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A TEN-YEAR SURVEY OF *TINEA PEDIS* IN THE CENTRAL REGION OF THE RIO GRANDE DO SUL, BRAZIL

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SUMMARY

Tinea pedis is the most common type of dermatophytosis, but can mimic many cutaneous diseases and tend to be chronic. We present a study of the frequency, epidemiology and clinical aspects of *tinea pedis* in the central region of Rio Grande do Sul during the period 1988-1997.

KEYWORDS: *Tinea pedis*; Frequency; Epidemiology; Clinical aspects.

INTRODUCTION

Approximately 10 to 20% of the population is estimated to be infected by a dermatophyte and *tinea pedis* is the most common type of dermatophytosis, occurring in up to 70% of adults with the infection[1]. The term *tinea pedis* is used to encompass several clinically different infections of the skin of the foot. Dermatophytes infect, invade, and persist in the *stratum corneum*, increasing skin proliferation, which eventuates in scale and epidermal thickening. Infection of the interdigital spaces and plantar surface is characterized by inflammatory and noninflammatory lesions. The major clinical forms of *tinea pedis* are: 1) intertriginous; 2) plantar hyperkeratosis and 3) vesiculo-bullous infections[2]. Because the infection can mimic many cutaneous diseases and tend to be chronic, it is important to do diagnosis of *tinea pedis* as early as possible.

We present a study of the frequency, epidemiology and clinical aspects of *tinea pedis* in the central region of Rio Grande do Sul, Brazil, during the period 1988-1997.

MATERIALS AND METHODS

During the period 1988-1997 a total of 1,986 cases of dermatophytosis were diagnosed in Laboratório de Pesquisas Micológicas of the Santa Maria University Hospital, from which 909(45.8%) of *tinea pedis*. Skin scrapings obtained from an unique collection from the lesions were clarified with 30% potassium hydroxide for microscopic examination. From cultural studies the skin scales were inoculated on Sabouraud glucose agar with antibiotics(Mycosel, BBL), and then incubated at 25°C for two weeks.

RESULTS

Of the patients, 476(52.4%) were males and 433(47.6%) females, with a male/female ratio of 1.09/1.0. The age of the patients ranged between nine months and 82 years with a peak prevalence occurring after puberty (Table 1); the onset of the lesion ranged between one week and 40 years. Direct examination was positive in 899 (98.9%) of the patients, negative in 9 (1.0%), and an association dermatophyte and *Candida* was diagnosed in one patient. Cultures failed to grow in 296 (32.6%) cases; in four patients an association of two dermatophytes in the same lesion was disclosed, then 617 strains were isolated. *Trichophyton mentagrophytes* (48.3%) was the most frequent dermatophyte isolated from *tinea pedis* in our study, and predominate in the intertriginous and vesiculo-bullous forms, while *T. rubrum* predominate in the plantar and association forms (Table 2). The intertriginous form of *tinea pedis* was seen in 50.4% of the patients (Table 3), and in 20.2% association of clinical forms were observed; in 212(23.3%) patients nails were also infected by a dermatophyte. Intertriginous *tinea pedis* predominate in males, association of clinical forms was diagnosed equally, and the other predominate in females (Table 3). Seasonal variation in the frequency of diagnosis of *tinea pedis* was observed, with a preponderance in the autumn (Table 4). Eleven (1.21%) patients presented with dermatophytids of the hands, and two patients were infected by HIV.

DISCUSSION

Tinea pedis often begins in the web between the fourth and the fifth toes, and progress to involve the webs, subdigital and interdigital surfaces of the toes. Simple scaling infections are caused by

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TABLE 1
Frequency of *tinea pedis* according to the age

Age (years)	Frequency	%
0-9	16	1.8
10-19	107	11.8
20-29	282	31.0
30-39	190	20.9
40-49	145	16.0
50-59	96	10.6
> 60	73	8.1
Total	909	100

TABLE 2
Frequency of the agents of *tinea pedis*

Agent	Frequency	%
Trichophyton mentagrophytes	298	48.3
Trichophyton rubrum	276	44.7
Epidermophyton floccosum	38	6.16
Microsporum gypseum	2	0.32
Trichophyton tonsurans	2	0.32
Microsporum canis	1	0.16
Total	617	100

