

Otomycosis in Patients Attending to a Tertiary Care Centre: A Clinical and Microbiological ProfileAshutosh Kumar¹, Gunjan², Vinit Kumar Anand³¹Senior Resident, Department of ENT, Jawahar Lal Nehru Medical College and Hospital, Bhagalpur, Bihar, India²Senior Resident, Department of Obstetrics and Gynaecology, Patna Medical College and Hospital, Patna, Bihar, India³Senior Resident, Department of ENT, Jawahar Lal Nehru Medical College and Hospital, Bhagalpur, Bihar, India

Received: 17-08-2023 / Revised: 18-09-2023 / Accepted: 14-10-2023

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Conflict of interest: Nil

Abstract

Introduction: Otomycosis, or fungal otitis externa, is a superficial, subacute, or chronic infection of the External Auditory Canal (EAC). It is characterized by tympanic membrane perforation, otalgia, edema, pruritus, scaling, hearing loss, and ear discharge. Fungus-based infections can coexist with bacterial infections as the primary pathogen.

Aim of the study: To find the signs and symptoms of otomycosis and the agents responsible for it.

Materials and Methods: A tertiary hospital's Microbiology department and the Ear, Nose, and Throat (ENT) department conducted the current study over the course of six months. 300 samples were taken from individuals with otomycosis who had received a clinical diagnosis. Standard microbiological techniques were used to identify the bacteria and fungi isolates, and the isolates' predisposing factors, demographics, and employment were evaluated. Categorical data was shown as frequencies and proportions. The test of chi-square was used to analyze various pieces of information, including the prevalence of otomycosis, its risk factors (ear pricking and oil instillation), and others. Major differences were known as P-values of 0.05 or less.

Results: This study's male:female ratio was 1:1.30, indicating males are less than females. Most incidents occurred in people between the ages of 21 and 30 (24.67%), while housewives saw the highest cases (36.67%). The most often found fungi associated with otomycosis were *Aspergillus* species (70.37%) and *Candida* species (15.74%). *Pseudomonas* species (13.33%) was the most prevalent causal agent in bacterial isolates; however, mixed fungus and bacterial infections were also reported.

Conclusion: According to the current study, the most prevalent species connected to otomycosis are *Aspergillus* fungi. The custom of applying oil and poking your ears instillation, which results in otomycosis, must be made known to the general population.

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Introduction

An external auditory canal (EAC) infection that is superficial, subacute, or chronic caused by a fungus is known as otomycosis or fungal otitis externa. Issues with the middle ear are characterized by swelling, itching, ear discharge, hearing loss, otalgia, fullness, tympanic pain, scaling, and membrane perforation [1].

Otomycosis prevalence is dependent on various climatic circumstances. According to studies, more cases are seen in the hot, dusty, and tropical regions, according to Fasunla J et al. and Pontes ZB et al [2, 3]. In India, otomycosis is a widespread medical condition. There are many systemic or local risk factors for otomycosis. Long-term use of antibiotics, immunosuppressed status, or coexisting diseases

like diabetes are systemic risk factors for otomycosis [4, 5].

In contrast, EAC humidity levels are high, and epithelial debris accumulates on instruments, or trauma brought on by using non-sterile sharp or pointed objects like keys, hairpins, and matchsticks, among other things, maybe local risk factors [6]. Infections caused by fungi can be secondary to bacterial infections or the primary pathogen. Many fungi can bring on otomycosis, although *Aspergillus niger* and *Candida albicans* are the most common offenders [7, 8].

Aim of the Study

The recent investigation is focused on identifying the bacterial and fungal agents that cause otomycosis and the related risk factors.

Materials & Methods

The Department of Microbiology at a tertiary care centre conducted the current study for six months. 300 samples altogether were gathered.

Inclusion Criteria: Patients with otomycosis who have been clinically diagnosed and who also provided written consent, must exhibit symptoms such as itching, pain, a sense of clogged otoscopic findings indicating moist tinnitus, deafness, and discharge were included in the study.

Exclusion Criteria: The patients who declined to sign the consent form, and patients with clinically confirmed otomycosis underwent evaluation and analysis of their demographic profiles and risk indicators (such as age, sex, and employment), and submitted complaints utilizing a premade proforma were excluded from this study.

Data Collection

Obtaining two ear swabs was done. One ear swab was treated with Gram staining, 10% KOH, and wet mount for direct microscopy, while a second swab was employed for bacterial and mycological culture. A specific growth medium for fungi was Sabouraud's Dextrose Agar (SDA) with chloramphenicol (Himedia, India).

Two SDA slants were inoculated with ear swabs that had been chloramphenicol-treated, and they were subsequently cultured for four weeks at 37° Celsius and 25° Celsius with frequent checks for fungal development.

If there was any filamentous fungal development, the filamentous fungal isolate was identified using a Lactophenol Cotton Blue (LPCB) mount and microscopy. Colonies were inoculated on HiChrome agar to describe the *Candida* isolates for species identification.

The material was grown on Bacterial Growth for 48 hours, required for Blood Agar and MacConkey Agar to be tested to identify aerobic pyogenic bacteria. The bacterial isolates were identified using conventional bacteriological methods.

Statistical Analysis

The chi-square test in SPSS version 25 was used to analyze the prevalence of otomycosis. P-values of 0.05 or less were regarded as significant. Frequencies and percentages were used to present the statistics from the categories.

Results

Derived from the complaints from otomycosis patients who have received a clinical diagnosis. The two most common complaints were ear blockage (66%) and itching (33.33%), while ear discharge and tinnitus (8.66% and 14%) were the least common (Table 1).

