PREVALENCE OF TINEA CAPITIS IN PRIMARY SCHOOL CHILDREN IN SOUTHERN PART OF PORT SAID

THESIS
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SUMMARY

Scalp scaling is a common finding in infants and children that may be a manifestation of or associated with variety of disorders like, Seborrheic dermatitis,atopic dermatitis, psoriasis, scabies, dermatomyositis and histiocytosis

Tinea capitis is an important dermatophyte infection of the scalp that is caused by species of Trichophyton or Microsporum. The disease is a worldwide public health problem, especially among school children, and poses specific therapeutic challenges. Tinea capitis may manifest as a seborrheic dermatitis-like pattern, “black dot”, which refers to the breakage of hairs at the scalp; alopecia areata-like pattern, kerion, and favus.

Visual screening examination of microscopic mounts and isolation by culture are the preferred methods used for diagnosing ringworm infection of the scalp. Children complaining of an itchy, scaly scalp and any child with alopecia should be carefully examined for evidence of tinea capitis.

The aim of this thesis was to study the overall prevalence of scaly scalp and tinea capitis in school children in southern part of Port Said with identification of the causative agents. We collected about 2587 student (6-13years old) who were examined clinically. 151 of which manifested with scaly scalp and were subjected to mycological cultures which revealed about 54 case with positive fungal infection.

statistical analysis revealed the prevalence of scaly scalp (5.8%) and tinea capitis (1.2%) and that scaly scalp prevailed in male students, age group less than 9 years old, and

INTRODUCTION

Scalp scaling is a common finding in infants and children that may be a manifestation of or associated with variety of disorders like, Seborrheic dermatitis, atopic dermatitis, psoriasis, Norwegian scabies, dermatomyositis, and histiocytosis ***(Elewski, 2000).***

Tinea capitis is an important dermatophyte infection of the scalp that is caused by species of Trichophyton or Microsporum. The disease is a worldwide public health problem, especially among school children, and poses specific therapeutic challenges ***(Gupta and Summerbell, 2000).***

The epidemiology of tinea capitis varies within different geographical areas throughout the world. It may occur sporadically or epidemically and an increase in its incidence has been noted over the last few decades. It is endemic in many developing countries, making it a significant infectious dermatological disease. On the other hand, the prevalence of tinea capitis remains low in developed countries, and there is usually a history of indirect or direct contact with immigrant population originating from endemic areas for tinea capitis ***(Elewski, 2000; Menan et al., 2002; Koussidou-Eremondi, 2005; Ginter-Hanselmayer et al., 2007).***

The high frequency of tinea capitis in developing countries may be explained by the weakness of sanitary education, the lack of good hygienic conditions, and household overcrowding ***(Ali-Shtayeh, 1998; Frieden, 1999).***

The prevalence of asymptomatic carriage has a wide range of variation from region to region. Asymptomatic carrier is defined as an individual who has dermatophyte positive scalp culture without signs or symptoms of tinea capitis. The

prevalence state of asymptomatic carriers may be the main factor responsible for resistance to eradication and consequently, prevalence variation between developed and developing countries ***(Menan et al., 2002; Ilkit and Demirhindi, 2008).***

In developing countries, some behavioral, cultural, and hormonal factors may play a role in the presence of a significant relationship between male gender and tinea capitis ***(Menan et al., 2002).***

AIM OF THE WORK

The aim of this thesis is to study:

a- The overall prevalence of scaly scalp and tinea capitis in school children in southern part of Port Said.

b- The associated epidemiological determinants.

c- The causative agents.

Our ultimate goal is to collect data that may have potential influence on local health care strategies to deal with this disease.

