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Onychomycosis in Patients with Psoriasis

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The frequency and type of fungal infections of the finger- and toenails was studied prospectively by direct microscopic and culture examinations in dermatological out-patients without psoriasis ($n = 41$), in patients with psoriasis but no nail involvement ($n = 39$), and in patients with both psoriasis and nail involvement ($n = 39$). In these three matched groups the frequencies of dermatophytic nail infections were 10%, 13%, and 13%, respectively, and the frequencies of yeast infections 10%, 10%, and 15%, respectively. These figures were not significantly different. It is concluded that dermatophytic invasion of involved psoriatic nails is not so rare as previously supposed. However, yeast infections are possibly more frequent in involved psoriatic nails as compared with uninvolved and normal nails. *Key words: Onychomycosis; Psoriatic nails.* (Received January 25, 1983.)

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The most frequent changes in involved psoriatic nails are: pitting, onycholysis, subungual hyperkeratosis, discoloration, and thickening (9). These clinical manifestations might alter the susceptibility to fungal infections. A few studies with conflicting results have dealt with this subject (4, 6, 10), but in neither of these investigations has the frequency of fungal infections in uninvolved nails of psoriatic patients been studied.

In the present prospective and controlled study we have therefore investigated both the frequency and type of fungal infections in the nails of subjects without signs of psoriasis, patients with psoriasis but no nail involvement, and patients with psoriasis and nail involvement.

MATERIAL AND METHOD

Three matched groups of dermatological out-patients without any history of fungal infections were investigated consecutively (Table I). Group 1 comprised control patients without any anamnestic or clinical signs of psoriasis (mostly patients with benign tumours on the skin). Group 2 consisted of patients with psoriasis but without involvement of the nails. Group 3 comprised patients with both psoriasis and nail involvement (onycholysis, discoloration, thickening, or subungual keratosis).

In the laboratory, material was collected separately from the nail plate and nail fold from fingers and toes. Direct microscopy was carried out as a 30% KOH preparation. Cultures were performed in Petri dishes on Sabouraud's chloramphenicol-cycloheximide agar (3). The fungal diagnosis, based on the results of the direct microscopic examinations and of the cultures, was established blind by the same trained investigator.

The statistical evaluations were performed by means of the χ^2 -test, and the differences between the groups were considered significant when $p < 0.05$.

RESULTS

In the group with psoriasis and nail involvement, 32 patients had involvement of both finger and toe nails, whereas 5 patients had only involvement of the toes and 2 patients involvement of the fingers.

The numbers of patients in each group with fungal infections (dermatophytes, yeast (primarily *Candida albicans*), and mould) of the fingers or the toes are listed in Table I. No patient had more than one type of fungal infection and in no case were both fingers and toes infected. In all groups the dermatophytes were found in toes and the yeast primarily in fingers. Furthermore, the dermatophytes were found primarily in the nail plates and the yeast in the nail folds. No significant differences were observed between the groups.

The frequency of fungal infections in normal nails (group 1) and uninvolved psoriatic nails (group 2) was quite similar. In group 3 (patients with involved psoriatic nails) a slightly greater number of patients were infected with fungi (12; 30%) as compared with group 2 (9; 23%) and group 1 (8; 20%). This increased frequency in group 3 was based on a slightly increased frequency of yeast infections. However, the differences were not significant.

DISCUSSION

It is a common belief that *Candida* species frequently invade involved psoriatic nails, whereas dermatophytes are rare (9). In direct microscopic examinations of subungual debris from 40 involved nails of 15 patients with psoriasis, yeast was isolated in 22 specimens, whereas no dermatophytes were observed (10). In this study, cultures were not performed, and no uninvolved or healthy nails were investigated. It was assumed that the low frequency of dermatophytes might be due to a rapid turnover and desquamation of the nail unit or that the large amounts of 'serum-like' glycoprotein material seen in these nails was inhibitory to dermatophytes but not to yeasts (10). In a study by Götz et al. (6) dermatophytes were isolated in 14% of involved psoriatic nails, and in 33% of the toenails of a non-psoriatic group. No microscopic evaluation was performed.

The results from these investigations are in contrast to a study by Feuerman et al. (4) in 120 patients with psoriasis of the nails. In this trial, dermatophytes were isolated from the finger- or the toenails of 29 patients (24%) and *Candida albicans* in 18 patients (15%). No patients with uninvolved nails or healthy subjects were included. Others have demonstrat-

Table I. Total number of patients and number of individuals with infection of the nail unit (nail plate or nail fold) by fungi in the three matched groups of patients investigated

Group	Total no. of patients	No. of patients with fungal infections ^a							
		Dermatophytes		Yeast		Mould		Total	
		Fingers	Toes	Fingers	Toes	Fingers	Toes	No.	%
1. Controls without psoriasis	41	0	4	3	1	0	0	8	20
2. Psoriatics without nail involvement	39	0	5	4	0	0	0	9	23
3. Psoriatics with nail involvement	39	0	5	6	0	0	1	12	30

^a None of the patients had more than one type of fungal infection and in no patient were both fingers and toes infected.

ed a connection between psoriasis and candidiasis, possibly due to a diminished natural resistance in the host (5).

In vitro investigations have shown that dermatophytes did not grow so readily on material from psoriatic nails as compared with non-psoriatic nails (6). However, others have reported the increased growth of several types of fungus in *in vitro* studies of psoriatic scales and nails (8). In a recent study to establish whether dermatophytes are able to attack psoriatic skin *in vivo*, *T. rubrum* and *T. mentagrophytes* were inoculated in to uninvolved and involved skin of 27 patients with psoriasis (1). Less positive responses were found in uninvolved skin *vis-à-vis* involved skin and it was suggested that the association of psoriasis and infections with dermatophytes may not be such an exceptional coincidence as previously thought.

Several features of psoriatic nails such as a faster nail growth (2), an increased blood flow (7), an altered chemical composition (10), or an altered morphological appearance might alter the susceptibility to fungal infections. However, in the present controlled investigation we have not been able to demonstrate any difference between the frequency of dermatophytic infections of involved psoriatic nails as compared with uninvolved psoriatic nails, or normal nails. The frequency of yeast infections was similar in normal and uninvolved psoriatic nails, but slightly higher in involved psoriatic nails *vis-à-vis* uninvolved and normal nails. However, this difference was not significant. In the present study we have therefore not been able to substantiate the theory that dermatophytes are rare in involved nails, but yeast infections are possibly more frequent in involved psoriatic nails as compared with uninvolved and healthy nails.

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