



ORIGINAL RESEARCH PAPER

Dermatology

TINEA PEDIS-A CLINICO-MYCOLOGICAL STUDY

KEY WORDS:

Dermatophytosis, superficial fungal infections, tinea corporis, tinea cruris, tinea pedis.

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ABSTRACT

A total of 2306 patients were examined for the clinical evidence of Tinea pedis. Only 52 of these were found to suffer from this condition. Trichophyton rubrum was the commonest (47.6%) isolate and it produced predominantly non-inflammatory scaly lesions. Trichophyton mentagrophytes was the next commonest (21.4%) agent; it was responsible for most of the macerated lesions.

INTRODUCTION

Dermatophytosis is the superficial fungal infection of keratinized tissues caused by dermatophytes. They are a group of taxonomically related fungi that utilize keratin as a source of nutrients. Tinea pedis is a common superficial dermatophyte infection of the feet. It may present in several clinical varieties such as intertriginous, hyperkeratotic, vesiculobullous, ulcerative or a combination of these. It is often referred to as "Athlete's Foot". Tinea pedis may be accompanied by dermatophyte infection of other parts of the body including groin, hands or nails. It is estimated to affect about 15% of the population at large, being more common in closed communities such as army barracks and boarding schools, in warm weather, among those frequently using swimming pools, and when the feet are occluded with nonporous tight fitting shoes. In the west, tinea pedis is estimated to be present in about 40% of all patients who attend clinics for any medical concern. Those patients with more severe symptoms seek medical help and often have concomitant fungal infection of the toenails. There are many undiagnosed cases, many of which may be asymptomatic and unsuspecting of having tinea pedis and be a possible source of infection for others. Chronic infection is common in patients with concomitant diabetes, atopy, and immunosuppression. In an increasingly ageing population and with the increasing numbers of immune compromised patients, tinea pedis is emerging as an important and a significantly prevalent infection.

MATERIAL AND METHODS

Seventy five randomly selected patients with tinea pedis, during the period August 2007 to September 2009, were enrolled to the study. A clinical diagnosis of tinea pedis was made by the presence of scales, fissuring and morphology of the lesions and all cases of tinea pedis were first confirmed by KOH examination. Age, sex and duration of the disease were recorded. A detailed history was obtained in all the patients with regard to socioeconomic status, occupation, about the habit of shoe wearing, any similar episodes in the past with exacerbation during summer months or associated with hyperhidrosis. Any contact with pet animals and living in institutions with habit of sharing of shoes or socks, similar illness among the residents or the family members were especially enquired into. History of any systemic illness and treatment were also recorded. The dermatological examinations included the clinical type of infection with areas of involvement. Particular importance was given to the presence of any anatomical deformities of the foot, spacing between the toes and the nature of sweating. Any other associated dermatological condition of the foot were also noted. Screening for dermatophyte infection over other areas of skin and nails especially the palms for idiopathic eruptions were

done. Systemic examination and screening for other dermatological disorders were done in all the patients. In all the 75 patients, mycological examination of the skin scrapings from the affected site or blister top specimens from the vesiculobullous lesions were carried out in wet mount in 10% potassium hydroxide (KOH). Isolation of the agent was done through inoculating the specimen (scales or crusts) in Modified Sabouraud's Dextrose Agar medium with cycloheximide. The isolates were studied with regard to macroscopic, microscopic colony morphology and pigment production. Differentiation of the species was done by culturing on corn meal agar and looking for the persistence of pigmentation.

RESULTS

Cassius Felix in 400 AD first coined the term "tinea" to mean "Ring worm" in Latin. In an extensive historical review, Sabouraud, the father of modern mycology cited Horace as stating that in Roman Times, the word tinea indicated the insects whose larvae feed on clothes and books. Later the word 'tinea' came to mean any of the verminous or parasitic infestation of the skin. The term 'ring worm' came to use at about the same time and referred to any skin disease in which the lesions were arranged as rings. The dermatophytes have the ability to form molecular attachment to keratin and use it as a source of nutrients which allows them to colonize keratinized tissues, including the stratum corneum of the epidermis, hair, nail and the horny tissues of animals. In 1910 Raymond Sabouraud published his "Les Tiegnes" classifying dermatophytes into 4 genera based on microscopic and clinical characters: Achiorion, Epidermophyton, Microsporium and Trichophyton.

