Clinico-mycological Profile of Superficial Mycosis in a Hospital in North-East India

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Abstract

A clinico-mycological study of superficial mycoses was conducted on 121 cases (98 males and 23 females). Direct microscopy by KOH mount and culture was undertaken to isolate the fungal pathogen in each case. The commonest age group involved was 21-30 years (39.6%). Dermatophytosis was the commonest clinical presentation (70.5%), followed by candidiasis (20.5%) and *Pityriasis versicolor* (9.0%). The commonest dermatophytosis was *Tinea pedis* (29.2%), followed by *T. cruris* (26.2%). The commonest dermatophyte isolated was *Trichophyton tonsurans* (20.5%), followed by *T. rubrum* (8.7%). Cultures grew a high proportion of non dermatophyte moulds (34%), of which *Cladosporium spp* (37.1%) was the commonest mould isolated. Total KOH positivity rate was 53.3% and total culture positivity rate was 79.1%. Our study revealed a variant local dermatophyte flora, a clinical pattern typical to our work environment in the Defence Services and a high isolation of yeasts and NDM.

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Introduction

Superficial mycosis refers to the diseases of the skin and its appendages caused by fungi. This group includes Dermatophytosis, *Pityriasis versicolor* and Candidiasis. They possess the affinity for parasitising keratin rich tissues and produce dermal inflammatory response and intense itching in addition to a cosmetically poor appearance. Various studies have been conducted in different parts of the country on superficial mycosis [1,2]. Our patients come from North East India where the monsoons are heavy and relative temperature and humidity is high for most part of the year. This climate retards sweat evaporation due to high environmental moisture content, thus facilitating fungal growth resulting in a high incidence of fungal diseases in this area. We undertook this study to identify the clinical pattern of this disease in our centre and to identify the most common fungal pathogen responsible for the superficial mycosis.

Material and Methods

This study was conducted at our hospital from November 1999 to April 2001. Successive out patient serving personnel and their families diagnosed clinically as superficial mycoses were included in the study. None of them had any significant medical history. The collection and preservation of specimens and entire mycological evaluation was carried out in the laboratory of our hospital.

The material for the study were skin scrapings, hair pluckings and nail clippings. All specimens were obtained from the active edge of the lesion after thorough cleaning with 70% alcohol. These were preserved in small black paper envelopes for easy visualization and absorption of moisture to reduce / eliminate bacterial load. All scrapings were

subjected to direct microscopy for fungal elements in 10% KOH with Parker Quink ink. Nail clippings were immersed in 10% KOH overnight and examined next morning. One week after the specimens were adequately dried of the moisture in the envelopes, they were inoculated in plain Sabouraud's Dextrose Agar (SDA) and SDA with chloramphenicol slants and incubated at room temperature. All cultures were examined bi-weekly for growth and incubated for four weeks before declaring them negative. The growths were noted for colony characteristics in the form of texture, surface, colour, colour on the reverse and any diffusible pigment. Tease mount, cellphone tape mount and slide cultures were undertaken for microscopic morphology [3,4]. Germ tube tests were performed on all growths identified as yeasts. As *Pityrosporum* is a normal skin commensal, scrapings from clinically diagnosed cases of *P. versicolor* were subjected to KOH mount only and not cultured. However, due to non-availability of differentiation test media for yeasts and dermatophytes, no further biochemical tests were performed and the cultures were reported on the basis of the macroscopic and microscopic examination and germ tube tests only.

Results

A total of 121 patients were enrolled in the study, comprising 98 males (81%) and 23 females (19%). None of them had any systemic diseases. The commonest age group involved was 21-30 years in 48 (39.6%), followed by 31-40 years in 36 (29.7%) and 41-50 years in 18 (14.8%) cases (Table 1).

