

CLINICAL AND MYCOLOGICAL STUDIES OF OTOMYCOSIS

Ali Zarei Mahmoudabadi¹, Saied Abdoulhosien Masoomi², Hamdolah Mohammadi³

ABSTRACT

Objectives: Otomycosis (fungal external otitis) is a common disease especially in persistent or chronic external ear infection. Disease is more prevalent in warm climates. Opportunistic fungi usually cause Otomycosis. The aim of this study was to investigate the prevalence of otomycosis, species distribution, predisposing factors and sex distribution for otomycosis in Ahvaz, Iran.

Methodology: Secretion and pus were collected from fifty-seven patients by two sterile cotton wool swabs. One swab was used for direct microscopy and next for culture examination. Direct examination of the samples was carried out by staining the smears with methylene blue technique. Collected swab was inoculated onto Sabouraud's dextrose agar. The presence of fungal elements in stained smears was confirmed by growth of fungal colonies.

Results: In the present study 53.3% and 46.7% of patients were respectively males and females. The most common fungal pathogens were *Aspergillus niger* (30.8%) and *A. flavus* (23.1%).

Conclusion: In conclusion fungi were the etiological factor of otomycosis in 45.6% of cases. In order to solve the therapeutic difficulties and to apply the most adequate treatment, comprehensive mycological examinations, often skipped during routine clinical procedures, must be performed.

KEY WORDS: Otomycosis, *Aspergillus niger*, *Aspergillus*, *Candida*.

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1. Ali Zarei Mahmoudabadi, PhD, Associate Professor, Mycologist, Department of Medical Mycoparasitology, School of Medicine, and Infectious Diseases and Tropical Research Centre,
2. Saied Abdoulhosien Masoomi, MD, Associate Professor, ENT,
3. Hamdolah Mohammadi, MD, Department of ENT, School of Medicine,
- 1-3: Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran

Correspondence

Ali Zarei Mahmoudabadi
Dept. of Medical Mycoparasitology, School of Medicine,
Infectious Diseases and Tropical Research Centre,
Ahvaz Jundishapur University of Medical Sciences,
Ahvaz, Iran.
Email: zarei40@hotmail.com

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INTRODUCTION

The ear is constantly exposed to biotic elements and various microorganisms, including fungi. Thus underestimation or ignorance of these pathogens may lead to prolonged or ineffective treatment of patients. Otomycosis or external fungal otitis is acute, sub acute or chronic fungal infection of the external auditory canal.¹ Although rarely life-threatening, the disease processes present a challenge for both patients and otolaryngologist and the development of both external auditory canal and middle ear. Middle ear infection usually accrued when tympanic membrane is perforated. Otomycosis is usually a unilateral otitis that characterized by inflammation, pruritus and scaling in ear canal.

Otalgia, hearing loss and severe discomfort (suppuration, pain, aural fullness) appeared in chronic cases.^{1,2}

Otomycosis has a worldwide distribution and is estimated that approximately 10-20% of total external otitis cases are due to otomycosis.¹ Otomycosis is more prevalent in warm humid climates, and warm seasons (summer). The disease is a secondary infection and some of its predisposing factors for it are follows.² Presence of cerumen, instrumentation of ear (hearing aids, foreign body, cleaner abusers), immunocompromised host (diabetes mellitus, malignancies, AIDS, renal transplant, long term administration of corticosteroids and antibiotics), low socioeconomic conditions (poor hygiene), use of oils, ear drops (antibiotic and antiseptic agents), steroid (local and systemic), swimming (wetness predispose to fungal infection), allergy to topical agents (neomycin), contact dermatitis (hair sprays) and abnormal anatomy of external auditory canal (stenosis, osteoma). Otomycosis is prevalent worldwide but more common in tropical and subtropical countries.³ Several reports show that the disease is relatively common in different provinces of Iran.¹⁻⁵

Otomycosis is caused by some species of the saprophytic fungi, which abound in nature and/or form a part of the commensal flora of healthy external auditory canal. *Aspergillus niger*, *A. flavus*, *A. fumigatus*, *Allescheria boydii*, *Scopulariopsis*, *Penicillium*, *Rhizopus* and *Absidia* are the most common agents of otomycosis.^{1,3,4,6-9} *Candida* species, especially *C. albicans* is a part of human normal flora that causes otomycosis.^{5,9} The aim of the present study was to identify the frequency of otomycosis in Imam Khomainsi Hospital, Ahvaz. In addition fungal agents, predisposing factors and sex distribution for otomycosis were investigated.

METHODOLOGY

Fifty-seven patients supposed to suffering were involved in this investigation. The patients had visited with symptoms of external otitis, at Imam Khomainsi Hospital, Ahvaz (Iran). The patients consisted of 29 females (50.9%) and 28

males (49.1%). The ages of the patients ranged between 4-85 years with a mean of 44.5 years. A questionnaire was completed with information covering personal details, evaluation of symptoms, signs and results of mycological study for each patient.

All patients showed one or more of the aural symptoms (itching, otalgia, and hearing loss). Secretion and pus were collected from the ear lesions by two sterile cotton wool swabs. One swab was used for direct microscopy and the other for culture examination. Direct examination of the samples was carried out by staining the smears with methylene blue technique. Otomycosis was confirmed by the presence of septate branching mycelium, fungal conidia, fruiting bodies, yeast cells and pseudohyphae on direct microscopy. The presence of fungal elements in stained smears was confirmed by fungal culture. Swabs were rolled over the surface of Sabouraud's Dextrose Agar with Chloramphenicol (SC) plates (Merck, Germany). Cultures and were incubated at laboratory ambient (25-27°C) for one week aerobically.

