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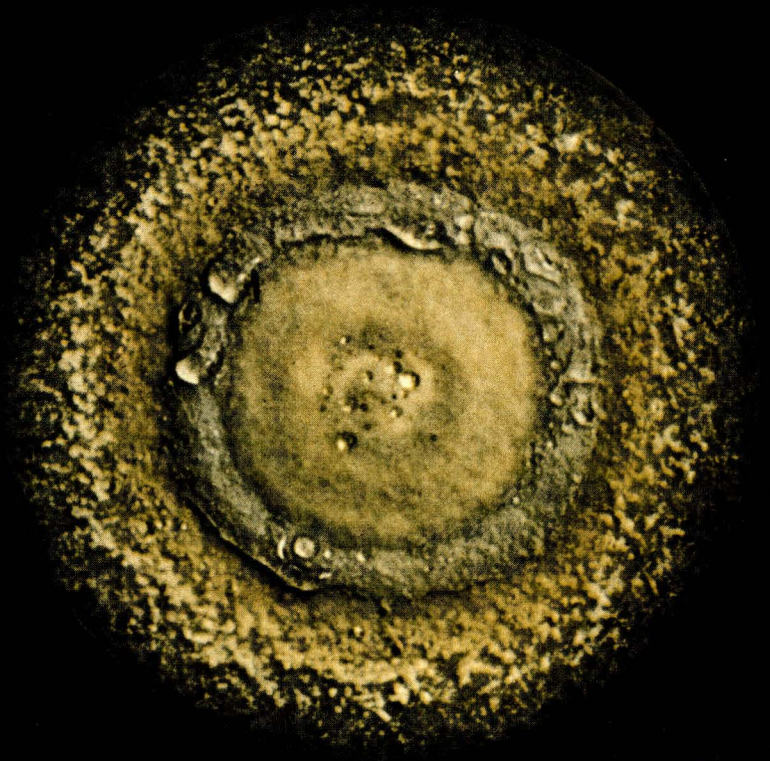

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Tinea pedis — A Clinical and Mycological Study

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Fungous infections constitute an important group of diseases. Tinea pedis has been worked upon in a big way the world over, yet so little seems to have been done in this country that a study on clinical and mycological aspects of the condition in the tropical climate of Northern India seemed warranted.

Material and methods

The study comprised of 75 clinically suspected cases of tinea pedis picked up at random from the Department of Dermatology and Venereology, All India Institute of Medical Sciences, New Delhi.

After taking clinical history and making physical examination, lesions were classified into following four categories (modified after Gentles, 1956)[1];

Group I: Interdigital maceration and/or peeling only.
Group II: Interdigital maceration, scaling and erythema.
Group III: Vesiculo-bullous lesions.
Group IV: Hyperkeratotic, squamous or fissured lesions

Each lesion was scraped and scrapings examined by direct microscopy in 10 % Potassium Hydroxide. This was repeated at least twice before being declared negative.

Scrapings were inoculated into Sabouraud's dextrose agar slants (Plain; with chloramphenicol 0.05 mgm/ml; and with chloramphenicol 0.05 mgm/ml + cycloheximide (Actidion) 0.5 mgm/ml.

The species were identified by their gross and microscopic morphological characters (Conant et al., 1954)[2]. If more than one species was suspected reinoculation was made for proper isolation and identification.

Lesions that failed to show any dermatophyte or Candida albicans on microscopic and/or culture examination were not regarded as cases of tinea pedis. Six patients who failed to show any fungus on two successive weekly examinations had their interdigital spaces sampled with sterile swab moistened with nutrient broth for inoculation of sheep blood agar plates incubated overnight at 37° C. The identification of bacterial organisms was made on gross morphology and stained smears.

Observations and results

For the purpose of this study only 55 cases in which the fungus could be demonstrated were labelled as cases of tinea pedis. The rest 20 shall, henceforth, be referred to as cases of amycotic interdigital intertrigo. The age of these 55 patients varied widely between 5 and 85 years, 33 of them falling in the age group between 21—40 years; 43 of these patients were males and 12 females. Patients belonged to all walks of life, though a vast majority (81.8 %) of them belonged to upper and middle classes. 74.5 % of patients were using shoes throughout or for a major part of the year. The other significant results have been briefly depicted in the following tables.