A total of 146 samples were collected and 21 cases (17.3%) had multiple site involvement. Dermatophytosis was the commonest superficial fungal infection in 103 cases (70.5%), followed by candidiasis in 30 (20.5%) and *P. versicolor* in 13 (9.0%) cases (Table 2). The commonest dermatophytosis was *T. pedis* in 30 (29.2%), followed by *T. cruris* in 27 (26.2%), *T. corporis* in 16 (15.5%), *T. manuum* 14

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Table 1

Age and sex distribution

Age (years)	Male	Female	Total
< 20	6	4	10 (8.2%)
21-30	38	10	48 (39.6%)
31-40	30	6	36 (29.7%)
41-50	17	00	17 (14.0%)
51-60	6	2	8 (6.6%)
> 60	1	1	2 (1.6%)
Total	98 (81%)	23 (19%)	121 (100%)

Table 2

Mycological isolates

Types	No. (%)
Dermatophytosis	103 (70.5)
Candidosis	30 (20.5)
P versicolor	13 (09.0)
Total	146 (100)

(13.6%) *T unguium* in 9 (8.7%), *T capitis* in 4 (3.9%) and *T faciei* in 3 (2.9%) cases. The commonest dermatophyte cultured was *T tonsurans* in 21 (20.5%), *T rubrum* in 9 (8.7%), *M ferrugineum* in 6 (5.8%), *T mentagrophytes* in 3 (2.9%) and *M vambreuseghemi* in 2 (1.9%) cases (Table 3). Non dermatophyte moulds (NDM) were isolated in 35 (34%) cases. The commonest NDM isolated was *Cladosporium spp* in 13 (37.1%) followed by *Penicillium* in 7 (20%), *Fusarium* in 4 (11.4%), *Curvularia* and *Acremonium* each in 3 (8.5%), *Gliocladium* and *Aspergillus spp* each in 2 (5.7%) and *Scopulariopsis* in 1 (2.8%) case (Table 4). Candidosis of the feet was seen in 10 (33.3%), of groin in 10 (33.3%), of nails in 6 (20.0%), of trunk in 3 (10.0%) and of scalp in 1 (3.4%) case (Table 5). All 13 cases of *P versicolor* were KOH positive.

Out of the 133 samples sent for culture, 106 (79.1%) were culture positive, including 30 (22.5%) for yeasts, and 27 (20.9%) were culture negative. A total of 71 samples (53.3%) were KOH positive. 3 KOH positive samples were culture negative (02.2%) and 38 KOH negative samples were culture positive (28.5%) (Table 6).

Discussion

Superficial mycosis forms a large fraction of ailments

in patients attending the skin OPD of our centre. A high prevalence among males in our study (81%) was owing to a comparatively large male presence in this predominantly non-family station. More than two thirds of the patients were between 21 and 40 years of age and conform to the predominant age group which is physically active outdoors.

T tonsurans (20.5%) was the commonest dermatophyte isolated, which differs from other studies, that reported *T rubrum* as the commonest fungal pathogen (88.15%) and a lower incidence of *T tonsurans* (1.3%) [1,2]. This variance is possibly due to the different geographical regions in these studies (Orissa in one and Upper Assam in other) with different prevailing dermatophyte flora.

Other studies have reported *T corporis* as the commonest clinical presentation (25%-27%) and a lower incidence of *T pedis* (5.4%-8.3%) and *T cruris* (9%-17%) respectively [1,2]. This is at variance with our study where *T pedis* was the commonest (29.2%) followed by *T cruris* (26.2%). The majority of our study group (80%) were soldiers by occupation, who wear uniform and closed footwear for prolonged periods in all weather. This promotes sweating and sweat retention - a milieu conducive to fungal growth. This also explains the preponderance of interdigital subtype of *T pedis* over the other subtypes (73% vs 27%) in our study. Multiple site involvement has been reported in 25-30% cases in other studies and was seen in 21 cases (17.3%) in our study.

