

Are Psoriatic Nails Predisposed to Fungal Infection?

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Background: Onychomycosis is a very common and widespread disorder, however the incidence of onychomycosis in psoriatic patients is not accurately assessed.

Objective: The present study was undertaken to evaluate the frequency of fungal infections of the nails changed in the course of psoriasis and to provide an answer whether psoriatic nails are specially predisposed to fungal infections.

Material and Methods: 83 psoriatic patients with nail changes participated in the study. Among them there were 25 females and 58 males, aged 18~76 years. 59 patients (71.1%) had psoriasis vulgaris, the remaining ones – 24 subjects (28.9%) suffered from arthropathic psoriasis. In any case of nail abnormalities clinically suspected of fungal infection the further mycological investigations were performed. Fungal infections were finally diagnosed on the base of direct microscopy and positive culture. The Chi² test and the Mann-Whitney U-test were used for statistical analysis.

Results: Positive mycological cultures were obtained from 15 patients (18%). The most commonly isolated fungi were moulds cultured in 6 patients (37%), followed by dermatophytes – 5 patients (31.5%) and yeast-like fungi – also 5 subjects (31.4%). Moulds and yeast-like fungi were found in both fingernails and toenails; all dermatophyte infections were diagnosed on the toenails. Psoriatic patients with fungal nail infections were older than those with negative mycological examination and the duration of psoriasis in this group of patients was also longer. Although the above differences between two studied groups were evident, they did not reach the statistical significance.

Conclusions: Based on the achieved results it is difficult to assess definitely whether psoriasis is a predisposing factor to the development of fungal infections of the nails.

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Key Words: Fungal infection, Psoriasis

INTRODUCTION

Onychomycosis is a very common and widespread disorder, especially among elderly patients. It is also more frequently found in males than in females^{1,2}. Fungal involvement of the nails is us-

ually preceded by the presence of predisposing factors, such as disturbances in peripheral circulation, traumatic and trophic changes, diabetes or polyneuropathy. In healthy nails there is a natural barrier preventing development of fungal infections, which may be disturbed in lesional nail plates in the course of many diseases²⁻⁵. The question is whether such nail plates are indeed more predisposed to fungal infections.

Psoriasis is one of the most frequent dermatoses affecting nails. Nail involvement is present in

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about 20~50% of patients with psoriasis vulgaris and in about 70% of patients suffering from arthropathic psoriasis⁶. There is also evidence of occurrence of isolated psoriasis of the nails without any skin lesions⁷. The most frequently observed psoriatic nail changes are subungual hyperkeratosis and pitting. Many psoriatic patients have nail changes, such as yellowish or white colour of the nails, onychorrhexis or thickening of the plates, which morphologically may resemble onychomycosis⁶. In these cases the further differential diagnostic procedures are essential to exclude the presence of coexisting fungal infection.

The incidence of onychomycosis in psoriatic nails is not accurately assessed and the literature data are very limited⁸⁻¹¹. Therefore, the present study was undertaken to evaluate the frequency of fungal infections of the nails changed in the course of psoriasis and to provide an answer whether psoriatic nails are specially predisposed to fungal infections.

MATERIAL AND METHODS

106 psoriatic individuals were dermatologically screened for the presence of nail abnormalities. Different nail changes were found in 83 patients (78.3%), and these subjects constituted a group for final analysis. Among them there were 25 females and 58 males, aged 18~76 years, mean 47.4 ± 13.8 years. 59 patients (71.1%) had psoriasis vulgaris, the remaining ones – 24 subjects (28.9%) suffered from arthropathic psoriasis. The disease lasted from 2 months to 50 years, mean 17.4 ± 11.1 years. All patients underwent dermatological examination with special attention paid to the nail changes.

In any case of abnormalities clinically suspected of fungal infection the further investigations were performed: direct microscopy in 20% KOH with addition of DMSO and mycological culture. The material from the lesional nails was cultured on the

Mycoline transport and culture medium (bio-Merieux, Marcy l'Etoile, France) and fungi were identified according to routine procedures described elsewhere^{2,12-14}. Fungal infections were finally diagnosed on the base of KOH direct smear and positive culture.

The Chi² test and the Mann-Whitney U-test were used for statistical analysis. *P* values less than 0.05 were considered statistically significant.

RESULTS

Positive mycological cultures were obtained from 15 patients (18%). The majority of patients with positive mycology – 10 subjects (66.7%) had toenails involved. In 4 patients (22.7%) fungi were cultured from the fingernails and in one patient fungi (different species) were isolated from both fingernails and toenails. The most commonly isolated fungi were moulds cultured in 6 patients (37%), followed by dermatophytes – 5 patients (31.5%) and yeast-like fungi – also 5 subjects (31.5%) (Table 1). Moulds and yeast-like fungi were found in both fingernails and toenails; all dermatophyte infections were diagnosed on the toenails. All dermatophyte infections were caused by *Trichophyton mentagrophytes var. granulosum*, among yeast-like fungi the majority of pathogens constituted *Candida albicans*, only in one patients *Rhodotorula rubra* was isolated (Table 1). In group of moulds *Penicillium sp.* appeared to be the most frequent fungus, the remaining ones were cultured only in single case.

