

Evaluation of the Prevalence of Otomycosis in Patients Referred to the ENT Clinic

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Abstract

Objective: Otomycosis is a common fungal infection of the outer ear that is seen in tropical and subtropical regions of the world. This disease is one of the common problems that ENT specialists, face. Therefore, this study was conducted to evaluate the status and frequency of this disease in patients referred to the ENT clinic of Salmaniya Medical Complex, Kingdom of Bahrain for one year (2019-2020). **Materials & Methods:** Thirty-five patients (23 males and 12 females) were mycologically examined with a clinical diagnosis of otomycosis. In order to diagnose the disease, first ear sampling done and then the collected samples directly tested with 10% KOH and culture of samples was performed on Saburo dextrose agar and Saburo dextrose agar containing chloramphenicol. In order to determine the fungus species, various laboratory methods and differential tests were used. **Results:** In this study, out of 56 patients with clinical diagnosis of otomycosis, according to laboratory results, only 38 patients (67.8%) were diagnosed with otomycosis. Of these, 18 patients (32.1%) were male and 20 (35.7%) were female. The highest number of cases was observed in the age group of 30 - 40 years. Isolated fungal agents were: *Aspergillus niger* 24 cases (63.1%), *Candida albicans* 9 cases (23.7%), *Aspergillus fumigatus* 2 cases (5.3%), *Aspergillus glaucous* 2 cases (5.3%), and *Penicillium* one case (2.6%). **Conclusion:** In this study, the most common fungi isolated from patients with otomycosis were *Aspergillus* and *Candida* species, which is consistent with other studies. The present study showed, otomycosis cannot be diagnosed by clinical symptoms alone and it requires laboratory diagnosis.

Keywords

Otomycosis, *Aspergillus niger*, *Candida albicans*

1. Introduction

Fungal spores are abundant in the respiratory air. On average, there are thou-

sands of fungal spores per cubic meter of ambient air. Also, about 250,000 different fungal spores enter the human lung through respiration every minute [1] [2]. The presence of these spores in the air causes problems during eye, orthopedic, ear, nose and throat surgeries [3]. External ear infection is one of the most common problems faced by physicians, especially ENT specialists. External ear infection (otitis externa), inflammation of the external duct and earlobe, which is painful, in patients with immunocompromised condition can be life threatening [4] [5].

Otomycosis is a common fungal infection of the ear that is found in tropical and subtropical regions of the world. Meyer first described the fungal infection of the external ear canal in 1884 [6], which account for more than 20% of external ear infections in some parts of the world. In some cases, manipulation and cleaning of the ear by the patient can be predisposing factors [7]. Although a wide range of fungi have been reported to cause otomycosis, the most common are *Aspergillus niger*, *Aspergillus flavus*, *Candida famata*, *Aspergillus terreus*, *Candida parapsilosis*, *Candida utilize*, *Rhizopus stolonifera*, *Candida guilliermondii*, *Candida krusei*, *Cryptococcus laurentii* and *Penicillium duclauxi*. According to some previous studies, all cases of otomycosis are caused by *Aspergillus* and *Candida* species. Of course, *Penicillium* has also been mentioned as a causative factor [8] [9]. In general, this disease is significant because many physicians, particularly ENT specialists, have difficulty treating patients with otomycosis, particularly those who are immunocompromised and have been chronically ill [10]. The causes of otomycosis are mainly mycelial or mold fungi that are abundant in the environment and are transmitted to humans through dust and contaminated equipment. The purpose of this study was to investigate the relative frequency and prevalence of the disease in patients referred to the ENT clinic of Salmaniya Medical Complex.

2. Methods & Materials

In this study, which was performed for one year during January 2019 and January 2020 on patients referred to the ENT clinic, 56 patients (including 26 males and 30 females) with clinical diagnosis of otomycosis were studied mycologically. Clinical diagnosis was made based on clinical signs and observation of fungal elements in the outer ear by otoscope. Ear sampling was performed with sterile swab moistened with sterile saline. Direct experiments were performed with 10% of KOH to observe fungal elements including hyphae, spores and germinated yeast. Samples were cultured on two media: Sabouraud dextrose agar and Sabouraud dextrose agar containing chloramphenicol (0.05 mg/ml). The inoculated plates were kept at laboratory temperature (25°C) for 4 weeks for fungal growth and species determination. Fertility and morphology tests were performed on Corn Meal agar medium with Tween 80 to identify yeast species. Corn Meal Agar with Tween 80 is utilized primarily for the testing of *Candida* species for their ability to produce chlamydo spores. Also, it can be used as a general pur-

pose medium for the cultivation of fungi.

