

PATTERN OF DERMATOPHYTES AFFECTING THE NAILS

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Summary

Thirty cases of tinea unguium with positive culture for dermatophytes have been studied. Involvement of all the nails on hands, feet or both was not uncommon. Twenty-three cases had distal subungual onychomycosis, and seven white superficial onychomycosis. Trichophyton mentagrophyton was the most frequently isolated fungus being present in 50% of isolates followed by trichophyton rubrum in 36.37%. Other fungi isolated were epidermophyton floccosum and trichophyton tonsurans.

Onychomycosis is an infection of nails caused commonly by dermatophytes and at times by non-dermatophytic fungi and yeasts like candida albicans^{1,2,3}. This infection of nail comprises less than 10% of cases among dermatophytosis. In majority, onychomycosis caused by dermatophytes present clinically as distal subungual onychomycosis or white superficial onychomycosis, and rarely as proximal subungual onychomycosis. Though certain types of involvement of nails is characteristic of certain species, usually clinical appearance caused by one species of fungus is indistinguishable from that caused by another². Though trichophyton rubrum has been reported as the most common agent causing onychomycosis^{3,4,5}, it has been confuted at times^{6,7} and the difference is thought to be due to the site from where the material has been obtained.

Distal subungual onychomycosis is caused mainly by trichophyton rubrum, trichophyton mentagrophytes and epidermophyton floccosum, whereas white superficial onychomycosis is mainly caused by trichophyton mentagrophytes and rarely by trichophyton rubrum and trichophyton schoenleinii^{2,8,9}. The deeper infection i.e. proximal subungual onychomycosis is confined to European countries, and the fungi trichophyton rubrum, trichophyton schoenleinii, trichophyton megninii and trichophyton tonsurans are the main causative agents^{10,11,12}.

The present paper is a study on pattern of nail involvement by dermatophytes causing onychomycosis in this part of the country.

Material and methods

Thirty cases suffering from tinea unguium attending Skin & S. T. D. Department of Shri Guru Tegh Bahadur Hospital, Amritsar during the year 1976 have been studied. The cases were culture positive for dermatophytes. Each case was examined in detail for duration of illness, occupation, area

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to which person belonged, number and types of nail involvement, associated tinea, or skin disorders. Scrapings from involved nails were examined in 10%. KOH under microscope and only those which were positive were submitted to culture. Primary nail culture has been carried out on Sabouraud's dextrose agar supplemented with chloramphenicol and further identifications have been carried out by subcultures on corn meal agar medium, Sabouraud's glucose agar thiamine medium and blood agar base (DIFCO) medium. Fungi were identified on the basis of rate and general topography of growth, character of colony, pigmentation produced and examination of culture material under microscope.

Observations - General

The cases included four females and twenty-six males. Their ages ranged between twelve years and seventy years, and duration of illness from one month to ten years. Sixteen of them were from urban areas and fourteen from rural areas. Among male patients twelve were involved in manual labour (farmers and labourers) and others were involved in sedentary occupations.

Type and number of nails involvement

In twenty-eight cases finger nails were involved and eleven of them, in addition, had involvement of toe nails. In two cases, only toe nails were involved. All the finger nails were involved in nine cases, all the toe nails in seven cases and all the twenty nails in six cases.

On the hand, ring finger nails were most commonly involved and on the feet, the big toe nails. Twenty three cases had distal subungual onychomycosis and seven had white superficial onychomycosis. In all the cases with white superficial onychomycosis both finger and toe nails were involved. Six of them were from rural areas and in three of them all the twenty nails were involved.

Associated tineas and other diseases

Dermatophytosis on other parts of the body was observed in sixteen cases. Tinea manuum alone was observed in four, tinea pedis alone in one and both in two cases. Generalised skin conditions such as psoriasis and pemphigus were present in one case each. In the former all the twenty nails were involved.

Culture

All cases were positive for dermatophytes on direct microscopy and culture. The dermatophyte isolated most frequently was trichophyton mentagrophytes followed by trichophyton rubrum. Others isolated were trichophyton tonsurans and epidermophyton floccosum (Table I).