CHAPTER I
SCALP SCALING IN CHILDHOOD

Scalp scaling is a common finding in infants and children that may be a manifestation of or associated with variety of disorders. Seborrheic dermatitis usually occurs between the first two to 6 weeks of life, but it occasionally presents as late as 5 months and often recurs during or after puberty. It rarely occurs in the period between infancy and puberty ***(Bonifazi, 1992).***

It has been reported that approximately half of all children with atopic dermatitis may manifest scaling of the scalp, as found in studies of infants from 0 to 6 months old and in children up to 12 year ***(Nagaraj et al., 1996).***

Few studies have documented the prevalence and etiology of scalp scaling in children. Allen and Honig evaluated scalp scaling disorders in children in 1983, and reported prevalence, clinical picture and response to various treatments in both the infantile and early school-age population where they found that scalp scaling is a common entity. Classic seborrheic dermatitis in two- to 10-year-olds seems to be fairly common. Adenopathy of the head and neck is common also in infants and prepubertal children. Head and neck adenopathy in a posterior location is not specific and may be associated with scalp scaling from a variety of causes, particularly atopic dermatitis/eczema, may be seen in seborrheic dermatitis, or with a positive dermatophyte culture. Scalp scaling with adenopathy was not diagnostic of tinea capitis. They recommended additional studies to define the causes of nonspecific scalp scaling in children, particularly in the ages between infancy and puberty ***(Allen and Honig, 1983).***

Scalp scaling is noted frequently in tinea capitis as well as psoriasis. Occasionally scalp scaling can be seen in patients with scabies ***(Duran et al., 1993; Elmros and Hornquist, 1981)***, dermatomyositis ***(Kasteler and Callen, 1994)***, pityriasis rubra pilaris (***Shvili et al., 1987***) and Langerhans cell histiocytosis ***(Pakula and Paller, 1993)***. Less common etiologies include pemphigus foliaceous ***(Jones et al., 1986)***, and leukemia cutis ***(Friedlander et al., 1996).***

Seborrheic dermatitis is a mild inflammatory dermatitis that often causes a thick greasy scaling of the vertex scalp known as "cradle cap" during the first few months of life. Other areas that may be affected are the face and diaper area. It has been shown that newborns have large sebaceous glands with high sebum secretion rates similar to the adults. In childhood, sebum production and seborrhiec dermatitis are closely connected. In adulthood, however they are not, as the sebaceous gland activity peaks in early puberty and decade later seborrheic dermatitis may occur ***(Gerd and Thomas, 2008).*** The borders of individual patches are often distinct, in contrast to psoriasis. Lack of broken or easily plucked hairs, KOH examination, and fungal culture distinguish seborrheic dermatitis from tinea capitis ***(Janniger and Schwartz, 1993***).

The scalp has been identified in many studies as the most common site of involvement in childhood psoriasis ***(Farber, 1992).*** In patients with psoriasis, thick silvery scale adheres to sharply demarcated plaques. When the scale is removed, small bleeding points can be seen (Auspitz's sign). The scalp lesions may extend beyond the hairline onto the skin of the neck or forehead, an unusual finding in seborrheic dermatitis. Periumbilical, postauricular, and gluteal fold skin areas are often involved in psoriasis. Nail abnormalities such

as pitting or onycholysis also suggest psoriasis. KOH examination of skin scales and fungal culture are negative. Pruritus is usually not a prominent symptom ***(Farber et al., 1996).***

Atopic dermatitis is a chronic pruritic disease associated with a high incidence of allergic respiratory disease and an elevated level of serum immunoglobulin E. Presentation is usually between two and 6 months of age ***(Charlesworth, 1994).*** The distribution of skin lesions varies according to different age populations. In infants the face is usually the first area involved. The scalp is involved in approximately half of the cases in the first 6 months of life. In older children the extensor limb surfaces are frequent sites of involvement. There is pruritus with weeping or oozing of lesions ***(Bonifa, 1992).***

The eruption seen most commonly in scabies infestation consists of pruritic papules, burrows, and sometimes nodules. In infants, lesions may be seen in a generalized distribution, whereas, in older children and adolescents, the eruption tends to be concentrated in the finger webs, volar wrists, axillae, and groin. Pruritus is a prominent symptom. An unusual presentation of this common infestation is that of scaly scalp ***(Elmros and Homquist, 1981).*** High index of suspicion is required to diagnose atypical scabies infestations. Skin scrapings from the scalp examined in a drop of saline solution or mineral oil should reveal the scabies mites, eggs, or feces. Pruritus in other family members or close contacts is often reported ***(Elewski, 2000).***