Table 1: Clinical grouping of Mycotic (Tinea pedis) and Amycotic Interdigital Intertrigo

Clinical Group		Clinical Tinea pedis	Mycotic Intertrigo (True Tinea pedis)	Amycotic Intertrigo
Group I	(Interdigital maceration)	24	17	7
Group II	(Maceration scaling & erythema)	39	28	11
Group III	(Vesiculo-bullous)	8	6	2
Group IV	(Hyperkeratotic, squamous)	4	4	0
		75	55	20

Table 2: Site of lesion in Tinea pedis

1.	Interdigital spaces alone	34
2.	Soles + Interdigital spaces.	10
3.	Soles alone	7
4.	Interdigital spaces + nails	3
5.	Soles + nails	1
6.	Interdigital spaces, nails and soles	0
	Total	55

Table 3: Mycological study

I	Total mycotic Intertrigo	55	
II	Cases positive by both culture and KOH	36	(65.5 %)
III	Cases positive by KOH examination alone	13	(23.6 %)
IV	Cases positive by culture alone.	6	(10.9 %)
V	Total cases revealed by KOH	49	(89.0 %)
VI	Total cases revealed by culture	42	(76.3 %)

Forty five pathogenic isolates were obtained from the 42 culture positive cases; three cases having shown double infection. The species distribution was as under:

Trichophyton rubrum	19	(42.2 %)
Candida albicans	13	(28.9 %)
Trichophyton mentagrophytes	6	(13.3 %)
Epidermophyton floccosum	6	(13.3 %)
Microsporum gypseum	1	(2.2 %)

Repeated scrapings from 20 amycotic cases failed to reveal any fungus. Six of these examined for bacteria revealed only saprophytic bacteria (Staph. albus; diphtheroids and Sarcina).

Discussion

Pellizari[3] in 1888, for the first time demonstrated the presence of fungus in the macerated intertriginous lesions. Since then, some physicians have been hasty to conclude that intertriginous lesions were always caused by fungi inspite of common knowledge that fungi could not be demonstrated in all cases. The results of the present studies showed that patients with interdigital intertriginous lesions could be divided into two distinct groups.

1. A larger group of 55 (73.3 %) patients in whom the fungus could be demonstrated by direct examination or culture or both i. e. cases of "true" tinea pedis.

2. A small though sizeable, group of 20 (26.6 %) patients with intertriginous lesions identical to those seen in group 1, but where the fungus could not be demonstrated either by direct microscopy or by culture. This has been referred to as "amycotic interdigital intertrigo".

The mycological positivity in clinically suspected cases has varied from 1.7 % (LINN & MAGAREY, 1941)[4] to 90 % (HOPKINS et al. 1947)[5], the present series showing it in 73.3 % of patients. The great variation between clinical suspicion and mycological positivity might possibly reflect a difference in the diagnostic criteria of the disease.

One fact, however, is obvious. There does exist a certain, though variable, proportion of cases which inspite of close clinical simulation of tinea pedis are not mycologically proved. Cause of mycological negativity may lie in either or both of the following:

i) Inability to demonstrate the fungus despite its presence.
ii) The existence of truly amycotic intertrigo indistinguisheable clinically from tinea pedis.

Some workers believe that the failure to demonstrate the fungus is due to faulty mycological techniques and despite negative laboratory reports fungi are, in fact, present (ENGLISH 1962)[6]. While no claim is made that the fungus is never overlooked; the proportion missed with repeated microscopic and culture examinations, except in the highly inflammatory lesions would be very small indeed. It would thus seem logical to deduce that most (only 2 patients belonged to group III (vesiculo-bullous lesions) if not all these cases were amycotic in nature. The importance of realizing this fact is obvious. Were clinicians to diagnose and treat all cases of so-called tinea pedis on clinical suspicion alone, almost one fourth of patients would be unnecessarily treated with local and/or systemic antifungal remedies.