A striking finding in our study was the isolation in pure cultures of non dermatophyte moulds (NDM) in 34% cases. Though commonly considered as contaminants, they have been reported to colonize damaged tissues and cause secondary tissue destruction. Their role in causing cutaneous infections is not proven and a primary pathogenic role of NDM is controversial, at best [5]. But these species are increasingly implicated in causing primary invasion of the nail in onychomycosis [6,7]. Only 3 of the 35 NDM (8.6%) in our study were isolated from infected nails. Of the

Table 3

Clinico-mycological co-relation of dermatophytosis

	T pedis	T faciei	T corporis	T cruris	T capitis	T unguim	T mannum	Total
T rubrum	5	0	1	2	0	0	1	9 (8.7%)
M ferrugineum	2	1	1	1	0	0	1	6 (5.8%)
T ment'phyte	0	0	1	2	0	0	0	3 (2.9%)
M vam'ghemi	0	0	1	1	0	0	0	2 (1.9%)
T tonsurans	5	1	3	4	3	2	3	21 (20.3%)
NDM	11	1	5	9	0	3	6	35 (34%)
No growth	7	0	4	8	1	4	3	27 (26.2%)
Total	30 (24.7%)	3 (2.9%)	16 (15.5%)	27 (26.2%)	4 (3.8%)	9 (8.7%)	14 (13.5%)	103 (100%)

Table 4

Non dermatophyte moulds (NDM)

NDM species	No.	(%)
<i>Cladosporium</i>	13	(37.1)
<i>Penicillium</i>	7	(20.0)
<i>Fusarium</i>	4	(11.4)
<i>Curvularia</i>	3	(8.5)
<i>Acremonium</i>	3	(8.5)
<i>Gliocladium</i>	2	(5.7)
<i>Aspergillus</i>	2	(5.7)
<i>Scopulariopsis</i>	1	(2.8)
Total	35	

Table 5

Cutaneous candidiasis

Sites involved	No.	(%)
Feet	10	(33.3)
Groins	10	(33.3)
Nails	6	(20.0)
Trunk	3	(10.0)
Scalp	1	(03.4)
Total	30	

Table 6

Culture and KOH characteristics of clinical types

Clinical types	Culture+		Culture -	
	KOH+	KOH-	KOH+	KOH-
<i>T capitis</i>	3	1	0	1
<i>T cruris</i>	18	11	1	7
<i>T pedis</i>	23	10	1	6
<i>T corporis</i>	12	3	0	4
<i>T unguium</i>	3	8	1	3
<i>T faciei</i>	2	1	0	0
<i>T mannum</i>	7	4	0	3
Total	68	38	3	24

35 NDM grown in our study, 15 were KOH positive. It is suggested that this subgroup may have a direct causative role as it fulfills the criteria of a pathogen (proposed initially for nails) viz isolation in pure culture, KOH positive and absence of dermatophytes in the same culture [8]. But their primary pathogenic role in cutaneous fungal infections cannot be proven with certainty yet.

Cutaneous candidiasis occurs commonly in the skin folds and regions that remain moist [9]. Two thirds of our cases were isolated from the intertriginous areas of the feet and the groin and 10% from the belt region of the trunk. In soldiers, these regions remain occluded for long and become moist by sweating and sweat retention, hence predisposing to candidiasis.

In various studies, KOH positivity rate varied from 35.6% to 88.6% and culture positivity rate varied from

36% to 53.6%. In these studies, the proportion of KOH negative isolates turning positive on culture varied widely from 5.6% to 56.7% [10]. Though the KOH positivity rate (53.3%) and KOH negative-culture positive fraction (28.5%) in our study was well within the reported range, a comparatively high culture positive rate (79.1%) and low KOH positive-culture negative fraction (02.2%) was achieved. This can be attributed to the 'drying procedure' advocated by Milne and followed by us [3]. The 38 KOH negative culture positive samples in our study consisted of 20 isolates of NDM, 14 of candida and 4 of dermatophytes. Though *Candida* and dermatophytes are known pathogens, a primary pathogenic role of NDM in cutaneous mycoses is not proven yet. A high KOH negative-culture positive fraction and low KOH positive culture negative fraction also underscores the unreliability of KOH mount in clinical dilemmas and stresses the adoption of culture positivity as gold standard in such cases.

To conclude, our study has revealed a variant local dermatophyte flora, a clinical pattern typical to the work environment in the Defence Services and a high isolation of yeasts and NDM. It also re-inforces the 'drying out procedure' to achieve culture positive results, as direct microscopy by KOH mount may be false negative in many cases.

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