DISCUSSION

Out of the 75 cases taken in our study 52 were males and 23 were females. This gave a male:female ratio of 2.26:1. This is in accordance with the previous study by Bindu et al and other studies on tinea pedis by Singh K A et al which all showed male predominance. Lack of shoe wearing and indoor dwelling among females explains to some extent the male predominance in incidence observed in all these studies. All the studies conducted previously by Banerjee et al Maheshwari. A et al. and Singh K.A. et al showed that maximum number of patients belonged to the age group 21 – 30 years. In our study also the maximum patients were seen in the 21-30 year age group (32 patients, 42.6%), in agreement with the previous studies. But the study by Bindu et al, have reported higher incidence of tinea pedis in the second decade. This higher incidence may be attributed to more participation in active field work, high incidence of hyperhidrosis and shoe wearing encountered in this age group. The youngest patient is a 2 years old male child and the

oldest a 60 year old man. Average age group in the study was 28.78years . Majority of patients belonged to the middle and lower income groups. Shoe wearing habit has been noted in 23 patients (30.6%) . Among the 23 patients who have the habit of shoe wearing in our study the maximum were students followed by policemen, businessmen and car drivers whose occupation compels them into the habit of shoe wearing. Tight fitting occlusive footwear, and usage of non absorbable socks were the most important predisposing factors which caused fungal infection in these patients. In the West it has been called penalty of civilization as tinea pedis has been the predominant type of dermatophyte infection among the most active younger age group people.

CONCLUSION

Prevalence of tinea pedis infection was more common among males with male:female ratio of 2.26:1. The 21- 30 years age group was commonly affected by tinea pedis. The mean age was 28.8 years. Shoe wearing habit has been encountered among 30.6% of patients. Most of them were school or college students and policemen who have to wear shoes compulsorily. More incidence of bilateral involvement and recurrent episodes were noted among the shoe wearing population than in the non shoe wearing population. Bilateral involvement was seen in 9.3% and hyperhidrosis was associated among 14.6% patients. Any patients diagnosed with tinea pedis should be screened for diabetes as implied by the outcome of the study. Among the 12 patients who were associated with diabetes 5 were newly diagnosed patients after our investigation. The blood group distribution in our study showed 37.3% of patients belonging to blood group O +ve. The distribution of blood groups reflected the general distribution pattern of the population. Intertriginous type of tinea pedis was the most common type observed in this study in 36 patients. 3rd web space was the most commonly affected with involvement seen in 15 patients. 4 patients had extensive dermatophytosis and ide eruption was observed in 2 patients. Among other dermatophyte infections observed in the patients with tinea pedis, tinea unguium was the most commonly associated problem in our study with 11 patients (14.6%). Infected toe nails may be the site of primary infection and fungal disease can spread to other body areas from these primary sites. Other foot abnormalities observed were crowding of toes, traumatic fissures, keratolysis punctata, corn foot and plantar wart. Culture positivity was recorded in 81.3% (61 cases) of cases studied. *Trichophyton rubrum* happened to be the chief isolate. Among the 61 culture positive specimens *Trichophyton rubrum* was isolated in 47 cases. *Trichophyton mentagrophytes* was isolated from the rest of the tinea pedis patients. *Trichophyton rubrum* was isolated more commonly from the dry squamous or hyperkeratotic lesions of tinea pedis and *Trichophyton mentagrophytes* was isolated from wet vesicular lesions.

REFERENCES

1. Mochizuki et al, Taxonomy of *Trichophyton interdigitale* by restriction enzyme analysis of mitochondrial DNA, *J Med Vet Mycol*, 1990;28:191-6.
2. Rothman S, Knox C, Windhorst D. Tinea pedis a source of infection in the family. *Arch Dermatol* 1957;75:270-1.
3. Elewski BE, Malden MA. Cutaneous Fungal Infections. 2 nd ed. London: Blackwell Science; 1998:13-72, 321-46.
4. Jones HE, Reinhardt Jh , Rinaldi MG, A clinical mycology and immunological survey of dermatophytes, *Arch Dermatol* 1973;108:61-8.
5. Gentles CC, Evans EGV, Foot infection in swimming baths. *BMJ* 1973;3:260-2.
6. English MP, Tinea pedis as a public health problem. *Br J Dermatol* 1969;81:705-7.
7. English MP, *Trichophyton rubrum* infection in families. *BMJ* 1959;1:744-6.
8. Strauss JS, Kligman AM. An experimental study of tinea pedis and onychomycosis of the foot. *Arch Dermatol* 1957;76:70-9.
9. Gentles JC, Athlete's foot fungus on the floor of communal bathing places, *Br Med J*, 1957;1:746-8.
10. Rippon JW. Epidemiology and emerging patterns of dermatophyte species In: Current topics in Medical Mycology, Vol 1. New York: Springer, 1985:208-34.