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Original Article

Prévalence des mycoses chez les sujets âgés: étude transversale

Prevalence of mycosis in elderly individuals: a cross-sectional study

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AB S T R A C T

Introduction: Superficial mycosis may be considered among elderly due to the presence of concomitant diseases that can complicate their treatment. The aim of the study was to determine prevalence of superficial mycosis among elderly patients over a period of one year. **Material and Methods:** A questionnaire for each patient (sex, age, bath, animal contact, weight, clinical signs) was applied. **Results:** A total of 100 patients with suspicion of mycosis (onyxis, skin disorders) were enrolled. 45 patients were positive for fungal elements on both direct examination and culture on SDA medium. The most common associated morbidity was diabetes mellitus (71,1%). A correlation was found between mycosis in elderly and onyxis especially in fingernails (p=0,041). On culture examination Candida non albicans(35,6%), *Trichophytonrubrum* (26,7%), followed by *Candida albicans* (22,2%) were the most identified fungi. **Conclusion:** Adequate education and mycological monitoring are required to improve our elderly patient's quality of life.

KEYWORDS: mycosis, prevalence, elderly, skin mycosis, onychomycosis

RESUME

Introduction : Une mycose superficielle peut être envisagée chez les personnes âgées en raison de la présence de maladies concomitantes pouvant compliquer leur traitement. Le but de l'étude était de déterminer la prévalence de la mycose superficielle chez les patients âgés sur une période d'un an. **Matériel et Méthodes :** Un questionnaire pour chaque patient (sexe, âge, bain, contact animal, poids, signes cliniques) a été appliqué. Un total de 100 patients avec suspicion de mycose (onyxis, lésions cutanées) ont été inclus. **Résultats :** 45 patients étaient positifs à la fois à l'examen direct et à la culture mycologique sur milieu SDA. La morbidité associée la plus fréquente était le diabète (71,1%). Une corrélation a été retrouvée entre les mycoses des sujets âgés et l'onyxis en particulier celui des ongles de la main (p=0,041). A l'examen des cultures, Candida non albicans (35,6%), *Trichophyton rubrum* (26,7%), suivi de *Candida albicans*(22,2%) étaient les champignons les plus identifiés. **Conclusion :** Une éducation adéquate et un suivi mycologique sont nécessaires pour améliorer la qualité de vie de nos patients âgés.

MOTS CLES : Mycose, Prévalence, vieux, Mycose cutanée, onychomycose

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Introduction

The World Health Organization (WHO) classified individuals in the 60-70 age range as elderly, in the 75-90 age range as old, and those aged over 90 as very old. All individuals over the age of 60 are considered elderly. Cutaneous and nail plate abnormalities are quite common in elderly persons [1], for instance, in most cases of onychomycosis, during the transition from elderly to old, the fungi causing the condition tend to infect other nails [2,3]. Fungal infections are more prevalent in the elderly than in non-elderly adults; risk factors include local trophic disturbances, and underlying diseases such as diabetes mellitus. Biological changes associated with advanced age, and polypharmacy (corticosteroids) may adversely affect the immunological response to infection. Moreover, superficial skin troubles occur as a result of the reduced function of sebaceous and sweat glands.

Host factors and social situation can play a role in elderly mycosis, for an instance, long-term care settings and nursing homes, are incriminated [4]. Onycholysis in the elderly has been linked to filamentous fungi [1].

In addition, the fungal transmission among the elderly can easily occur, by walking on carpets, bathroom floors, or by sharing shoes. Moreover, Old adults have outdoor activities as gardening, which support awide contact with various fungi.

It is important to assess fungal infection among elderly individuals, the deficits in organ function may trouble the antifungal drug therapy [4].

The aim of this study is to determine the prevalence of mycosis in our elderly patients and the factors associated with this condition.

Material and Methods

This is a cross-sectional study. A total of 100 elderly patients were seen over a period of one year in the department of parasitology-mycology of "Hassani Abdelkader hospital" in Sidi-Bel-Abbès. All these patients were suspected to have a superficial mycosis (onychomycosis, skin mycosis).

A complete dermatological examination was performed on all subjects, and specimens of the nail and skin were taken from patients presenting signs of dermatophytosis or onychomycosis for microscopy and fungal culture. Before collecting samples, a questionnaire was performed among all patients, including socio-economic features (age, residence), concomitant disease, and contact with animals. Clinical signs (onyxis, skin disorder), signs duration, IMC were applied for each patient.

Direct microscopy of skin and nail scrapings by Lactophenol Cotton Blue (LPCB) wet amount preparation or KOH was performed, and all samples were cultured on Sabouraud dextrose agar (SDA) in combination to Chloramphenicol and incubated at 25°C for a minimum of 6 weeks.
Data were managed and analyzed using SPSS 17.

