

## Original Article

### A Study on the Frequency of Fungal Agents in Otitis Externa in Semnan

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#### ABSTRACT

**Background and Objective:** Otitis externa is a common condition affecting the external auditory canal. Predisposing factors implicated in the pathogenesis of the condition include preexisting aural disease, genetic factors, infection, trauma, and climatic conditions. Bacteria are the most common cause of infection and fungi play a smaller but significant role in the disease. Otomycosis is characterized by inflammation, pruritus, pain, and scaling, usually in a unilateral pattern. Otomycosis has a worldwide distribution with a higher prevalence in the hot, humid, and dusty climate of the tropical and subtropical regions. The objectives of this study were to determine the prevalence of mycotic infections in inflammatory conditions of the ear and to determine fungal species responsible for otitis.

**Materials and Methods:** The study was conducted on 70 cases who presented with symptoms of otitis from September 2000 to December 2003. Patients were admitted in ENT clinic of Amir-Al-Momenin hospital. To determine the species of fungi present in the ears, samples were collected from the external auditory meatus using sterile swabs for mycological examination. These specimens were processed at the department of microbiology. A part of the samples was used for direct microscopy in 10% potassium hydroxide and Gram's method was employed to stain the smears from all specimens cultured on Sabouraud Dextrose agar with chloramphenicol (Sc). To identify yeasts, assimilation tests were used by API 20C AUX.

**Results:** Otomycosis was diagnosed in 8 (11.4%) of 70 investigated patients. Yeast species responsible for otitis were classified as belonging to the genus *Candida*. The most frequent fungal species detected were *Candida parapsilosis* (5 cases), *Candida glabrata* (2 cases), *Candida krusei* (1 case). In other patients, the bacterial agents isolated were as follow as: *Pseudomonas aeruginosa*, *Staphylococcus aureus*, *Streptococcus*, *S. epidermidis*, *S. saprophyticus*, and *Enterobacteriaceae*.

**Conclusion:** In the present study fungi on average were the etiological factor of otomycosis in 11.4% of cases. A similar rate for ear fungal infections was observed by Kurnatowski and Filipiak. In order to solve the therapeutic difficulties and to apply the most adequate treatment, comprehensive mycological examinations, often avoided during routine clinical procedures, must be performed. Underestimation and sometimes ignorance of the role of these pathogens in the etiology of diseases of the ear may lead to a prolonged and/or ineffective treatment of patients.

**Key words:** Otomycosis, Fungal otitis externa, *Candida*

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## Introduction

Otomycosis has a worldwide distribution with a higher prevalence in the hot, humid, and dusty climate of the tropical and subtropical regions. Otitis externa is a common condition affecting the external auditory canal. Acute diffuse otitis externa (swimmer's ear) occurs mainly in hot and humid weather. The ear itches and becomes increasingly painful. The skin of the canal is edematous and red. Symptoms similar to bacterial otitis externa consist of itching, pain, scant discharge, and aural fullness. Predisposing factors implicated in the pathogenesis of the condition include preexisting aural disease, genetic factors, infection, trauma, and climatic conditions. The bacteria such as *Pseudomonas* and *Proteus* species and *Staphylococcus aureus* are the most common causes of infection and fungi play a smaller but significant role in the disease (1).

The ear is constantly exposed to biotic elements of the biosphere and thus accessible to various microorganisms including fungi. Local lesions observed in otitis create favorable conditions for the growth of fungi and development of mycoses both in the external and middle ear (2). Conant expressed the opinion that not more than 15-20 percent of the ear infections are true otomycosis (3) and an increase in incidence has been seen among outpatients (4). Underestimation and sometimes ignorance of the role of these pathogens in the etiology of diseases of the ear may lead to a prolonged and/or ineffective treatment of patients.

Therefore, the objectives of this study were to determine the prevalence of mycotic infections in the ear and to determine responsible fungi species.

