

Original Research Article

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Otomycosis-Clinical and Mycological Spectrum

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ABSTRACT

Otomycosis is an external ear canal infection caused by various fungi. The aim of this study was to identify the fungal agents, predisposing factors and characteristics of patients. Between June 2018 to December 2018, 66 patients with clinical suspicion of otomycosis were enrolled and the samples from their external ear were examined for any mycological infection. Otomycosis was confirmed after mycological diagnosis in 60 of clinically suspected patients. Otomycosis was found to be more common among females (38) and majority in the age-group 30-40 years (34.84%). Pruritus was the most commonly presenting symptom seen in 57.5% of the otomycotic patients. Self cleansing was found to be predominating predisposing factor for Otomycosis (50%), followed by Instillation of coconut oil (13.63%). *Aspergillus niger* 29(43.93%) was the predominant species isolated, second most common species isolated was *Aspergillus flavus* 20(30.3%), *Aspergillus fumigatus* 5(7.57%), *Candida* species 3(4.54%), *Penicillium* species 2(3.03%) and *Mucor* 1(1.51%) were other species isolated. Clinical suspicion of otomycosis is important to prevent unnecessary use of antibiotics. The present study highlights the practice of self cleaning and using home remedies and eardrops to get relief from sensation of blocked ear and itching which are the predominant risk factors for otomycosis.

Keywords

Otomycosis,
Aspergillus,
Candida,
Pruritus

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Introduction

Otomycosis is a common condition, frequently encountered in otolaryngology outpatient clinics. It is defined as a fungal infection affecting the external ear canal in the majority of cases. Less commonly, it can involve the middle ear, if the drum is perforated, and the mastoid cavity following an open mastoidectomy¹ Its prevalence has been quoted to range from 9%² to 27.2%^{3, 4} among patients who present with signs and

symptoms of otitis externa and up to 30%⁵ in patients with discharging ears. It is worldwide in distribution with a higher prevalence in the hot, humid, and dusty areas of the tropics and subtropics^{3, 4, 6, 7}. Overview of the literature reveals otomycosis to be a common medical problem in India^{8, 9}. Fungi can either be the primary pathogen or be superimposed on bacterial infections. Most patients suffering from early otomycosis complain of severe itching which often progress to pain, hearing loss, aural discharge, and often leading to

tympanic membrane perforations⁹. Although *Aspergillus niger* and *Candida albicans* are by far the most common offenders^{3,6-9}, a wide spectrum of other fungi can cause otomycosis. Various factors have been proposed as predisposing factors for otomycosis, including a humid climate, presence of cerumen, instrumentation of the ear, self-inflicted trauma (use of q-tips to clean the ear), immunocompromised host, and, more recently, increased use of topical antibiotic/steroid preparations.¹⁰

The study is taken up to know the various fungi responsible for ear infection and to compare with demographical details.

Materials and Methods

This study is an institution based prospective study. The ethical clearance was obtained from institutional ethical committee. The subjects included for the study are those who attended ENT OPD with symptoms like itching, pain, feeling of blocked ear, deafness, discharge and otoscopic findings revealing wet or dry matted masses of hyphae/spores or thick, white cheesy material.^{11, 12}. Patients with otitis externa due to other causes like history of trauma to external auditory canal and prior ear surgery were excluded from the study

The study was conducted during the period of June 2018-December 2018. Total of 66 subjects fulfilling the inclusion criteria was included after taking informed consent. The detailed predesigned proforma was filled and sample was collected with two sterile swabs and sent to the microbiology department.

Sample processing

Specimens were collected aseptically using two sterile cotton swabs from each diseased ear canal and sent immediately to microbiology laboratory. The samples were

processed following standard fungal identification protocol. Of these, one swab was subjected to direct microscopic examination in 10% KOH wet mount and the other was inoculated on Sabouraud Dextrose Agar with antibiotic (Gentamicin and Chloramphenicol) in duplicate and incubated at 25⁰C & 37⁰C for upto three weeks. The culture tubes were examined for any fungal growth, daily during the first week & then twice weekly during the next two weeks. Positive cultures were identified by colony morphology and microscopic morphology in Lactophenol Cotton Blue (LCB) mount and Slide culture. All *Candida* isolates were identified by Germ tube test & chlamydospore formation on Corn meal agar.¹³

Results and Discussion

In the present study, out of the total 66 cases of clinically-diagnosed otomycosis, 28 were males and 38 were females (Figure 1). The highest incidence of otomycosis was in the age group of 30-40 years and the lowest was noted in the age group of <10 years (Table 1).

