TINEA PEDIS IN CHILDREN IN PESHAWAR

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ABSTRACT

Objective: Tinea pedis is an infrequent disease in children before the age of puberty. There are few epidemiologic and clinical data regarding cases of tinea pedis observed in children in Peshawar.

Material and Methods: We prospectively collected all cases of tinea pedis in children diagnosed during the years 1999-2000. Only those showing a positive result with potassium hydroxide preparation (KOH) were included in the study. We performed fungal cultures in Sabouraud's agar in all cases to document the etiologic fungi. The clinical characteristics were investigated.

Results: 102 children with foot dermatitis were screened out of which a total of 21 children, aged 3 months to 14 years, were included. Fifteen patients were boys and six were girls. The mean age was 7.1 years. All the children were otherwise healthy. The intertriginous type was most common (53.3%). The first or second toe-webs were the sites of predilection (32.3%). Eighteen children (86%) had a family history of tinea pedis and more than half of cases (52.4%) showed occurrence in the summer. The results of fungal cultures were positive in 13 patients (57%). The other associated dermatoses over onychomycosis (33.3%) atopic dermatitis (14%), plantar warts (10%) and chronic Urticaria (5%). *Trichophyton rubrun* was the most commonly isolated pathogen (69.2%). Tinea pedis cleared after treatment with topical antifungals with or without systemic antifungals in all cases.

Conclusion: Tinea pedis in children can occur more frequently than suspected. Our study shows strong association with family history and seasonal relationship with occurrence in summer in more than half of cases. The condition was more common in the lower socio-economic class of patients.

Key words: Tinea pedis, children, family history.

INTRODUCTION

Tinea pedis is infection of feet or toes with a dermatophyte fungus. It is considered to be uncommon in children. The wearing of shoes and the resultant maceration of the toe-cleft skin predisposes to this condition, which is in most cases initially a web-space infection, usually involving the lateral toe-clefts. The condition is commoner in adults than in children and is probably acquired most often in the early teens. Adults males probably have a 20% chance of developing tinea pedis while among women only 5% are likely to become chronically infected.[1] Anthropophilic species *T.rubrum, T.mentagrophytes* var. *interdigitale* and *E. floccosum* are together responsible for most of the cases of tinea pedis throughout the world. *T. Violaceum* is also sometimes isolated and infections with this organisms may be very intractable.[2]

Tinea pedis is the commonest form of dermatophyte infection in the UK and North America[3] and probably in Pakistan. The wearing of shoes and the resultant maceration of the toe-cleft skin predisposes to this condition, which usually involves the lateral toe clefts. The condition is commoner in adults than children and is probably acquired most often in the early teens.

The commonest form of tinea pedis is the intertriginous type characterized by peeling, maceration and fissuring affecting the lateral toe clefts, and sometimes spreading to involve the undersurface of the toes. A vesiculobullous reaction may occasionally extend over the whole sole. It may be preceded for months or years by maceration or fissuring in the toe clefts. Younger children do not commonly suffer from foot ringworm but frequently have eczema of the foot such as juvenile plantar dermatosis. Where the sole of the foot is affected without obvious involvement of the toe cleft, a diagnosis of pustular psoriasis must be considered. Scrapings by which a positive diagnosis of tinea pedis may be established should always be taken, and they may need to be repeated if an initial negative result is incompatible with the clinical features. All dermatophyte species appear identical in skin and nail samples. Septate hyphae are observed, which may branch without constriction at the branching point and which display an even diameter along their length. The isolation and identification of dermatophytes is directly from the primary culture. The treatment of fungal infections is now comparatively straight forward and cure rates for many forms of dermatophytosis are over 80%. In the prevention of tinea pedis, improvement of hygiene in swimming baths may result in lower levels of infection. Frequent washing of changing-room floors and walkways will remove infective material in skin scales.[4]

There are few studies on the etiology, epidemiology, and clinical features of tinea pedis in children. Several large epidemiologic studies of children show an incidence in the range 3-6%.[1,5] The purpose of this study was to investigate the epidemiology and clinical and mycological characteristics of foot ringworm infection in children and to look at other associations.

MATERIAL AND METHODS

Among the children under the age of 15 years who presented with dermatitis of feet, patients were included in this study on the basis of a positive potassium hydroxide (KOH) preparation.

We performed direct microscopic examinations with 20% KOH preparation. Fungal cultures were incubated at 32° for 4 weeks using sabouraud dextrose agar with and without cycloheximide and chloramphenicol in all cases. We classified the clinical forms and investigated the seasonal relationship and family history of tinea pedis, the

distribution of the lesions and the associated dermatoses.

RESULTS

There were 102 children with feet dermatitis who visited the hospital in the study and were screened for tinea pedis. Total of 21 children, aged 3 months to 14 years, were included. The mean age was 7.1 years. Fifteen patients were boys and six were girls. All the children were otherwise healthy. Prior to the establishment of the diagnosis of tinea pedis, 17 patients (80.9%) were treated for eczema without improvement. We classified the clinical types of tinea pedis as interriginous, vesicopustular, and hyperkeratotic: the intertriginous type is characterized by peeling, maceration, and fissuring of the toe-webs; the vesicopustular type by the appearance of vesicles and/or pustules; and the hyperkeratotic type by erythematous skin covered with fine scales affecting the soles, the heels, and the border of the feet[6]. The intertriginous type was the most common (53.3%) (Table 1). The toe-webs were the most commonly involved sites (Table 2). The first or second toe-webs were the sites of predilection (32.3%). Eighteen children (86%) had a family history of tinea pedis (Table 3) and more than half of cases showed a seasonal relationship with tinea pedis more common during the summer months (52.4%). The results of fungal cultures were positive in 13 patients (57%). *Trichophyton rubrum (T. rubrum)* was the most commonly isolated pathogen (69.2%) *T. mentagrophytes*, and *Candida albicans (C. albicans)* followed. The rate of coexistent onychomycosis with tinea pedis was 33.3%. The other associated dermatoses were atopic dermatitis (14%), plantar warts (10%), and chronic urticaria (5%) (Table 4) Tinea pedis and onychomycosis were cleared after treatment with topical antifungals with or without systemic antifungals in all cases. We also broadly evaluated the socio-economic class of patients and nearly 80% of them belong to the lower socio-economic class.