TABLE 1
Showing the incidence of dermatophytes isolated

Dermatophytes	No. of cases	Percentage
Trichophyton mentagrophytes	15	50
Trichophyton rubrum	11	36.37
Epidermophyton floccosum	3	10.0
Trichophyton tonsurans	1	3.33
Total	30	100

TABLE 2
Showing the type of dermatophytes obtained from various sites of nail involvement

	Trichophyton rubrum	Trichophyton mentagrophytes	Trichophyton tonsurans	Epidermophyton floccosum	Total
Fingers	8	6	1	2	17
Toes	1	1	—	—	2
Fingers & toes	2	8	—	1	11

When finger nails alone were involved the most common isolate was trichophyton rubrum and when in addition toe nails were involved, the most common isolated was trichophyton mentagrophytes (Table II).

When finger nails alone were involved, and associated with tinea manuum trichophyton rubrum was the only dermatophyte isolated and when tinea-pedis was associated with nail involvement, trichophyton mentagrophytes was the only species isolated. In white superficial onychomycosis trichophyton mentagrophytes was cultured in six cases out of seven, whereas in distal subungual onychomycosis trichophyton rubrum was the most common organism isolated in ten cases (Table III).

eight cases and in six cases all the twenty nails were involved; only one of them having psoriasis. Involvement of all finger or all toe nails was not uncommon. Factors which have led to involvement of all nails, remained conjectural as their involvement was not related to duration of disease, age, sex or occupation of the individual. However, it was observed that those with involvement of all twenty nails, were manual workers and the disease had been present in them for more than one year.

Zaias² has stated that both distal subungual onychomycosis and white superficial onychomycosis are equally common, but that in white superficial onychomycosis toe nails rather than

TABLE 3
Showing isolated dermatophytes versus type of nail involvement

	Tricho- phyton rubrum	Tricho- phyton mentag- rophytes	Tricho- phyton tonsurans	Epidermo- phyton floccosum	Total
Distal sub-ungual onychomycosis	10	9	1	3	23
White superficial onychomycosis	1	6	—	—	7
Total	11	15	1	3	30

Among cases from urban areas, trichophyton rubrum and trichophyton mentagrophytes were cultured with equal frequency whereas in those from rural area, trichophyton mentagrophytes was isolated in eight out of fourteen cases. Trichophyton mentagrophytes was also isolated in three of the four female cases and in half of the cases involved in manual labour.

Discussion

Ringworm affection of the nail occurs more frequently in toes than in fingers¹³. Further, involvement of all the nails is uncommon and in case it happens, the primary cause may be dystrophies of nails^{14,15,16}. In the present series finger nails were involved in twenty

finger nails are nearly always involved. In the present series in three fourth of the cases nail involvement was of distal subungual onychomycosis type and in seven cases white superficial onychomycosis. Further, in the latter type both the finger and toe nails were involved together and in three of them all the twenty nails were involved. Six of these seven cases belonged to rural areas. Probably under prevailing daily working chores of rural areas, finger or toe nails become equally prone to white superficial onychomycosis.

Most workers in India have reported preponderance of trichophyton rubrum infections of nails^{17,18,19}, and less than

25% of cases with trichophyton mentagrophytes infection^{4,18,20}. Walshe and English⁶ from a survey in South-west England have shown an increased incidence of trichophyton mentagrophytes affecting nails.

In the present series of thirty cases trichophyton mentagrophytes was cultured in 50% of cases followed by trichophyton rubrum in 36.4% of cases. The types of dermatophytes cultured from the affected nails depend upon the sites from which the material is obtained. In earlier studies where finger nails only are involved trichophyton rubrum have been shown to predominate thus reflecting common affection of the hands with this fungus²¹. In the present series among seventeen cases with only finger nail involvement trichophyton rubrum was most frequently isolated.

As reported by Zaias², in white superficial onychomycosis trichophyton mentagrophytes was the most common dermatophyte isolated in 85.7% of cases. In distal subungual onychomycosis, trichophyton rubrum was the most commonly isolated.

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