Results

A total of 100 elderly patients was seen over a period of one year, the mean age was 68,19 years (range: 60–86 years) and sex ratio was 1,81. Among the 100 patients, 45 were confirmed to have superficial mycosis by direct examination and culture on SDA medium. No correlation was found between socio-demographic characteristics and presence of fungi (Table 1). The most common associated morbidity was diabetes mellitus (71,1%), followed by arterial hypertension (15,6%). A statistical correlation was found between mycosis in elderly and onyxis specially in fingernails (p=0,041) (Table 2)

On culture examination Candida non albicans (35,6%), *Trichophytonrubrum* (26,7%), followed by *Candida albicans* (22,2%) were the mostrecovered fungi (Table 3)

Figure 1: (A) onychomycosis of toe nail; (B) fungal elements on direct examination

Table 1: socio-demographic characteristics andprevalence of mycosis

Variables		result-/result+	Prevalence	p
Sex	Male	16/16	50,0%	0,491
	Female	39/29	42,6%	
Age	60-64	25/17	40,5%	0,355
	65-69	10/10	50,0%	
	70-74	7/11	61,1%	
	75 et +	13/7	35,0%	
Residence	Rural	8/7	46,7%	0,888
	Urban	47/38	44,7%	
Mycosis (entourage)	Absence	46/39	45,9%	0,256
	Presence	9/6	40,0%	
Bath place	Home	16/14	46,7%	0,826
	Public	39/31	44,3%	
Animal contact	Absence	47/40	46,0%	0,611
	Presence	8/5	38,5%	

Table 2: Clinical variables and prevalence of mycosis among elderly patients

Variables		result-/result+	Prevalence	p
IMC	o* weight	24/28	53,8%	0,104
	overweight	21/14	40,0%	
	obesity	10/3	23,1%	
diabetes mellitus	Absence	22/13	37,1%	0,246
	Presence	33/32	49,3%	
HTA	Absence	30/38	55,9%	0,001
	Presence	25/7	21,9%	
previous treatment	Absence	52/40	43,5%	0,3
	Presence	3/5	62,5%	
onyxis	toenail	28/14	33,3%	0,041
	fingernail	4/10	71,4%	
skin disorders	Absence	33	42,1%	0,503
	Presence	22	48,8%	
signs duration	<5 years	30/25	45,5%	0,134
	5-9 years	15/6	28,6%	

o*=optimal

Table 3: Aetiological fungi isolated in elderly patients with mycosis

Mycological results	Number of isolates (%)
Candida non albicans	16 (35,6%)
Trichophytonrubrum	12 (26,7%)
Candida albicans	10 (22,2%)
Aspergillusflavus	3 (6,7%)
Trichosporonsp	1 (2,2%)
Aspergillusniger	1 (2,2%)
Microsporumcanis	1 (2,2%)
Rhodotorulasp	1 (2,2%)

Discussion

Population ageing is related to the increased life expectancy [5]. Prevalence of superficial mycosis among the elderly is 45%, similar frequencies have been reported in Algeria and Europe. A survey that included over 90 000 patients, the prevalence of fungal foot infections was 40,6% [6,7,8]. In this study, we observed a preponderance of men over women (2:1 approximately), that because 16% of our patients are still working as farmers, construction workers, and cleaning employee. Contrary to our selection, women were more predominant in other studies, probably because they show a greater interest seeking a diagnosis for ungual and cutaneous pathology than men, who either do not attend hospital or refuse the examination [1].

Aging is the most common risk factor for mycosis in our sample, most likely due to poor peripheral circulation, longer exposure to pathogenic fungi, especially for men working outdoors, repeated nail trauma, suboptimal immune function, and slower nail growth [9].

Moreover, a predominance of onychomycosis and tinea pedis in older individuals has been reported in previous studies, in Algeria, Tunisia, and Europe [6,10,11,7,9].

Incidence of onychomycosis among the elderly is high. It is estimated to be at 13% among individuals with diabetes mellitus [1,12], which is in accordance with our findings, but there is no correlation observed in our investigation.

Onycholysis in the elderly and the humid environment created by shoes have been associated with filamentous non-dermatophytic infections [1,13]. The religious custom of washing the feet 5 times daily may be a cause of maceration facilitating fungal infection [10]. In addition, transmission of fungi can occur by walking on carpets, or bathroom floors or by sharing shoes [14]. Nevertheless, these factors contributing to fungal infections were not closely related to mycosis in our population, probably because they are shared by a large group of individuals. Other factors that need to be considered are animal contact and obesity. This suggests that ungueal and cutaneous changes are not only due to intrinsic factors such as sedentarism, age_related and poor circulation.

Our mycological results are consistent with other studies conducted in Algeria [6] and Tunisia [10]. The most commonly reported fungal isolates are *Candida parapsilosis*, *Candida albicans* for yeasts and *Trichophytonrubrum* for dermatophytes, in addition to*Aspergillussp* for molds.

Furthermore, *Trichophytonrubrum* is the mostcommon dermatophyte in foot mycosis in worldwide [7], which is in accordance with our results. In our study, Candida non albicans was the most frequent fungi. The adherence capacity of Candida and its ability to form biofilms may be important fungal virulence factors for all Candida species [15]. This may explain the high prevalence of Candida strains among our samples. The elderly population is particularly vulnerable to Candida infections: polypharmacy and high colonization rate are also suspected to trigger Mycosis in this population [16].

Older adults have a higher risk of achlorhydria than do younger individuals. They may so not predictably absorb oral antifungal drugs [17]. Furthermore, Oral hypoglycemic agents and phenytoin drugs are frequently prescribed for older individuals and can beincreased by azoles [18].

Further studies are needed to uncover the epidemiology of superficial mycosis in elderly patients.

Conclusion

Superficial mycosis is relatively common in elderly individuals. Its incidence is expected to rise, mainly because of yeasts from Candida's genus. A significant challenge remains with regard to education and prevention, especially for onychomycosis presentations in our population.

Conflicts of interest

No conflict of interest to disclose.

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