In our study majority of patients presented with the symptom of Pruritis 38(57.5%) followed by Pain 21(31.8%). Other symptoms were Hearing loss 18 (27.2 %) and ear discharge 8 (1.21%) (Table 2).

Data of the various predisposing factors for otomycosis is given in Table 3. The incidence of otomycosis was high in patients with history of Self cleansing 33 (50%). The use of unsterile oil in an attempt to clean ear was found in 9 (13.63 %) patients, 10(15.15 %) patients were associated with Diabetes and least association was found in subjects with CSOM 6(9.09%)

Specimen was collected from 66 clinically diagnosed cases of otomycosis out of which 60 specimens yielded growth (Table 4). All

specimens yielded single organism. *Aspergillus* (81%) was the commonest species found. *Aspergillus niger* 29(43.93%) was the predominant species isolated. Second most common species isolated was *Aspergillus flavus* 20(30.3%). *Aspergillus fumigatus* 5(7.57%), *Candida* species 3(4.54%), *Penicillium* species 2(3.03%) and *Mucor* species 1(1.51%) were other species

Table.1 Age wise distribution of otomycosis patients

Age (in years)	Total	%
<10	2	3.03
11-20	5	7.57
21-30	10	15.15
31-40	23	34.84
41-50	11	16.16
51-60	9	13.63
>60	6	9.09
total	66	100

Table.2 Presenting symptoms of cases

Presenting symptom	No of patients	%
Pruritis	38	57.5
Pain	21	31.8
Hearing loss	18	27.2
Discharge	8	1.21

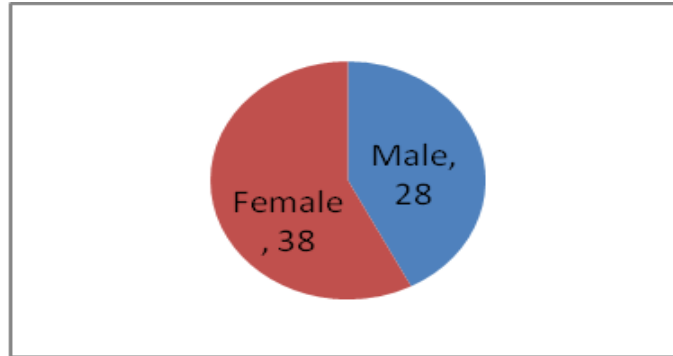
Table.3 Predisposing factors for otomycosis

Predisposing factor	Frequencies
Self cleansing	33(50%)
Instillation of oil	9(13.63%)
Instillation of topical ear drops	8(12.12%)
Diabetes	10(15.15%)
CSOM	6(9.09%)

Table.4 Fungal isolates from otomycosis patients

Fungal isolates	No of patients
<i>Aspergillus niger</i>	29(43.93%)
<i>Aspergillus flavus</i>	20(30.3%)
<i>Aspergillus fumigatus</i>	5(7.57%)
<i>Candida</i> species	3(4.54%)
<i>Penicillium</i> species	2(3.03%)
<i>Mucor</i> species	1(1.51%)
No fungal isolate	6(9.09%)
Total	66

Fig.1 Sex distribution among cases



Otomycosis is a significant mycotic infection of external auditory canal frequently encountered by otolaryngologist and can usually be diagnosed by clinical examination. It is highly prevalent in tropical & subtropical regions of the world. This could be due to hot & humid weather and presence of dust in the environment, all of which favours the dissemination and growth of fungus.