## Materials and methods

This study was a descriptive and cross sectional research. The study consisted of 70 individuals who presented with symptoms of otitis from September 2000 to December 2003. Patients were admitted in ENT clinic of Amir-Al-Momenin hospital. For every individual, a questionnaire was filled out. To determine the genera and species of fungi present in the ears, samples were collected from the

external auditory meatus using sterile swabs for mycological examination. These specimens were processed at department of microbiology. A part of the samples was used for direct microscopy in 10% potassium hydroxide and Gram's method was employed to stain the smears from all specimens inoculated on Sabouraud Dextrose agar (Merck) with chloramphenicol (Sc). The plates were incubated at 30 °C for 7 days. A rapid method of identification for *Candida albicans* and *Candida* species in general was based on its ability to form germ tubes within two hours of inoculation in human serum at 37 °C. Corn meal agar with Tween 80 provides a rapid presumptive identification step for *C. albicans*. To identify the genera and species of yeasts, assimilation test by API 20C AUX was used. For bacterial culture, the swabs were inoculated in thioglycolat broth, sheep blood agar, and mac conkey's agar.

## Results

Seventy patients (58 females (82.9%) and 12 males (17.1%)) were investigated in this study. In this respect, most of patients (35.17%) were at an age range of 20-29 years old. All of the patients were diagnosed with inflammation of the external auditory meatus. Meanwhile, all of the patients had unilateral otomycosis. All of the cases of otomycosis were observed in females (11.4%). The observed symptoms are similar to the bacterial otitis, but of lower intensity. The most frequent fungal species detected were *Candida parapsilosis* (5 cases), *Candida glabrata* (2 cases), and *Candida krusei* (1 case). In other patients, the bacterial agents isolated were as follow: *Pseudomonas aeruginosa*, *Staphylococcus aureus*, *Streptococcus*, *S. epidermidis*, *S. saprophyticus*, and *Enterobacteriaceae*. The most frequent bacteria species were *Pseudomonas aeruginosa* (47.9%) and *Staphylococcus aureus* (12.4%).

## Discussion

In the course of their lives humans often come into contact with fungi that are present in the biosphere and one of the organs especially predisposed for fungal colonization is the ear. In the present study,

fungi were the etiological agents of otomycosis in 11.4% of cases. Otomycosis was associated with fungi of the genus *Candida*. *Candida parapsilosis* was the most common etiological agent. A similar rate of ear fungal infections (30.4%) was observed by Kurnatowski and Filipiak and the majority of strains (62.1%) were classified as belonging to the genus *Candida*, whereas strains of *Aspergillus* family were less frequent (37.9% ) and the most common pathogenic fungus was *Candida parapsilosis* (2). The prevalence of otomycosis in the results from Jadhav (5) was lower and it was higher in patients described by Paulose et al (3). The literature data (1, 6) indicate that *Candida* spp are causal to otomycosis in 1-38% of cases, although Garcia et al (7) and Dorko et al (8) reported even higher rates.

Our findings are in general agreement with observation of earlier workers (2,7-8). The yeasts were present in samples together with *Staphylococcus epidermidis* and *S. aureus* which remains in accordance with Dorko et al findings (8). In our study, we found that otomycosis was more common in females and our finding confirmed the results other researchers have reported (9,10). Our observations show that one of the most common reasons for which patients seek the help of the laryngologist is symptoms of otitis which do not respond to conventional treatment.

In order to solve the therapeutic difficulties and to apply the most adequate treatment, comprehensive mycological examinations, often avoided during routine clinical procedures, must be performed. Underestimation and sometimes ignorance of the role of these pathogens in the etiology of diseases of the ear may lead to a prolonged and/or ineffective treatment of patients.

Secondary bacterial infection was one of the most common predisposing factors in the history of our patients followed previous antibiotic therapy for one month duration. All patients were referred to physician for treatment.

## Conclusion

we found that otomycosis is common in females and *Candida parapsilosis* is the major etiologic agent in Semnan.

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