TABLE 3
Frequency of clinical forms according to the sex

Clinical form	Males (%)	Females(%)	Total (%)
Intertriginous	278 (60.6)	180 (39.3)	458 (50.4)
Plantar	65 (40.1)	97 (59.8)	162 (17.8)
Vesiculo-bullous	31 (39.7)	47 (60.2)	78 (8.60)
Dorsum	9 (33.3)	18 (66.6)	27 (3.00)
Association	93 (50.5)	91 (49.4)	184 (20.2)
Total	476	433	909 (100)

dermatophyte invasion of the *stratum corneum*. In chronic infections of intertriginous spaces, a fissure of the toe webs with soggy macerated white epidermis may be the only clinical sign. These erosive infections are caused by selection and overgrowth of bacteria, with the production of sulfur compounds that leads to inhibition of dermatophytes and accounts for the lower recovery of fungi from the most severe and chronic cases[3]. Chronic infections may also affect the soles, heels and lateral surfaces of the feet resulting in widespread furfuraceous scaly patches or hyperkeratotic plaques, called moccasin-type infection. Chronic plantar infections are usually caused by *T. rubrum* and found primarily in patients with an atopic background. Acute or subacute infections in the arch and sides of the feet due to an immune response of delayed hypersensitivity to *T. mentagrophytes*[2], are characterized by episodes of intense inflammation with the formation of vesicles, secondarily infected by bacteria and resulting in the formation of oedematous and painful vesicopustules.

TABLE 4
Seasonal variation in diagnosis of *tinea pedis*

Season	Frequency	%
Spring	233	25.6
Summer	197	21.7
Autumn	301	33.1
Winter	178	19.6
Total	909	100

The most prevalent species of dermatophyte may vary from one geographic region to another, like wise their frequency in the clinical forms of dermatophytosis. In a previous study in the central region of Rio Grande do Sul[4], *T. mentagrophytes* was the most frequent agent of *tinea pedis* during the period 1970-1979; the same study revealed an increase in frequency of *T. rubrum* in *tinea pedis* during 1980-1987. More recently, other study revealed again the prevalence of *T. mentagrophytes* in *tinea pedis* in the same region[5], while in the metropolitan area of Porto Alegre *T. rubrum* was the predominant agent of *tinea pedis*[6].

Peak prevalence of *tinea pedis* occurs after puberty[1]. The occurrence of the infection in children is uncommon, with a frequency of 2.2% in children aged seven to 10 years, to 8.2% in children aged 11 to 14 years[7]. In the present report the youngest patient aged nine months, and presented a pustulous lesion in the dorsum of the foot caused by *M. gypseum*, and the total of children aged until nine years with *tinea pedis* accounts 1.8%. The concept of *tinea pedis* as an infection that affects predominantly males[8] need a revision: in our study the male/female ratio demonstrate that both were equally affected.

On the contrary of the report of ZAITZ[8], seasonal variation in the frequency of *tinea pedis* apparently having relations with the time of diagnosis: in our study it is impossible to particularize when the patient was infected, since the onset of the lesions ranged between one week and 40 years. On the other hand, Rio Grande do Sul have well defined seasons, and at the end of the spring specially young people search for medical care, with the purpose to frequent swimming pools. However, the peak incidence in the autumn, as sure as can be, signify that the patients had been infected during the summer, resulting from the communal use of swimming baths and restroom.

Tinea pedis must be differentiated from allergic conditions, non dermatophyte fungi, *Candida* or bacterial infections. Difficulty in delivering a sufficient quantity of antifungals to the lower layers of a thick *stratum corneum* makes therapy of *tinea pedis* a problem. Infections often require prolonged therapy with topical or systemic agents, but recurrence occurs in up to 70% of patients. Recurrence is caused mainly by the persistence of infective fungal elements on the skin, socks and shoes. Another issue in the incomplete eradication, when patients stop applying topical therapy because their symptoms are alleviated. If untreated, *tinea pedis* may be complicated by nail infections, serving the nails as a reservoir for relapses and recurrence of *tinea pedis*[1].

RESUMO

Um estudo de dez anos sobre a tinha do pé na região central do Rio Grande do Sul, Brasil.

A tinha dos pés é a forma mais comum das dermatofitoses, mas pode simular outras doenças da pele e tende a se tornar crônica. Apresentamos um estudo da freqüência, epidemiologia e aspectos clínicos da tinha dos pés na região central do Rio Grande do Sul durante o período 1988-1997.

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