Isolated moulds were identified on the basis of colonial morphology and slide cultures.¹⁰ Yeast colonies, were detected by growth on Chromagar *Candida*, germ tube test and production of chlamydoconidia on corn meal agar.¹¹ In the present study three cases of otomycosis due to *Malassezia* were also identified only by direct smears.

RESULTS

The mycological examinations revealed presence of fungi in 45.6% of cases, 53.3% females and 46.7% males. However there is no difference in occurrence of disease between male and female ($\chi^2 = 0.196 / df = 1, P \text{ value} = 0.681$). The most common complaints in patients with otomycosis were otorrhea followed by pruritis, otalgia, aural fullness, burning sensation, tinnitus, vertigo and headache. The most common sign in patients with otomycosis were swelling (33.0%) and redness (28.0%) of the external auditory canal skin. No case of otomycosis was associated with pustules or ulceration. In the majority of patients (75.0%), the tympanic

membrane remained free of lesions; in the others it was opaque (23.0%) or had a central defect (12.0%). In cases of otomycosis secretion were usually scant (37.0%) or had the appearance of a dry plug (15.0%). In addition the secretion was more frequently black in color (9.0%).

The majority of strains (65.4%) were classified as belonging to the genus *Aspergillus*, namely, *A. niger* (30.8%), *A. flavus* (23.1%), *A. terreus* (7.7%) and *A. persicolor* (3.8%). *Candida albicans*, *C. parapsilosis* were responsible for 19.2% of infection. In this study only one isolate of *Penicillium* spp. was detected. On the other hand in three cases, *Malassezia* spp. was only detected on direct smears (Table-I).

DISCUSSION

Otomycosis usually occurs most frequently in the adults, and is less common among children. Many otomycosis cases have been reported in ages between 16-30 and 31-40.^{2,5,8} In the present study only one case of otomycosis was seen in a 9 years old child. Several studies show that otomycosis is more common in females (especially housewives) than males.^{1,12,13} The frequency of otomycosis in males (53.3%) was more than females (46.7%). In this study; however, there was no statistical difference between occurrence of the diseases in the two genders. In our study, we found that the disease is more common in young men, which is similar to the findings of the other researchers.^{7,8,10} In the

Table-I: The distribution of the fungal isolates

Isolates	Number (%)
<i>Aspergillus niger</i>	8(30.8)
<i>A. flavus</i>	6(23.1)
<i>A. terreus</i>	2(7.7)
<i>A. persicolor</i>	1(3.8)
<i>Candida albicans</i>	3(11.5)
<i>C. parapsilosis</i>	2(7.7)
<i>Penicillium</i> spp.	1(3.8)
<i>Malassezia</i> spp.	3(11.5)
Total	26(100)

present study, otomycosis was responsible for 45.6% of external otitis in patients. In the two studies carried out by Kuylen¹⁴ and Pavlenko *et al.*,¹⁵ fungi were 26.7% of external otitis patients. Others studies in Iran shows that fungi were responsible for 38%-74% of external otitis.^{1,5,16} External fungal otitis is a secondary infection and various factors have been proposed for fungal invasion.^{2,7,15} Our patients had a history of secondary bacterial infection and previous antibiotic therapy for one to four months. Our patients were admitted in the winter (December-February), when temperature was around 5-20°C in Ahvaz. Dusty conditions for several days in Ahvaz and a moderate temperature (suitable for fungal growth) are probably important for the disease.

In our study otomycosis was one of the most common reasons for patients with external otitis symptoms, who did not respond to conventional treatment. In order to solve these therapeutic difficulties, comprehensive mycological examinations that are often avoided during routine clinical procedures must be performed. The most common complaints in otomycotic patients were otorrhea, pruritis and eachache similar to other reports.^{15,17,18} The most common physical findings in our study were swelling and redness of ear canal. Finally in our study, secretion, white, black and dry plaques were similar to other studies.

Infectious mould agents which are present in environment include: *Aspergillus* species, *Penicillium*, *Scopulariopsis*, *Rhizopus*, *Mucor*, etc. Several studies showed *A. niger* as major agents of otomycosis in Iran.^{1,2,4,13,16} Ozcan *et al.*,⁷ and Hurst¹⁹ were reported *A. niger* as a major etiologic agent of otomycosis in Turkey and Australia. However Kaur *et al.*,⁸ reported *A. fumigatus* as major agent, followed by *A. niger*. Other species of *Aspergillus* that have been associated with otomycosis are *A. flavus*¹² and *A. fumigatus*.⁸ Also *Penicillium*, *C. albicans* and *C. parapsilosis* have been associated with otomycosis.^{4,12,15} In our study *A. niger* was the most common isolate, followed by *A. flavus*, *A. terreus* and *A. persicolor*. Our study shows that *Candida* species are responsible for 19.2% of fungal

infection similar to Araiza *et al.*,²⁰ although in Dorko²¹ report were main etiologic agents.

Although *Malassezia* species were isolated from ear canal,^{22,23} there is no information about the presence of *Malassezia* as etiologic of otomycosis in humans. In the present study we isolated *Malassezia* from the three cases of subjects with otomycosis which were clinically confirmed by us.

CONCLUSION

In the present study fungi were the etiological factor for otomycosis in 45.6% of cases. In order to solve the therapeutic difficulties and to apply the most adequate treatment, comprehensive mycological examinations, which are often avoided during routine clinical examination, must be performed.

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