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Superficial Fungal Infections in Chronic Hemodialysis Patients: Prospective Study

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Abstract | **Original Research Article**

Onychomycosis has a high prevalance among immunocompromised patients such as diabetics and hemodialysis patients. In the present study, we aimed to investigate the prevalence of onychomycosis among hemodialysis patients with and without diabetes mellitus, and to find out the factors likely to be associated with the development of onychomycosis among hemodialysis patients. One hundred hemodialysis patients were enrolled. Nail scrapings were obtained from 76 patients who had dystrophic nail changes. Samples were examined with 30% potassium hydroxide solution and all of the samples were inoculated on Saboraud's dextrose agar, potateus dextrose agar and mycobiotic agar. Diagnosis of onychomycosis was based on the presence of both positive clinical signs and positive potassium hydroxide test. Onychomycosis was diagnosed in 54% of hemodialysis patients. Diabetes mellitus was present in 36% of patients with onychomycosis. Toenail scraping cultures were reported to be positive in 24% of patients with dystrophic nail changes. Logistic regression analysis revealed that the presence of diabetes mellitus and the mean duration of hemodialysis were the significant predictors associated with the development of onychomycosis. The prevalence of dystrophic nail changes and onychomycosis is increased among hemodialysis patients. The dialysis duration and the presence of diabetes mellitus are the independent risk factors associated with the development of onychomycosis in uraemic patients.

Keywords: Hemodialysis, onychomycosis, fungal infections, risk factors.

INTRODUCTION

Skin disorders are common problems in patients with chronic renal failure (CKD) on long-term hemodialysis. Fungal infections are one of the main problems in these patients [1]. The objective of our study is to establish the prevalence of superficial mycosis in hemodialysis patients and to determine the factors likely to be associated with their development.

PATIENTS AND METHODS

This is a cross-sectional and prospective epidemiological study, spanning 14 weeks. One hundred patients (35 women and 65 men, mean age: 54.6 ± 16.7) hemodialysis were included in the study. All subjects were patients with end-stage renal disease (end-stage renal failure) (creatinine clearance ≤ 5 mL / min / 1.73 m2BS). The mean duration of dialysis was 2.8 ± 2.7 years. The etiology of end-stage renal failure was diabetic nephropathy in 36 patients (36%) and non-diabetic nephropathy in 64 patients (64%). Included in this work were all hemodialysis patients from two hemodialysis centers in Marrakech who had one or more suspicious lesions. All patients were informed of the protocol of the study and the consent of each was obtained.

The mycological diagnosis was carried out in the mycology parasitology department of the Avicenne military hospital in Marrakech. Mycological studies included direct microscopic examination and culture. The nails were cleaned with 70% ethanol prior to collection. Microscopic examination of nail scrapes was performed with the use of a 30% solution of potassium hydroxide (KOH). The samples were grown on Sabouraud Dextrose agar. The cultures were incubated at 26 ° C and examined twice a week for a total of 4 weeks. The identification of dermatophytes was based on macroscopic examination of fungal colonies and their microscopic examination with lactophenol blue cotton dye. The yeast species were identified using the filamentation test. The diagnosis of onychomycosis was based on the presence of positive clinical signs, a direct examination and a positive culture.

RESULTS

Of the 100 hemodialysis patients, almost half of the patients had suspicious lesions. The nails were most often the target of the lesions (47%) followed by the inter-toes and the soles of the feet with 2 cases in the large folds and 5 cases in the mucous membranes (Table 1). Of the 76 samples taken, 54 were positive for direct examination with predominance of mycelial filaments in 69.5%. None of the patients experienced nail trauma, high heel, high-heeled or traumatic shoes, or excessive foot sweating during the activity. Table 1 summarizes the distribution of lesions according to their nature.

Direct examination was positive in 49 cases, while culture was positive in 24 cases. It revealed the dermatophytes in 50% of cases, dominated by Trichophyton rubrum (75%).

Candidiasis accounted for 37.5% and molds for 12.5%.

Table-I: Distribution of lesions according to their nature

Sampling site		Number
Smooth skin		3
Mucous	Vaginal	2
	digestive	3
Nails		35
Interdigital	Palmar	0
	plantar	17
Intertrigo	Axillary	1
	Mammary	1
	nail	0
Soles		13
External ears		1
Hair		0

DISCUSSION

The hemodialysis is subject to high morbidity and mortality. This may be due to chronic kidney disease (CKD), hemodialysis itself, and / or comorbidities. Skin conditions are among the most common and negatively affecting the quality of life of the patient [1, 2] hemodialysis. They are known to be depressogenic [3, 4]. The prevalence of cutaneous manifestations during CKD and in the hemodialysis patient is greater than 50%.

In fact, hemodialysis has prolonged the life of patients with end-stage renal failure, at the cost of a range of disorders such as dermatological signs, the pathogenesis of which is often hypothetical. Compared to the general population, hemodialysis patients are predisposed to mycotic infections such as mucormycosis and Candida infections of the mucous membranes, nails and folds of the skin [1].

In the present study, and in agreement with literature data [2], we have shown that the prevalence of abnormally-looking nails and onychomycosis is increased in hemodialysis patients 47% joining the Indian series observing a rate. 60%.

These patients would have an increased susceptibility to nail disorders which may be due to impaired immunity and histological changes in the skin caused by uremia. Histological changes in the skin of uremic patients include severe microangiopathy and pericollogenic amyloid deposition, identified as beta-2-microglobulin amyloidosis [4].

Numerous previous studies have shown that the prevalence of nail disease increases with duration of hemodialysis [1-3]. Contrary to these reports, in the present study, we observed that there was no apparent link between the occurrence of cutaneous manifestations in our patients and their seniority in hemodialysis. Mourad *et al*. In Egypt [11] as well as Udayakumar in India [1] made the same observation.

Although contradictory reports [9, 10] are available, it has been reported that hemodialysis patients are predisposed to dermatophyte infections. In addition, in two recent large-scale studies [5, 6], it has been shown that the prevalence of onychomycosis was significantly higher in hemodialysis patients than in normal individuals and that age, male, family history of onychomycosis, simultaneous use of immunosuppressive agents and peripheral vascular disease have been shown to be independent risk factors for the development of the infection. In this study, Trichophyton rubrum was the most frequently isolated agent among cultures and was followed by T. mentagrophytes. These results were consistent with previous studies in renal failure and in a normal population [6, 7].

CONCLUSION

The prevalence of dystrophic nail changes and onychomycosis is increased in hemodialysis patients. The duration of dialysis and the presence of peripheral vascular disease are the independent risk factors associated with the development of onychomycosis in patients with uremia. Since fungal infections have a

potential progressive nature and a potentially serious outcome such as erysipelas and even long-term amputation, the nails need to be periodically examined, particularly in patients with diabetes mellitus suffering. In addition, education of diabetic patients undergoing hemodialysis on the importance of foot and nail care should be an essential part of the management of these patients.

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