This study was aimed to assess the relationship between the fungal appearance and clinical symptoms of otomycosis, and to determine most prevalent microbial isolate in otomycosis. A total of 66 (38 males, 28 females) clinically diagnosed cases of otomycosis were included in the study. In our study, females (57.6%) were more commonly affected by Otomycosis than males (42.4) this is in agreement with studies by Aneja KR et al and Panchal *et al.*,^{14,15}. The percentage of females was 57% in our study, which may be due to the household work like dusting, cleaning or gardening thus exposing them to the fungal spores.

The age groups between 6-70 years were considered. Incidence was highest in young adults between 30-40 yrs age group. Considering the fact that otomycosis can occur at any age, the common age groups affected were 21-30 years (15.15%) and 31-40 years (34.84%), 44-50 years (13.63%) i.e. adults which constituted the working

population. This observation is in accordance with Desai KJ *et al.*, Nandyal CB et al and most other studies from India.^{16, 17}. The people in age group from 11-40 years usually spend more time in the outdoors and are more exposed to the fungal spores due to occupational exposure, travelling etc making them more vulnerable to otomycosis.

In the present study, the predominant predisposing factor for Otomycosis was found to be self cleansing (50%). Metallic /wooden/paper roll etc commonly used for cleaning ear canal, often leads to trauma of the canal skin into which the fungal spores may seed in. Moreover it damages the normal lining epithelium, which is the natural defense against such infections. This is in accordance with the study conducted by Pontes *et al.*,¹⁸

In our study second most common predisposing factor is oil instillation (13.63%) into the external ear and association of Diabetes (15.15%). Other predisposing factors were chronic suppurative otitis media and prior use of topical antibiotic eardrops. Oils have fatty acids that provides a suitable medium for the growth of fungus, which explains the higher incidence of otomycosis in people who instill oils regularly. Recurrent use of antibiotic drops, steroids, antiseptics or wax solvent ear drops applications alters the local environment of the external ear canal and allows super infection by fungus. This is

in accordance with the study conducted by Pontes *et al.*,¹⁸.

In our study itching in the ear was the commonest symptom in 57.5% of the patients followed by pain (31.8%) in ear and hearing loss (27.2%), similar findings was found in other studies¹⁹. The fungus growth mixed with the epithelial debris and cerumen forms characteristic mycotic plug which gives rise to the symptom of blocked ear and hearing loss.

In our study, *Aspergillus niger* (43.9%) was the most commonly isolated organism. This finding is similar to what was observed by other studies^{20, 21}. *A. flavus* (30.3%) was found to be the second most common causative agent followed by *A. fumigates* (7.5%). Other fungi that have been associated with otomycosis in our study were *Candida*, *Mucor* and *Penicillium* sp. However, the results obtained by Kaur *et al.*,²² show that in the tropical regions, the commonest aetiologic agents accountable for otomycosis are *A. fumigates* (41.1%) and *A. niger* (36.9%).

Aspergillus species and *Candida* species are the most commonly identified fungal pathogens in Otomycosis²³. *Aspergilli* have an optimum pH range of 5.7 and a maximum growth rate at a temperature of 37⁰C and this is conducive for all species of *Aspergillus* isolated in the present study. This is supported by the predilection of fungi to grow in the inner one-third of external auditory canal^{10, 24}.

In conclusion, otomycosis is fungal infection of the EAC that is frequently encountered in patients attending otolaryngology clinics. As clinical features are non specific, this study demonstrates the laboratory diagnosis of otomycosis and its confirmation by fungal culture which helps in tackling the disease. Clinical suspicion of otomycosis can also prevent unnecessary use of antibiotics.

In the present study, the predominant predisposing factor for Otomycosis was found to be self cleansing (50%). Metallic /wooden/paper roll etc commonly used for cleaning ear canal, followed by common predisposing factor is oil instillation (13.63%) often leads to trauma of the canal skin damaging the normal lining epithelium into which the fungal spores may seed in. Constant use of ear buds and unnecessary usage of ear drops may be avoided as they are the predominant risk factors for otomycosis. Educating the patients about risk factors, impact of otomycosis and its complications will help to reduce the disease burden.

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