Dermatomyositis is a connective tissue disease characterized by proximal muscle weakness and tenderness, periocular “heliotrope” (dusky purple-colored) cutaneous

eruption, and widespread eczematous skin changes. Scaling of the scalp was reported. Scalp involvement is common where misdiagnosis as psoriasis or seborrheic dermatitis may occur. The scaling was characterized as diffuse and was often associated with erythema, atrophy, and non scarring alopecia ***(Kasteler and Collen, 1994).*** New associations of juvenile dermatomyositis also included the findings of pruritus (38%) and psoriasiform scalp dermatitis (25%) ***(Peloro et al., 2001).***

Letterer-Siwe disease is a histiocytic disorder that manifests with crusted lesions of the scalp, groin, trunk, and face. The presence of petechiae, fever, lymphadenopathy and hepatosplenomegaly are common differentiating features ***(Arnold, 1990).***

CHAPTER II
TINEA CAPITIS: OVERVEIW

Introduction

The dermatophytes are all capable of using keratin for growth, and all keratin-containing body parts (hair, skin, and nails) can become infected with dermatophyte species. Clinical manifestations are named for the area of the body infected; e.g. tinea capitis, tinea barbae, tinea corporis, etc ***(Elewski, 2000).***

Tinea capitis is a dermatophyte infection of the scalp (scalp ringworm) seen predominantly but not exclusively in prepubertal children ***(Elewski, 2000).*** The organisms adapted to this form of infection are well characterized and belong to the genera Trichophyton and Microsporum. While all the causative organisms can affect other skin sites, the scalp hair is usually a focus of infection ***(Hay and Ashbee, 2010).***

Invasion of the hair shaft is followed by the production of arthroconidia either inside the hair (endothrix) or its external surface (ectothrix). Tinea capitis caused by T. schoenleinii adopts a different pattern of infection, known as favus, as their growth within the hair is not sustained and the course of hyphal invasion is marked by air-containing tunnels in the hair. These organisms produce large clusters of hyphae along with inflammatory debris, in the perifollicular keratin (scutula) ***(Remak, 1837; Hay and Ashbee, 2010; McGinnis and Tilton, 1993).***

Historical background

The exhaustive studies of Sabouraud, at the beginning of the twentieth century ***(Sabouraud, 1894***), described a series

of involved dermatophytes. As a result of the new descriptions of the causative organisms, a pattern of scalp infection emerged where endemic tinea capitis was caused in many countries by Microsporum audouinii, M. ferrugineum, T. violaceum, T. tonsuarns, all dermatophytes originating from human or anthropophilic sources, and nonendemic infections largely of animal or zoophilic origin ***(Rippon, 1985).***

In Africa the situation was complicated as there appeared to be more characteristic species such as T. soudanense, T. yaoundei, M. rivalieri, M. audouinii, T. schoenleinii, and T. violaceum, which were often restricted to specific localities in the continent ***(Verhagen, 1978).***

In the 1960s, however, the introduction of griseofulvin as a specific treatment and control measures for endemic tinea capitis in school children changed this pattern. In those countries where these measures were available, endemic tinea capitis was largely eliminated and its place was often taken by M.canis infections ***(Rippon, 1985).***

During the past 30 years, some significant changes have occurred in the reported incidences of tinea capitis in different countries. These have included a rise in the incidence of infections due to T. tonsurans in the United States and parts of Western Europe, an increase in cases of M. canis infections elsewhere, and a decline in the reported cases of favus ***(Hay and Ashbee, 2010).*** While the latter can be counted a success for control measures, the more recent spread of anthropophilic infections is a blow to public health initiatives ***(Aly, 1994; Wilmngton et al., 1996; Hay et al., 1996).***

Of about 40 species of dermatophytic fungi discovered throughout 100 years after Sabouraud, only about 12 species are common causes of human infection and approximately 6 of

which are commonly responsible for the development of tinea capitis (Table 1) ***(Elewski, 2000).***

Epidemiology

Common worldwide causative dermatophytes are M. canis, M. gypseum, T. tonsurans, T. mentagrophytes, T. violoceum and T. verrucosum, and it is noteworthy that Epidermophyton floccosum and Trichophyton concentricurn, however, do not invade scalp hair and Trichophyton rubrum, which is the most common dermatophyte isolated worldwide, is not a frequent cause of tinea capitis (Table 1) ***(Elewski, 2000).***

