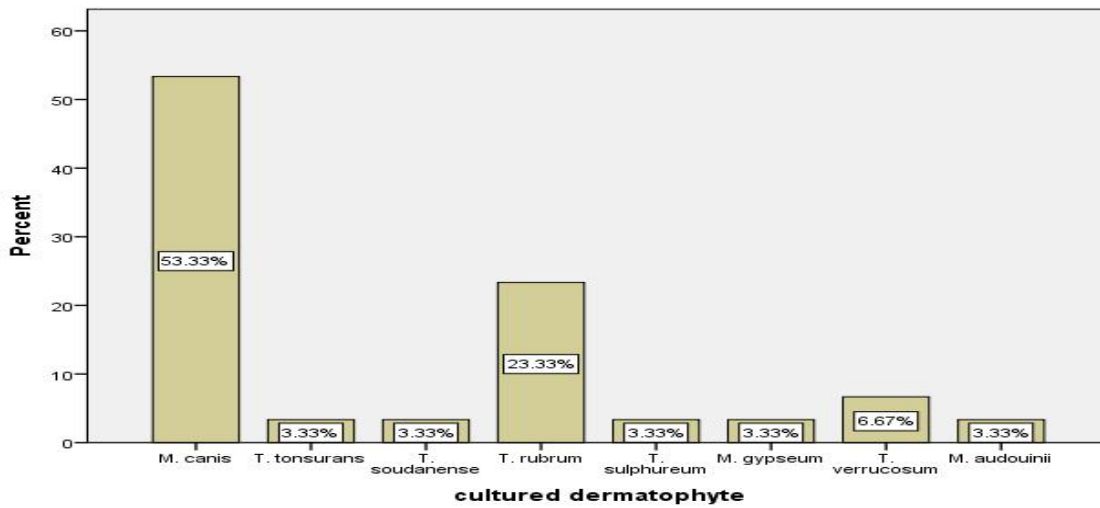


Fig. 8. Distribution of isolated species

Table 1. The relationship between the etiological fungus and clinical type

Etiological fungus	Clinical type (No. of cases)				Total Number
	Grey patch	Black dot	Seborrheic	Kerion	
<i>M. canis</i>	11	3	2	0	16
<i>T. tonsurans</i>	1	0	0	0	1
<i>T. soudanense</i>	1	0	0	0	1
<i>T. rubrum</i>	4	1	2	0	7
<i>T. sulphureum</i>	1	0	0	0	1
<i>M. gypseum</i>	0	1	0	0	1
<i>T. verrucosum</i>	2	0	0	0	2
<i>M. audouinii</i>	1	0	0	0	1
No growth	12	8	2	2	24
Culture was not done	3	2	1	0	6
Total Number	36	15	7	2	60

*p value= 0.03

In this study, the non-inflammatory types of tinea capitis were more commonly reported than inflammatory variant (Kerion). The grey patch was the most frequently recorded type. These observations are concurred with that in Bengahazi study [8]. The favus type was not reported in our study, and therefore, *T. Schoenleinii*, was not isolated.

Usually the culturing of fungi in special media gives valuable data regarding the causative species involved in the disease and earlier reports have shown a positive isolation rate of 56-92% [14]. However; regarding our results the culture of specimens yielded growth of dermatophytes in only 50% of the cases and fungal elements were confirmed microscopically in 60% of cases. In our study, *M. canis* was the most frequently isolated pathogenic dermatophyte same as found in Saudi Arabia, the United Arab Emirates and Qatar [15,16,17], while in Tripoli (Libya), Benghazi (Libya), and Egypt, the most frequent etiologic agent was *T. violaceum* [8,9,18]. *T. rubrum* was the second frequently isolated pathogen (13%), in contrast, *T. rubrum* was rarely isolated in Tripoli (Libya) and in Saudi Arabia [9,15]. *T. violaceum* was not isolated from our patients, despite it was most frequent pathogen in Tripoli and Bengahazi [8,9]. This could be explained by our small sample size.

5. CONCLUSION

In conclusion, in this study, the grey patch was the most frequently recorded type of tinea capitis, and *M. canis* was the most common species isolated. Further studies involving a larger number of patients and more sensitive fungal isolation methods are required to have more information on this issue in our locality.

CONSENT

It is not applicable.

ETHICAL APPROVAL

The study protocol was reviewed and approved by Ethical Committee of Zliten Teaching Hospital.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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