

## Etiological profile, Clinical features and risk factors of Otomycosis at a tertiary care hospital

MP Saraswathy<sup>1,\*</sup>, Aruna B. Patil<sup>2</sup>, Raj Prakash<sup>3</sup>

<sup>1</sup>Assistant Professor, Dept. of Microbiology, <sup>2</sup>Assistant Professor, Dept. of Community Medicine, ESIC Medical College & PGIMS, Chennai, Tamil Nadu, <sup>3</sup>Associate Professor, Dept. of ENT, Shri Sathyasai Medical College & Research Institute, Kancheepuram

**\*Corresponding Author:**

Email: drmpsaraswathy@gmail.com

### Abstract

**Aims and Objectives:** Otomycosis is a fungal infection of middle ear with infrequent complications involving middle ear. In an era of modern medicine generous use of antibiotics and advanced management give way to many opportunistic infections. Though otomycosis is a localised infection, it might leads to prolonged morbidity and disability like hearing loss. Hence, this study was aimed to find out aetiology, clinical presentation and various predisposing factors of otomycosis in a tertiary care hospital.

**Materials and Method:** A descriptive study was carried out in the department of Microbiology and ENT in a tertiary care hospital. About 129 samples were taken from clinically suspected otomycosis patients and cultured for fungal pathogens.

**Results and Discussion:** About Fifty four percentage (54%) of cases were mycologically confirmed as otomycosis and *Aspergillus niger* (57%) was the predominant isolate followed by *Candida albicans* (16%). Ear block and Ear pain were common symptoms in otomycosis. Usage of Ear buds and Ear drops were the common predisposing factors to otomycosis.

### Introduction

Fungal infection involving the pinna and external auditory meatus is termed as Otomycosis.<sup>(1)</sup> It is one of the commonest conditions encountered in otolaryngology OPD. The infection may occur as sub acute or acute and present with symptoms like itching, ear pain, ear block, ear discharge and hearing impairment.<sup>(2)</sup> It is sometimes associated with bacterial infection in its status as an opportunistic infection. Otomycosis can occur in both temperate and tropical environment. The prevalence of disease is greatest in hot, humid and dusty areas.<sup>(3)</sup> The commonest etiological agents associated with otomycosis are *Aspergillus* species and *Candida* species.<sup>(4,5)</sup> So far there were only few studies published from India describing the etiological profile and correlation of risk factors in otomycosis. Hence we have planned to conduct this study in our setup.

### Materials and Method

**Study place:** This was a cross sectional study carried out at the Department of Microbiology and ENT, at a tertiary care hospital, Tamil Nadu from July 2012 to July 2013.

**Inclusion criteria:** Universal sampling method was used, all patients with suspected otomycosis from various age group were enrolled into the study group.

**Exclusion criteria:** Patients with recurrent otomycosis, chronically debilitated and severe immunocompromised state were excluded from the study.

**Methodology:** Relevant clinical data such as predisposing factors- previous antibiotic usage, diabetes mellitus, swimming, usage of ear buds and ear drops, oil instillation, previous ear discharge, previous ear

surgery were collected from all patients. Two swabs were collected aseptically from each patient and transported to microbiology laboratory for processing. One swab was used for direct examination such as KOH mount and Gram's stain. The second swab was used for culture two sets in Sabouraud's dextrose agar with chloramphenicol and incubated at 25°C and 37°C respectively. The suspected moulds were identified based on macroscopic morphology on SDA and microscopic morphology in lactophenol cotton blue mount.<sup>(6)</sup> All *Candida* isolates were identified by germ tube test, colours produced in Chrome agar candida medium.<sup>(7)</sup>

Antifungal Susceptibility testing was performed for *Candida* isolates using Mueller Hinton agar containing 2% glucose and 0.5 µg/ml methylene blue. Sensitivity testing was done for fluconazole (25mcg) and nystatin (100units) as per Clinical laboratory standard institute guidelines (CLSI).<sup>(8)</sup>

**Ethical issues:** Informed consent was obtained from every patient during enrolment in to the study. Permission obtained from institutional ethical committee.

**Statistical analysis:** Statistical analysis was done using SPSS software. Chi square test was used to test symptoms and predisposing factors.

### Results

A total of 129 patients, 55 males and 74 females with clinical diagnosis of otomycosis were included in the study. Seventy patients (54%) had mycologically confirmed otomycosis. Various parameters of study population and comparison between mycologically

confirmed cases and culture negative cases are given in Table 1. Mean age affected was 32 years.

**Table 1: Comparison of culture positive and Culture negative cases**

Parameters	Culture positive (70)		Culture negative (59)		Study population (129)	
	No. of cases	%	No. of cases	%	No. of cases	%
<b>Sex</b>						
M	27	38.6%	28	47.5%	55	42.6%
F	43	61.4%	31	52.5%	74	57.4%
<b>Symptoms</b>						
Pain in ear	57	81.4%	47	79.7%	104	80.6%
Ear discharge	34	48.6%	37	62.7%	71	55%
Ear block	61	87.1%	41	69.5%	102	79.1%
Ear Itch	22	31.4%	19	32.2%	41	31.8%
<b>Pre disposing factors</b>						
Swimming	13	18.6%	19	32.2%	32	24.8%
Diabetes mellitus	3	4.3%	10	16.9%	13	10.1%
Drug intake	0		2	3.4%	2	1.5%
Ear Buds	46	65.7%	34	57.6%	80	62%
Eardrops	37	52.9%	36	61.0%	73	56.5%
Oil instillation	31	44.3%	23	39.0%	54	41.9%
Previous Ear discharge	15	21.4%	13	22.0%	28	21.9%
Previous ENT Surgery	4	5.7%	0	0.0	4	3.1%