Regarding aetiology of these intertrigoes, the clinical impression gathered was that it is the combined effect of excessive sweating (due to tropical climate) and the normally shed scales giving a clinical picture simulating tinea pedis.

Another point made out in this study was the apparent superiority of simple KOH examination, which detected 89 % of all cases compared to culture examination where detection was possible in 76.3 %. It is considered desirable that where possible, both techniques should be employed because by either technique employed singly a certain percentage of cases are bound to be missed. No case should, however, be diagnosed as one of tinea pedis unless the fungus is demonstrated by KOH examination and/or culture.

The mycological findings of this series seem to be at variance with reports by Western workers. In the present series, T. rubrum was the commonest species (42.2 %) followed by C. albicans (28.9 %); T. mentagrophytes (13.3 %), E. floccosum (13.3 %) and M. gypseum (2.2 %). Workers in the West have, however, reported a definite, though variable, preponderance of T. mentagrophytes (interdigitale) in the causation of tinea pedis (ENGLISH and GIBSON[7], 1959; ENGLISH et al.[8], 1961; MUNRO-ASHMAN and CLAYTON[9], 1962). The reason for the highest number of isolates of T. rubrum in the present series may possibly be due either to geographical preponderance of this dermatophyte or because of a greater susceptibility to T. rubrum of Indian population. It has been well established that while some species of dermatophytes are cosmopolitan others have a remarkably limited distribution (AJELLO, 1960)[10]. In India, it has been shown on abundant evidence that T. rubrum is the commonest skin disease fungus (LAHIRI, 1957[11]; BANERJEE, RAO and CHAKRABORTY[12], 1958; DESAI and BHATT[13], 1961). Reports by LAHIRI[11] (1957) and KURUP and ANATHANARYAN[14] (1961) reaffirmed that in India T. rubrum was the commonest species for tinea pedis, too. It might also be mentioned, that of late, a world-wide increase in T. rubrum infections has been observed (SULZBERGER and BAER[15], 1955, MANDEL[46], 1961).

M. gypseum, a dermatophyte commonly found in Delhi soil (Mohapatra and Gugnani[17], 1964) was isolated from a solitary cas with non-inflammatory hyperkeratotic lesions on feet. This is a rather unusual and infrequent pathogen and efforts were, therefore, made to rule out the possibility of its being a contaminant from soil. Attempts to isolate the fungus from the soil of the house lawn and floor scrapings from the bathroom were however, unsuccessful. Occasional reports in the literature about pathogenicity of M. gypseum are available (Desai and Bhatt, 1961[13]; Ajello, 1953[18]).

Summary

A total of 75 patients with clinical diagnosis of Tinea pedis were investigated for their clinical and mycological features. Twenty patients, who failed to reveal evidence of fungus on microscopic and culture examinations were regarded as examples of Amycotic intertrigo, the rest 55 having been labelled as true Tinea pedis. T. rubrum was the commonest dermatophyte isolated. Value of simple KOH examination is stressed.

Zusammenfassung

Insgesamt 75 Patienten mit der klinischen Diagnose „Tinea pedis" wurden klinisch und mykologisch untersucht. 20 Patienten, bei denen weder mikroskopisch noch kulturell Pilze nachgewiesen werden konnten, wurden als Musterbeispiel „amykotischer Intertrigo" aufgefaßt, die übrigen 55 dagegen als echte Tinea pedis. T. rubrum war der am häufigsten isolierte Dermatophyt. Der Wert der einfachen Untersuchung in Kalilauge wird hervorgehoben.

Resumen

Se investigaron las características clínicas y micológicas de un total de 75 pacientes con diagnóstico clínico de „tinea pedis". 20 pacientes, en los que el examen micológico directo y el cultivo arrojaron resultados negativos, fueron considerados como casos de intertrigo amicótico. El resto, 55 casos, pudieron ser rotulados como verdaderas „tineas pedis". Trichophyton rubrum fue el dermatofito mas frecuentemente aislado. Se hace resaltar la importancia del simple examen directo con hidróxido de potasio.

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