

Prevalence of Fungal Nail Infection Among Psoriatic Patients in the Western Province of Saudi Arabia

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Abstract

Aim: The aim of this study was to evaluate the cause of nail affection among psoriatic patients complaining of nail changes whether psoriasis, fungal infection or both.

Method: A 12 month period study was carried out on thirty psoriatic patients complaining of nail changes. Nail scrapping and/or clipping were collected and then subjected to direct microscopy then mycology culture. Nail biopsies were also taken for hematoxylin and eosin then PAS staining.

Results: Onychomycosis was found to be responsible for nail changes in 66.6% of psoriatic patients whether alone (26.6% of cases) or with psoriatic affection (40% of cases). Yeasts were isolated from 63.3% of cases, the most frequent species being candida; *C. albicans* constituted 33.3% of cases, followed by *C. glabrata* in 13.3% of cases then *C. tropicalis* in 3.3% of cases. Psoriatic nail affection alone was found to be responsible for nail changes in 33.3% of cases.

Psoriasis is a common, inflammatory and hyperproliferative disease of the skin. The most

characteristic lesions consist of chronic, sharply demarcated, scaly erythematous plaques, particularly on the extensor prominences and in the scalp. The disease is enormously In duration, extent and morphology⁽¹⁾.

Nail changes are present in 25-50% of all psoriatic cases⁽²⁾. There is no sex predilection, but patients over 40 years are affected twice as often as those under 20 years (Camp, 1998). The most frequent nail changes seen are pitting, ridging, grooving and discoloration due to affection of nail matrix; subungual hyperkeratosis, onycholysis and splinter hemorrhage due to affection of nail bed or hyponychium⁽³⁾. These psoriatic changes can mimic fungal nail infection to the extent that sometimes it becomes difficult to differentiate between both. In addition, fungal infection especially candida species frequently contaminate the psoriatic nail and nail bed, but dermatophytes are rare⁽¹⁾. So nail affection in psoriatic patients couldn't be solely attributed to psoriatic process, fungal infection could be the causative insult in some cases.

The aim of this study was to evaluate the cause of nail affection in psoriatic patients complaining of nail changes whether it is due to psoriatic affection, fungal infection or both, and to determine the causative fungus that frequently affect psoriatic nail.

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Patients:

This study was carried out over a 12-month period starting in February 2002 in the Outpatient Dermatology Clinic of Dr. Soliman Fakeeh Hospital in Jeddah, Saudi Arabia. Thirty psoriatic patients (17 males and 13 females) complaining of finger nail and/or toenail changes had been enrolled into this study. Patients were included after excluding predisposing factors, occupation or any systemic disease as diabetes mellitus. Nail changes included the following: changes in the color (whitish, yellowish, and loss of lustre); changes in the surface (pitting, ridging, grooving); changes in the texture (onycholysis); changes in the shape (subungual hyperkeratosis).

All these patients had been subjected to complete physical and dermatologic examination to assess the type and severity of psoriasis. From all these patients nail scrapings and/or clippings were collected and nail biopsies were also taken.

Methods:

1- Collection of specimens:

The most affected nail part was cleaned with 70% v/v ethanol. Nail pieces were collected either by taking snippings of infected part of the nail using arterial scissors to get full thickness of nail sample or scraped using arterial scalpel on a clean piece of paper (about 5cm square). If any debris underneath the nail, these debris were carefully sampled with sterile needle. Then the paper was folded to form a flat packet. It was closed with paper clip then the specimen was labeled with patients name, number and date. The specimens were delivered to the laboratory⁽⁴⁾.

2- Direct microscopy:

The small nail pieces, more than 2mm across, were deposited onto a clear microscopic slide, a cover slide is placed over the collected debris and a drop of clearing solution (10% KOH) is carefully placed on the edge of cover slide then gently heated. The fungal elements resist the clearing solution (KOH) because of their chitinous cell wall.

The specimen was examined microscopically using the 10X and 40X objectives. In a positive preparation, fungi appeared typical round to oval budding cells⁽⁴⁾.

3- Culture procedure:

The clinical specimens (nail) were subcultured after cutting into pieces as small as possible. For each sample, 2 slants of sabouraud's dextrose agar with and without 0.5_g/ml of cycloheximide and 16_g/ml of chloramphenicol to inhibit the growth of contaminating molds and bacteria and 1 slant of dermatophyte test medium for primary recovery of dermatophytes DTM (as screening medium). Cultures were incubated at room temperature (25-30°C) and examined periodically for growth of yeast and dermatophytes. Negative cultures are discarded after 30 days⁽⁵⁾.

4- Identification and Specification of the dermatophytes and yeast:

This requires careful observation of gross colonial morphology and microscopic examination of proper prepared samples. All colonies of yeasts were identified by the Yeast biochemical card (Biomérieux Vitec 2 Hazelwood, Mo) it is a 30-well disposable plastic card that contains 26 conventional biochemical test and 4 negative controls. The biochemical card was used with the automated antimicrobial system. Correctly identification was reported after 24 hours of incubation. It was performed according to manufactures⁽⁶⁾.

5- Nail biopsy:

2% Xylocaine was injected into lateral and proximal nail folds. With 3 mm punch biopsy, specimens from the nail and nail bed, were taken, then kept in formaline, and sent for histopathologic examination using hematoxyline and eosin for detection of nail psoriasis and Periodic Acid Schiff stain (PAS) for detection of fungal elements.