**Table 2: Age distribution of otomycosis**

Descriptive Statistics					
Age					
N	Minimum	Maximum	Mean	Std. Error	Std. Deviation
129	4	84	32.7	1.4	15.6

**Table 3: Etiological profile of otomycosis**

Name of the fungus	Culture positive otomycosis (70)	
<i>Aspergillus niger</i>	40	57.1%
<i>Aspergillus terreus</i>	1	1.4%
<i>Aspergillus flavus</i>	3	4.3%
<i>Aspergillus fumigatus</i>	6	8.6%
<i>Candida albicans</i>	11	15.7%
<i>Non albicans Candida</i>	8	11.4%
<i>Rhizomucor</i>	1	1.4%

**Table 4: Data on Culture Positive, *Aspergillus* and *Candida* species**

	Mycologically confirmed Otomycosis (70)		<i>Aspergillus</i> species (50)		<i>Candida</i> species (19)	
	No. of cases	%	No. of cases	%	No. of cases	%
<b>Sex</b>						
Male	27	38.6%	21	42%	6	31.5%
Female	43	61.4%	29	58%	13	68.4%
<b>Symptoms</b>						
Pain in ear	57	81.4%	42	84%	14	73.6%
Ear discharge	34	48.6%	23	46%	11	57.8%
Ear block	61	87.1%	44	88%	16	84.2%
Ear Itch	22	31.4%	12	24%	10	52.6%
<b>Pre disposing factors</b>						

Swimming	13	18.6%	12	24%	1	5.2%
Diabetes Mellitus	3	4.3%	2	4%	1	5.2%
Ear Buds	46	65.7%	31	62%	14	73.6%
Eardrops	37	52.9%	24	48%	12	63.2%
Oil instillation	31	44.3%	20	40%	10	52.6%
Previous Ear discharge	15	21.4%	11	22%	4	21%
Previous ENT Surgery	4	5.7%	1	2%	3	15.7%

**Table 5: Chi-square test showing Diabetes mellitus as a risk factor**

Diabetes Mellitus	Culture			Chi-Square Tests	df	p value
	Positive culture	Negative culture	Total			
Yes	3 (4%)	10 (17%)	13(10%)	5.666	1	0.017 (S)
No	67 (96%)	49 (83%)	116(90%)			
Total	59 (100%)	70 (100%)	129 (100%)			

The sensitivity test was performed for *Candida* isolates. The isolates showed 100% sensitivity to fluconazole and 95% to Nystatin.

## Discussion

Diagnosis of otomycosis is usually made on clinical grounds<sup>(9,10)</sup> and treated empirically. Chronic untreated ear infections might lead to hearing loss, and learning disabilities in children and reduction of productivity rate in adults.<sup>(11)</sup> In diabetic patients good glycaemic control is necessary to avoid complications like tissue necrosis in otomycosis, which is caused by *Aspergillus*.<sup>(12)</sup> Otomycosis in previous ENT surgery patients is multifactorial. Recurrent drainage and antibiotic use, alteration of anatomy thereby cerumen production plays a vital role.<sup>(13)</sup> Hence, etiological confirmation is must to start local antifungal therapy.

The current study showed otomycosis in 54% (70/129) of study population. In this study incidence of otomycosis was high in middle age population. Mean age was 32 years (Table 2). Females (60%) were more commonly affected compared to male population (Table 1).

**Aetiology:** *Aspergillus* and *Candida* were the common species isolated from otomycosis, which is consistent with the previous studies.<sup>(4,5)</sup> Among fungal etiology *Aspergillus niger* (57%) top the list, next common agents are *Candida albicans* (16%), *Non albicans candida* (11%) and *A.fumigatus* (9%) (Table 3). A study from Karnataka showed *Aspergillus* as most common, *Penicillium* as the second commonest agent.<sup>(14)</sup>

**Symptoms:** Ear block (87%) and ear pain (81%) are the most common complaints followed by ear discharge (49%) and itching (31%). Itching was more commonly seen in *Candida* (52.6%) infections when compared to *aspergillus* (24%) infections.

**Predisposing factors:** Among the eight predisposing factors evaluated, usage of ear bud (65.7%), ear drops (52.9%), oil instillation (44.3%) are the most commonly

associated factors with otomycosis. Though diabetes was associated only in 4% cases, statistically significant (Table 5).

Swimming was predominantly associated with *aspergillus* infection (24%:5%) whereas previous H/o ENT surgery was associated with *Candida* (15.7%:2%) when compared to each other. There was considerable association between ear bud usage (74:62%), ear drops (63:48%), oil instillation (52.6:40%) with *Candida* and *aspergillus* infection (Table 4).

Antifungal susceptibility testing was performed for the *Candida* isolates and is 100% sensitive to fluconazole and 95% to Nystatin.

## Conclusion

There is no considerable change in etiological profile of otomycosis. The tested *Candida* species were almost sensitive to local antifungal agents like nystatin and fluconazole. Still constant surveillance of aetiology and antifungal susceptibility testing is mandatory to establish any change, since we are in an era of antimicrobial resistance. 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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