THE PREVALENCE OF SUPERFICIAL FUNGAL INFECTIONS IN THE ELDERLY

Majid Zarrin¹, Seyedeh Elham Arab², Reza Yaghoobi³

ABSTRACT

Objective: The main goals of this study were to determine the distribution and frequency of dermatologic diseases in geriatric patients according to age and gender, and the place of residence.

Methodology: A total of 349 patients aged 65 years and over lived in elderly care centers and geriatric patients in Ahvaz Jundishapur University Hospitals were studied in winter of 2008. Specimens were collected from clinically suspected fungal infections of various body sites including toenail, fingernail, body and groin, head and scalp, face, hand, and foot.

Results: The distribution of the patients in the different age groups was as follows: 16 patients in the 65-74 year age group [11 female (69%) and 5 male (31%)]; 11 patients in the 75-84 year age group [7 female (58%) and 5 male (42%)]; and 3 patients in the > 85 year age group [1 female (33%) and 2 male (67%)]. Overall, the 3 most frequent diseases in this cohort of patients were erythrasma [16 patients (53.3 %)], onychomycosis [10 patients (33.3%) and skin yeast infections [4 patients (13.4%)].

Conclusion: In this study Corynebacterium minutissimum was the most frequent agent of infections (53.3%) followed by filamentous fungi (23.3%), C. albicans, Candida sp. and yeasts (6.7 % each). Only one dermatophyte (T. verrucosum) was isolated (3.3%).

KEY WORDS: Fungi, Superficial mycoses, Elderly.

INTRODUCTION

The elderly population is composed of people over 65 years of age. Elderly is a continuous process with a changeable spectrum of signs of all organs such as the skin.¹ The regular functions of skin decrease with age, including wound healing, DNA repair capacity and mechanical protection.² Therefore, several inevitable changes, for example, wrinkling and atypical appearances of dermatologic diseases are seen in elderly people.³,⁴

With increasing age they experience more disease and this is relevant especially to skin infections. Infections that happen more frequent in the old people are Gram-positive bacterial infections, intertriginous infections and onychomycosis. Superficial fungal infections caused by
yeasts, dermatophytes and nondermatophytes molds, though dermatophytes are the most commonly agent in fungal infections.

Infections in areas of the body folds include erythrasma and candidiasis. Erythrasma is caused with Corynebacterium minutissimum. The infection has a preference for the skin folds such as the axillae and groin. Candidiasis is most commonly caused with Candida albicans that usually occurs in skin folds. This infection promoted with use of corticosteroids, antibiotics, and other immunosuppressive medicines.

Onychomycosis should be understood as a superficial mycosis of the elderly people. Dermatophytes are the most common cause of onychomycosis. Candida and nondermatophyte molds also can be agents of onychomycosis. Onychomycosis is recognized more commonly in elderly and more often in males compare to females. The most common type of onychomycosis is distal subungual onychomycosis and reports for 75-85 percent of patients.

In this survey, we attempted to determine the frequencies of fungal infections of skin in geriatric people, and investigated for age-related and gender-related differences.

METHODOLOGY

A total of 349 patients aged 65 years and over living in elderly care centers and geriatric patients in Ahvaz Jundishapur University Hospitals were studied in winter of 2008. Two hundred and forty persons were geriatric patients in hospitals and 135 persons lived in elderly care centers. One hundred and ninety-six persons were female (56%) and 153 persons were male (44%). Specimens were collected from clinically suspected fungal infections of various body sites including toenail, fingernail, body and groin, head and scalp, face, hand, and foot. In all, four elderly care centers and three hospitals were represented in the study. The samples were divided into two parts for culture and direct microscopic examinations. Direct microscopic examinations of the specimens was performed in 20% potassium hydroxide and using gentle heat where necessary. The presence of hyphal elements or yeast forms or both was noted.

The second part of the sample was inoculated onto two different media, including Sabouraud’s dextrose agar (S) and Sabouraud’s dextrose agar containing cycloheximide 0.5 mg/ml and chloramphenicol 0.05mg/ml (SCC). Cultures were incubated at both 30ºC and 37ºC for four weeks. Lactophenol cotton blue mounts were prepared from positive cultures and examined under the microscope to study mycological details. Filamentous fungi identified according to their microscopic features. Recovered yeasts were subjected to the germ tube test, and checked for morphology in cornmeal agar. When direct microscopy was positive and culture was negative, the mycological investigation was repeated again in at least two further occasions. Erythrasma was diagnosed by staining of skin scales with methylene blue and microscopic examination.

The fungal diseases data from a total of 349 elderly (65 years of age and above) were analyzed according to age, sex and the place of residence (the care centers or hospitals). Three age groups were created: 65-74 years, 75-84 years, and > 85 years.

RESULTS

From a total 349 elderly seen during the winter 2008, we performed the mycologic investigation in 80 cases (23%) who were found suggestive for superficial fungal diseases. Out of 349 elderly studied, 30 persons (8.6%) had fungal infections or erythrasma. Patients were 18 females and 12 males.