Table 1: Causes of Tinea capitis infections ***(Elewski, 2000).***

SPECIES	TYPE	DISTRIBUTION
M canis	zoophilic	worldwide
M gypseum	geophilic	worldwide
T tonsurans	anthropophilic	US, Carbbean, Mexico, Europe
T mentagrophytes	Anthropophilic, zoophilic	worldwide
T violaceum	anthropophilic	Africa, Asia, Europe
T verrucosum	zoophilic	worldwide

- **Geographic distribution**

Dermatophytes have 3 major reservoirs and are found in humans (anthropophilic), animals (zoophilic), or soil (geophilic). Although geophilic dermatophytes occur worldwide, anthropophilic and some zoophilic species may be geographically restricted. The predominant organisms vary with geographic area and they have not been sought or identified in many parts of the world, where they tend to be reported only in those regions where there are mycologists to implicate them ***(Elewski, 2000).***

The major etiologic agents of tinea capitis in a given geographic region can also change over time. During the late 19th and early 20th centuries, M audouinii and M canis were the predominant etiologic agents of tinea capitis in Western and Mediterranean Europe ***(Clayton, 1978),*** whereas T schoenleinii predominated in Eastern Europe ***(Ajello, 1974).*** The introduction of griseofulvin for treatment of tinea capitis infections together with vigilant school surveillance in the late 1950s and early 1960s has produced a marked decline throughout Western Europe in the incidence of tinea capitis caused by Microsporum spp ***(Clayton, 1978).***

Current cases of anthropophilic tinea capitis in Western Europe are due predominantly to T. tonsurans, whereas T. violaceum is currently the dominant agent in Eastern Europe ***(Aly, 1994; Hay et al., 1996).*** Likewise, in Europe, M canis is still the organism isolated in most laboratories, but anthropophilic infections are increasing in number in many cities. Similarly, in the United States, T tonsurans has supplanted M audouinii and M canis as the primary etiologic agent of ringworm of the scalp. In Australia and New Zealand the most common organism that causes tinea capitis is M. canis with the emergence of T. tonsurans in some areas. In Western and Southern Asia, the most common species that causes tinea capitis is T. violaceum. In Middle Eastern countries, tinea capitis is generally caused by M. canis, T. mentagrophytes and T. violaceum. In Africa, the more common organisms include T. violaceum, M. audouinii, T. soudanense, T. mentagrophytes and M. canis; furthermore, T. gourvilii and T. yaoundei have also been recovered (Table 2) ***(Kemna and Elewski, 1996).***

Table 2: Species worldwide distribution ***(Elewski, 2000).***

North America	South America	Europe	Africa	Australia
T. tonsurans	M. canis	M. canis	M. canis	M. canis
M. canis	T.violaceum	M. audouinii	M. audouinii	T. tonsurans
T. verrucosum	T. tonsurans	T. tonsurans	T.violaceum	
		T. violaceum	T. soudanense	
		T. mentagrophytes	T. schoenleinii	
		T. schoenleinii	T. mentagrophytes	
			T. yaoundei	
			T. gourvilii	

- **Age and gender predilections**

Tinea capitis is overwhelmingly a scourge of childhood; the predominant age range affected is between three and 7 years of age ***(Hay et al., 1996; Kemn and Elewski, 1996).*** The incidence may also vary by sex, depending on the causative organism. When it is M audouinii, the ratio of infected boys to infected girls is as high as 5:1 ***(Elewski, 1999).*** With M canis, the ratio varies considerably, but the infection rate in boys is usually higher ***(Marples, 1956).*** Adults do become infected from time to time and women are infected more frequently than men ***(Elewski, 1999).***

Pathogenesis of tinea capitis

Tinea capitis develops when an inoculum from another individual, an animal or a fomite comes into contact with the scalp, although contact alone is not sufficient to produce infection ***(Howard and Frieden, 1995; Baxter, 1975).*** Trauma may be required to enable the conidium to become implanted into the stratum corneum and to begin the infective process. Braiding hair tightly may expose the stratum corneum of the