The main data and characteristics of psoriatic patients with and without positive nail mycology are given in Table 2. Psoriatic patients with fungal nail infections were older than those with negative mycological examination. The duration of psoriasis in this group of patients was also longer than in psoriatic individuals with nail changes not infected by fungi. Although the above differences

Table 1. Pathogens isolated from psoriatic nails

	Fungi ¹⁾	Number of fingernails	Number of toenails	Total	Percentage
Moulds	<i>Penicilium sp</i>	2	2	4	37%
	<i>Mucor sp</i>	0	1	1	
	<i>Alternaria sp</i>	1	0	1	
Dermatophytes	<i>Trichophyton mentagrophytes</i>	0	5	5	31.5%
Yeast-like fungi	<i>Candida albicans</i>	2	2	4	31.5%
	<i>Rhodotorula rubra</i>	0	1	1	
Total		5	11	16	100%

¹⁾16 pathogens were isolated from 15 patients

Table 2. Characteristics of psoriatic patients with and without fungal nail infections

Parameter	Patients with positive mycology N=15	Patients with negative mycology N=68	Statistical significance
Age (years)	range: 26~76 mean 52.7±13.8	range: 18~75 mean 46.2±13.6	<i>p</i> >0.1
Gender	6 females, 9 males	19 females, 49 males	<i>p</i> >0.35
Type of psoriasis	vulgaris: 12 arthropathic: 3	vulgaris: 47 arthropathic: 21	<i>p</i> >0.26
Beginning of psoriasis (age of patient in years)	range: 10~64 mean: 32.5±14.7	range: 5~72 mean: 29.2±14.7	<i>p</i> >0.27
Duration of psoriasis (years)	range: 1~41 mean: 20.5±12.2	range: 0.1~50 mean: 16.9±10.8	<i>p</i> >0.38

between two studied groups were evident they did not reach statistical significance (Table 2).

DISCUSSION

Onychomycosis is the most common disease of the nails and constitutes about a half of all nail abnormalities⁴. Epidemiological data showed that about 2~8% of the population suffered from fungal infections of the nails, but probably some of these assessments could be underestimated^{3,5,16}. Fungal nail infections are especially common in selected professional and hobbistic groups, called as risk groups, for example miners or sportsmen^{2,4}. The incidence of onychomycosis in Poland is not accurately known, however it seems to be higher than

in Western Europe and the United States. Some authors estimated the frequency of fungal infections of the nails in Polish population on even more than 10~15%¹⁵. The most frequently isolated pathogens are dermatophytes^{3,12}. Moulds and yeast-like fungi are rarely responsible for nail invasion, however they may more commonly affect the previously changed nail plates^{3,4,17}.

Nail abnormalities in the course of psoriasis are quite frequent. In the present survey we found nail fungal infections in 18% of psoriatic individuals with lesional psoriatic nails. This is in agreement with previous limited reports^{8,9,11}. Others showed that the frequency of onychomycosis in all psoriatic patients was as high as 10~13% and in psoriatic subjects with nail involvement as high as

13~27%^{8,9}. The observed differences between the studies might be due to different population of patients included. Different age of subjects may influence the results, as it is well known that prevalence of onychomycosis increases with age^{3,4}. Moreover, type of psoriasis could also be important, as in arthropatic psoriasis nail involvement is usually more common⁶.

It seems that psoriatic nails are more likely to be affected by non-dermatophytes, whereas there is no significant difference in the frequency of nail invasion with dermatophytes in patients with and without psoriasis⁹⁻¹¹. Our findings confirm the above observations and suggest that most of positive mycologic cultures obtained from the psoriatic nails are probably due to the secondary colonization with non-dermatophyte fungi. Dermatophytes constituted only 31.5% of all isolated pathogens. All dermatophyte infections were caused by *Trichophyton mentagrophytes* var. *granulosum*. This finding is not surprising, considering that the frequency of infections caused by *T. mentagrophytes* systematically increases in south-west Poland. Recent studies have shown that *T. mentagrophytes* predominates among isolated fungal pathogens in our region¹⁸, on the contrary to the earlier years, when the majority of infections were caused by *T. rubrum*^{13,19}. Based on our results and available literature data it is difficult to assess definitely whether psoriasis is a predisposing factor to the development of fungal infections of the nails. Nevertheless, we do believe that fungal colonization of psoriatic nails is a quite frequent clinical problem and should be taken into consideration by dermatologists working with psoriatic patients.

It is important to remember that oral terbinafine may induce *de novo* development of psoriatic lesions or exacerbate preexisting psoriasis^{20,21}. Therefore, this highly effective antifungal agent²² should rather be avoided in psoriatic individuals. It seems that depending on the severity of the disease and

on type of isolated pathogens oral itraconazole or topical antifungal preparations should be prescribed as first line drugs in this group of patients.

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