Results:

Thirty patients; 17 males (56.7%) and 13 females (43.3%) have been subjected into this study. Their ages ranged between 19 and 61 years (mean: 41.1±11.32) and their disease duration ranged between one month and three years (mean: 0.91±0.71). Seventeen patients had generalized psoriasis (56.7%), ten had peripheral distribution of psoriatic lesions affecting upper and lower limbs (33.3%), and three had trunkal affection (10%). PASI score ranged from; mild in

4 patients (13.3%), moderate in 7 patients (23.3%), severe in 19 patients (63.3%). The number of nail affected varied; 9 patients had affection of the twenty nails (30%), 13 had affection of hand nails only ranging from 2 up to 6 nails (43.3%), one patient had affection of toenail only (3.3%) and the remaining 7 had affection of hand and toe nails with variable numbers (23.4%); Direct microscopic examination of nail samples was positive for fungal element in 20 cases (66.6%); 19 showed yeast (63.3%) and one showed dermatophytes (3.3%), while the remaining 10 cases were negative (33.3%).

Mycology culture was positive for fungus in 17 cases (56.7%) and negative in 13 cases (43.3%). From the isolated cultures, *Candida albicans* was isolated in 10 cases (33.3%), *C. glabrata* was isolated in 4 cases (13.3%), *C. tropicalis* was isolated in 2 cases (6.7%) while the dermatophyte (*Trichophyton rubrum*) was isolated in one case (3.3%).

Histopathological examination using H&E then PAS staining of nail biopsies showed fungal element without psoriatic changes in 8 cases (26.6%), psoriatic nail changes only without detecting any fungal element in 10 cases (33.3%) and both psoriasis and fungal nail affection in 12 patients (40%). These results had no significant statistical relationship to age, sex, disease duration, extent of psoriatic lesions or PASI score. Also these results had no relation to the number, degree, type or extent of nail affection.

Discussion:

Nail affection in psoriasis is seen in almost all patients. Nail psoriasis is estimated to affect 80-90% of psoriatic at some point in their lives⁽⁷⁾. De Jong in 1996 reported that 93% of those with nail psoriasis considered it a significant cosmetic handicap, 58% found that it interfered with their job and 52% described pain as a symptom.

Nail changes in psoriasis could mimic other diseases especially onychomycosis. Onychomycosis is an increasingly common fungal infection of the nail, which has physical and psychological consequences for the patients⁽⁹⁾. The rise in the incidence of

Onychomycosis could be attributed to variety of factors including better diagnostic methods⁽¹⁰⁾, aging of the population, an increase in the use of immunotherapies, an increase in exposure to organisms through communal bathing, the use of tight fitting occlusive footwear for many athletic activities⁽¹¹⁾ and the advance in new antifungal lines of therapy made patients seek treatment⁽¹²⁾.

To our knowledge, such a study has not been reported previously. It was designed to estimate the incidence of fungal nail affection among psoriatic patients and to determine the commonest pathogen responsible for this affection as information on aetiological fungal agents and their frequency in onychomycosis affecting psoriatic patients is completely lacking especially in the gulf area, however there has been reports highlighting a high prevalence of candida infection in onychomycosis in general not in psoriatic patients in particular.

Among psoriatic patients, onychomycosis was responsible for nail changes in 66.6% of the patients as proved by KOH and nail biopsy with PAS staining whether alone (in 26.7% of cases) or with psoriatic nail affection (in 40% of cases). These results were also proved by mycology culture which was positive in 56.7% of cases. The difference between KOH, nail biopsy and mycology culture results could be explained by the fact that these patients might receive incomplete or interrupted courses of antifungal therapy, insufficient amount of sample cultured or improper culture media. These results indicate that onychomycosis is responsible for high incidence of nail changes among psoriatic patients.

Yeast infection was found to be the causative organism in 63.3% of positive cases while dermatophytes were responsible for only 3.3% of these cases as proved by KOH examination and mycology culture. This represents a high prevalence of yeast infection among psoriatic patients.

Social and climatic condition may explain the high prevalence of yeast involvement in onychomycosis. Incriminating yeast or mold as a primary cause of fungal nail infection is not a simple judgment and of more doubtful pathogenicity unless a number of criteria are

fulfilled and it must be confirmed by excluding the predisposing factors as nail dystrophic changes in peripheral vascular diseases or diabetes mellitus and by findings in direct microscopy and mycology culture. When fungal elements are found by direct microscopy to be related to the isolated fungi as pseudohyphae in candida; this ensure the etiology of onychomycosis. (9,13). This study satisfies the criteria for those documented as true pathogen Candida species, especially *C. albicans* were found to be the causative yeast for onychomycosis among psoriatics. *C. albicans* represents 33.3% of isolates, followed by *C. glabrata* in 13.33% of cases then *C. tropicalis* in 3.33% of cases. Although this yeast (*C. albicans*) is a member of the normal flora in the alimentary, it is not a normal inhabitant on the intact skin, and when it occurs in nail disease it is assumed to be of pathogenic significance⁽¹⁴⁾.

Conclusion:

Nail changes in psoriatic patients could not be solely attributed to psoriatic process but fungal infection could be responsible for such changes in a considerable percentage of cases. So onychomycosis should be suspected, excluded and treated in any psoriatic patient complaining of nail changes before starting any active antipsoriatic treatment. Definitive diagnosis depends on KOH direct microscopic examination and isolation of the causative fungus by mycology culture. Yeast were found to be the leading cause of onychomycosis in psoriatic patients in the western province of Saudi Arabia; in particular candida albicans. Climatic social factors could explain the high prevalence of yeast infection in such areas

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