3. Results

In this study, out of 56 patients with clinical diagnosis of otomycosis, 38 (67.8%) were diagnosed with this disease. Of these, 18 (32.1%) were male and 20 (35.7%) were female (Table 1).

The frequency distribution of patients with a diagnosis of otomycosis is shown in Figure 1. The highest number of cases was observed in the age group of 40 - 50 years (Figure 1).

As shown in Table 2, the fungal agents isolated are: *Aspergillus niger*, 24 cases (63.1%), *Candida albicans*, 9 cases (23.7%), *Aspergillus fumigatus*, 2 cases (5.3%), *Aspergillus glaucus*, 2 cases (5.3%) and *Penicillium* 1 case (2.6%) (Table 2).

Table 1. Frequency distribution of patients with otomycosis visited ENT Clinic 2018-2019 according to the sex.

Total	Male	Female	Total
Number of patients	26	30	56
Number of Positive Cases	18	20	38
Positive cases in Percentage	32.1%	35.7%	67.8%

Table 2. Frequency distribution of the fungal types isolated from positive cases.

Type of Fungus	Number	Percentage
<i>Aspergillus niger</i>	24	63.1%
<i>Candida albicans</i>	9	23.7%
<i>Aspergillus fumigatus</i>	2	5.3%
<i>Aspergillus glaucus</i>	2	5.3%
<i>Penicillium</i>	1	2.6%
Total	38	100%

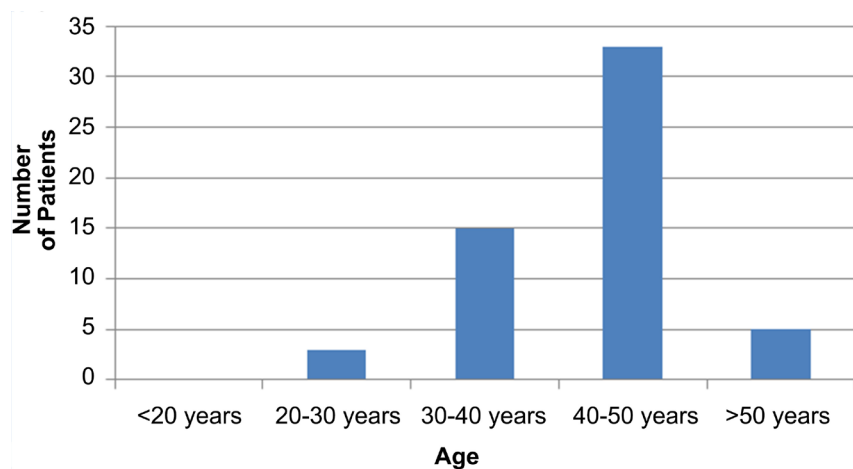


Figure 1. Frequency distribution of total number of patients with clinical diagnosis of otomycosis visited ENT clinic according to age.

4. Discussion

Otomycosis is quite prevalent in the Kingdom of Bahrain as well as other countries due to temperature, humidity, and environmental dust. The disease is more common in people who work outdoors and are exposed to fungal spores. These people are mostly young and middle aged [10], which the present study also confirmed (Figure 1). *Aspergillus* and *Candida albicans* were the most common fungal species isolated from otomycosis patients in 2003 [11]. In addition, Kaur *et al.* reported the prevalence of *Aspergillus fumigatus*, *Aspergillus niger*, and *Candida albicans* in their study in 2000 [12]. The most common fungi isolated from patients in this study were *Aspergillus* and *Candida* species, which correspond with other studies. The reason for the high prevalence of *Aspergillus* species can be attributed to its high presence in dust and acidity of the ear canal as *Aspergillus* species grow more at pH 5 to 7 [13]. In this study, *Aspergillus niger* was the most abundant species of *Aspergillus*, which is consistent with the study of other researchers [14] [15] [16] [17].

In this study, after *Aspergillus* species, *Candida* species were the most common fungi, which is consistent with the study of others [18] [19]. Protease produced by *Candida* species is implicated in the pathogenesis of *Candida*-caused otomycosis, according to research. This enzyme is involved in the colonization of *Candida* species on the skin and ears [20].

In the present study, the percentage of positive cases (with otomycosis) in patients with clinical symptoms of otomycosis was reported to be 67.8%, which indicates that the disease cannot be diagnosed by clinical symptoms alone and requires laboratory diagnosis.

5. Conclusion

In ENT practice, otomycosis is a common problem. It is critical to identify the causative fungal species in order to treat cases properly. The most common fungi isolated from patients with otomycosis in this study were *Aspergillus* and *Candida* species, which is consistent with previous research. According to the findings of this study, otomycosis cannot be diagnosed based solely on clinical symptoms and requires laboratory testing.

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Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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