CLINICAL TYPES OF TINEA PEDIS

Clinical type	Case (%)
Intertriginous	16 (53.3)
Vesicopustular	5 (16.7)
Hyperkeratolic	9 (30)
Total	30 (100)

TABLE – 1

DISTRIBUTION OF THE LESIONS

Sites	Case (%)
Toe-webs	16 (51.6)
1st or 2nd	10 (32.3)
3rd or 4th	6 (19.4)
Sole	8 (25.8)
Dorsum	3 (9.7)
Sides	2 (6.5)
Heels	0 (0)
Toes	2 (6.5)
Total	31 (100)

TABLE – 2

FAMILY MEMBERS WITH TINEA PEDIS

Family member	Case (%)
Father	15 (57.7)
Mother	8 (30.8)
Siblings	3 (11.5)
Total	26 (100)

TABLE – 3

DISCUSSION

Dermatitis of the feet is a frequent problem in children. In this study there were 102 children with feet dermatitis and 20.9% of these children with feet dermatitis (21/102) proved to have tinea pedis. Although

DISEASES ASSOCIATED WITH TINEA PEDIS IN THIS STUDY

Associated diseases	Number of patients (%)
Onychomycosis	7/21 (33.3)
Atopic dermatitis	3/21 (14.3)
Plantar warts	2/21 (9.5)
Bronchial asthma	1/21 (4.8)
Allergic rhintis	1/21 (4.8)
Chronic urticeria	1/21 (4.8)
Total	15/21 (71.4)

TABLE – 4

the incidence of tinea pedis in children has not been fully established, it has been suggested that tinea pedis may not be a rare occurrence in the pediatric age group. However, as stated that asymptomatic tinea pedis is uncommon in children.[4] It has been reported that tinea pedis predominates in adults, although it is often seen in children older than 4 years and both sexes are similarly affected.[7]

The condition is commoner in adults than children, and is probably acquired most often in the early teens. The mean age of onset was 15 years in one survey.[8] Prevalence figures as high as 80% have been reported among German miners, and in some wards of a long-stay hospital more than two-thirds of the patients were infected.[9] Among dermatological outpatients with T.rubrum infections there is a significant excess of atopics[10], and in the present study there were also 5 patients with history of allergic disorders like atopic dermatitis, bronchial asthma and allergic rhintis.

In the present study, the patients were between 3 months and 14 years of age. Six patients (28.5%) were younger than 4 years. The majority of patients (71.4%) were boys. The incidence of tinea pedis is highest among people who wear occlusive footwear.[7] There is an agreement with results showing a high occurrence in the summer months, because hyperhidrosis and retained moisture are predisposing factors for tinea pedis. Experimental evidence suggests the importance of maceration in dermatophyte infections of the toe clefts. These moist conditions probably favour growth of the fungus directly, and damage the stratum corneum at the same time. A simultaneous increase in the bacterial flora is likely and may also play a part.[11] Also physical activity may be a predisposing factor to the spread of foot infections as tinea pedis was found to be more frequent in boys than in girls in our study.[6] The sex difference in the level of tinea pedis may be partly explained by different exposure to the casual fungi. Males generally wearing more occlusive and heavier footwear throughout the year than females is probably important and this correlates well with the known rarity of interdigital tinea pedis among those who habitually go barefoot.[12]

Tinea pedis must be differentiated from other disorders that also present with inflammatory lesions on the feet in children. In our study, many patients (80.7%) had been treated with various topical ointments in other clinics for eczema. Eczema can be differentiated from tinea pedis by negative results with KOH preparation and negative cultures for fungus.

Clinically, the most common form of tinea pedis is intertriginous, characterized by peeling, maceration, and fissuring of the toe-webs.[6] Ordinarily, tinea pedis starts in the lateral web spaces, specifically between the fourth and fifth or third and fourth toes.[13] In our study, however, the first and second toe-webs were the sites of predilection. The high proportion of family members (86%) affected in our study may suggest that they act as the source of infection. The high positive rate of paternal infection observed in our study (57.7%) has been described previously[14].

Occasionally, tinea pedis presents as an inflammatory vesicopustular type, which is usually triggered by T.mentagrophytes[6]. In our series, interestingly, two hyperkeratotic cases grew T. mentagrophytes in culture. In accordance with the data for adults, most of the cases were of the interriginous type (53.3%) and T. rubrum was the most commonly isolated pathogen (69.2%) (13 cases showed a positive result for fungal cultures). This is in keeping with other previous studies of tinea pedis.[15]

CONCLUSIONS

Tinea pedis in children can occur more frequently than suspected. Our study shows the strong association with family history and the seasonal relationship with occurrence in summer in more than half of cases and particularly more common in the lower socio-economic class of patients. Tinea pedis in children may have different clinical features from cases in adults: in our study, the first and second toe-webs were the sites of predilection. We suggest that tinea pedis should be considered in the differential diagnosis of foot dermatitis in children. Therefore, the frequent use of KOH preparations and fungal cultures is mandatory when eczematous dermatitis of the feet is evaluated in children.

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