The distribution of the patients in the different age groups was as follows: 16 patients in the 65-74 year age group [11 female (69%) and 5 male (31%)]; 11 patients in the 75-84 year age

Table-I: The distribution of superficial mycoses according to gender in elderly patients.

<table>
<thead>
<tr>
<th>Disease</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Erythrasma</td>
<td>7</td>
<td>9</td>
<td>16</td>
</tr>
<tr>
<td>Onychomycosis</td>
<td>5</td>
<td>28</td>
<td>33.3</td>
</tr>
<tr>
<td>Skin yeast infections</td>
<td>-</td>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>

Total 12 100 18 100 30 100

The distribution of the patients in the different age groups was as follows: 16 patients in the 65-74 year age group [11 female (69%) and 5 male (31%)]; 11 patients in the 75-84 year age group

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<tr>
<td>Onychomycosis</td>
<td>10</td>
<td>4</td>
<td>14.3</td>
</tr>
<tr>
<td>Skin yeast infections</td>
<td>-</td>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>

Total 20 100 24 100 44 100
group [7 female (58%) and 5 male (42%)]; and 3 patients in the > 85 year age group [1 female (33%) and 2 male (67%)].

Overall, the 3 most frequent diseases in this cohort of patients were erythrasma [16 patients (53.3%)], onychomycosis [10 patients (33.3%)] and skin yeast infections [4 patients (13.4%)].

Within the three different age groups, the three most frequent diseases were as follows: in the 65-74 year age group, erythrasma and onychomycosis; in the 75-84 years age group, erythrasma, onychomycosis and skin yeast infections, and in the >85 year age group, there were not significant differences in the diseases. Twenty persons (15%) of elderly people who lived in elderly care centers had skin fungal infections and erythrasma, while it was 10 persons (5%) for geriatric people in hospitals.

The distributions of all diseases according to gender, age group and the place of residence are shown in Tables I - III. The isolated fungi and their frequencies according to site of infection are shown in Table-IV.

Ten persons were positive for onychomycosis. The most frequency of onychomycosis was observed in the 65-74 year age group (6 cases). Toe nails [8 cases (80%)] were infected more than fingernails [2 cases (20%)]. One hundred percent patients of toe nails onychomycosis was infected by filamentous fungi and 100% patients of finger nails onychomycosis was infected by yeasts. Two mentioned fingernails onychomycosis were infected by Candida sp. and unknown yeast.

It should be noted that some nail samples were positive by microscopic examination, but were negative on culture. This is an acceptable result for the laboratory diagnosis of onychomycosis by filamentous fungi. In cases of consideration positive result in both direct examination and culture of clinical samples of onychomycosis by filamentous fungi, only 1 (12.5 %) of patients was positive which it was Trichophyton verrucosum. There are several reasons for negative culture results from samples which were positive in direct microscopic examination. These reasons are mentioned in discussion. There were 16 cases of erythrasma seen over the study period. The toe web infection was the most prevalent clinical type [7 cases (44%)], followed by groin infection [5 cases (31%)] and breast folds infection [4 cases (25%)]. In this study Corynebacterium minutissimum was the most frequent agent of infections (53.3%) followed by filamentous fungi (23.3%), C. albicans,
Candida sp. and yeasts (6.7% each). Only one dermatophyte (T. verrucosum) was isolated (3.3%).

**DISCUSSION**

The percentage of elderly patients is progressively growing, particularly in developed countries, with more geriatric patients admitted to clinics of dermatology each year. In elderly people, declines in personal care, functions of immune system, and epidermal turnover of skin are seen, probably responsible for the high prevalence of superficial mycoses. Decrease of immune system functions in the elderly could be due to aging and systemic diseases, preparing more chance for the progress of infections in the patients. Disorders of the feet, which are more frequent in males, are because of trauma. The analysis of elderly patients with suspected cases of onychomycosis by filamentous fungi is not easy because, although fungal elements may be occasionally recognized in the collected samples, the culture result is negative. A 30-70% rate of negative result in culture has been described by various researchers. Thus, the interpretation of suspected onychomycosis caused by filamentous fungi are sometimes more difficult than in other forms of fungal skin infection, as showed by the efforts of different researchers to develop diagnostic techniques.

Onychomycosis is caused mainly by dermatophytes and Candida species, however, Candida species are more possible to be isolated in fingernail, especially from women.

Erythrasma with 16 patients was the most prevalent disease in this study. In some studies, up to 30 percent of patients with interdigital erythrasma were found to have a coexisting dermatophyte or Candida albicans infection, frequently noted in third and fourth interspaces. Factors, for example, advanced age, poor hygiene and diabetes have a role in the incidence of this disease. In the present study C. minutissimum was the most frequent agent of infections.

This study provides important information about prevalence of the superficial fungal infections in the elderly people, although further studies are needed to have complete information on this subject.

**ACKNOWLEDGEMENTS**

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**REFERENCES**