Table 1: Distribution based on patient's complaints

	Clinical Manifestation	Yes	No
1	Ear Pain	56%	44%
2	Ear Discharge	8.66%	91.33%
3	Tinnitus	14%	86%
4	Itching	33.33%	66.66%
5	Blocked Ear	66%	34%

The ratio of male to female was 1:1.30 (65:85), with female patients predominating over male patients. While in the urban population, females were impacted in a ratio of 1.34:1 more than males (Table 2).

Table 2: Distribution based on demography

Area	Urban	%	Rural	%	Total
Male	100	33.33%	30	10%	130
Female	134	44.67%	36	12%	170
Total	234	78%	66	22%	300

The 21 to 30 age group had the most instances, and the age group of 60 years or more had the fewest cases. 234 (78%) of the 300 patients who participated in this study were from metropolitan backgrounds, in contrast to 66 (22%) patients from rural areas. Housewives had the highest incidence, with 110 instances (36.67%), followed by students with 102 cases (34.00%) and farmers with 24 cases (8%). In contrast, auto drivers, cobblers, engineers, mechanics, shopkeepers, supervisors, welders, and artisans had the lowest incidence.

Oiling, topical and systemic antibiotic use, and ear pricking were the common risk factors responsible for otomycosis, with respective rates of (81.33%), (24.67%), and (22%). While just 1.33 percent of diabetes patients had cases, everyone in this trial tested HIV-negative.

According to the study, *Aspergillus niger* accounted for 50% of all molds. It was followed in importance by *Aspergillus fumigatus* (9.25%), *Aspergillus flavus* (7.40%), and *Aspergillus terreus* (3.70%).

Scopulariasis species (0.92%) had the fewest cases, followed by Paecilomyces, Rhizopus microsporus, Rhizomucor, Syncephalastrum, and Basidiobolus species.

Chrysosporium species was linked to Alternaria spp. (0.92%), Bipolaris spp. (0.92%), Cladosporium spp. (0.92%), and Curvularia spp. (0.92%) in dematiaceous fungi. Candida krusei (12.96%), Candida albicans (0.92%), Candida dubliniensis (0.92%), and Candida parapsilosis (0.92%) were identified from yeast-like fungi. In cases of aerobic pyogenic, the most frequent isolate of bacteria was Pseudomonas species (13.33%), followed by Escherichia coli (0.67%), Klebsiella spp. (10.1%), and Staphylococcus aureus (2.38%).

Discussion

In recent decades, researchers Agarwal P., [9] and numerous others concluded that tropical and subtropical areas, including India, had a very high prevalence of fungal otitis externa [10, 11, 12].

The current study's high prevalence of otomycosis (72%) is comparable to those reported in investigations by Barati B et al. [13] and Kaur R et al. [5], which exhibited prevalence rates of 74.6% and 69%, respectively. Fungi are saprophytic in nature and frequently found on rotting plant matter; workers in moldy or dusty environments frequently experience discharge, earache, and tinnitus. The greater otomycosis cases may be related to dampness. In line with studies conducted based on research done by Pontes ZB et al., [3] Yehia MM et al., [14], Barati B et al., [13] and Fasanla J. [2], the ratio of females in this study was higher than that of males.

All age groups in the current study experienced an infection incidence. It contrasts nicely with studies of Prasad SC et al. [1], and Agarwal P [9]. It was observed that the age group of 21–30 years had the highest prevalence of followed by the age group of 31–40 years (19.33%). They also reported, respectively, 21.33% and 66.31%. 36.67% of the 300 sample cases involved housewives, similar to the 28.60% discovered in the Adoga AS and Iduh AA [15] study. According to Agarwal P [9], farmers and other outdoor workers who were subjected to dust and fungus due to their employment conditions were found to be the majority of cases. In contrast, Prasad SC et al. [1] discovered that 70% of patients with the disease were employed in agriculture.

Patients with ear pricking (81.33%) or a tendency to clean their ears with contaminated objects such as a key or hairpin had a higher prevalence of otomycosis. etc., causes the comparable inoculation of fungal debris in the EAC, an identical study done by Pontes ZB et al [3]. In the study conducted by Prasad SC et al. [1], the most frequent, or 42% causal agent, was injecting coconut oil into the ear.

There was a 24.67% difference in the usage of systemic antimicrobials and topical antibiotic ear drops.

Aspergillus spp., Penicillium spp., in the study by Prasad SC et al., [1] C. albicans, Rhizopus spp., and Chrysosporium spp. were all isolated in 1% of the cases. According to the results of Singer DE et al.'s study [16], Pseudomonas spp. was shown to be the cause of 20 (13.33%) of the study group's cases of fungal bacterial association.

Aspergillus spp. and Candida spp. were the most prevalent fungi discovered in cases with otomycosis in our study, which is consistent with the work by Hagiwara S et al., Aneja KR et al., [17] and Agarwal P [9].

However, antifungal medications successfully cure and remove infections, so the predisposing variables must be considered. Tropical medications are ineffective until the epithelium debris and discharge are eliminated because most fungi prefer moist environments and environments with epithelial debris. Therefore, it is advised that patients with otomycosis practice good personal hygiene meticulous drying, and cleaning of their EAC.

Conclusion

In tropical and subtropical areas, fungus otitis externa is very common. In the current investigation, Aspergillus spp., the most common fungi involved in otomycosis, were Candida spp., Rhizomucor, and Dematiaceous fungi. There was bacterial co-infection brought on by Pseudomonas spp. and other bacterial isolates, in addition to other strange fungi like Candida spp., Rhizomucor, and Dematiaceous fungus. Since ear pricking is the most common risk factor for otomycosis, the general public must know its serious consequences.

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