



A CLINICOMYCOLOGICAL STUDY OF OTOMYCOSIS FROM A TERTIARY CARE HOSPITAL IN RAJASTHAN

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ABSTRACT **Background:** Otomycosis is superficial fungal infection of the external auditory canal, commonly seen in tropical and subtropical regions of the world. External ear has an ideal warm and humid environment for the proliferation of fungus. **Objectives:** To determine the prevalence of various fungal etiological agents in clinically suspected cases of otomycosis & associated predisposing factors. **Materials & Methods:** Ear swabs were collected from 192 clinically suspected cases of otomycosis (from May 2016 to April 2017) and subjected to direct microscopic examination (10% KOH mount) and fungal culture. **Results:** Out of 192 patients, fungus was isolated from 168 (87.5%) cases. The highest incidence was noted in the age group of 21-30 years (27.3%), more prevalent in females (53%) with unilateral distribution more on left ear. Ear picking (72.6%) was the major predisposing factor and pruritis (88%) was the commonest complaint. *Aspergillus* species (93.8%), especially *A.niger* (45.5%) was the predominant fungi isolated followed by *Candida* species (3.3%), *Penicillium* (1.1%), *Mucor*(0.5%) and *Scopulariopsis* (0.5%). **Conclusion:** Otomycosis is a common problem and is often misdiagnosed for chronic otitis conditions. High index of clinical suspicion and proper laboratory identification of causative agents is mandatory for appropriate antifungal therapy and to prevent recurrences and complications.

KEYWORDS : Otomycosis, *Aspergillus*, *Candida*

Introduction

Otomycosis or fungal otitis externa is superficial fungal infection of the external auditory canal with infrequent complications involving the middle ear¹. It is one of the common conditions encountered in otolaryngology clinic. The disease is worldwide in distribution with a higher prevalence in warm & humid climate of tropical and subtropical zones, especially in monsoon².

External ear canal has an ideal warm and humid environment for the proliferation of fungus. Approximately 5% -25% of the total cases of otitis externa are due to otomycosis³. It is predominantly unilateral and commonly occurs between 2nd and 3rd decade of life among individuals belonging to lower socioeconomic status, probably because of poor hygienic conditions⁴.

Predisposing factors for otomycosis include chronic ear infections with long term use of antibiotic &/or steroid ear drops, self inflicted trauma, swimming, use of oils, instrumentation of ear, immunocompromised state like diabetes, fungal infection elsewhere in body, malnutrition in children and hormonal changes during pregnancy & menstruation⁵. Patients suffering from otomycosis commonly present with pruritis, otalgia, otorrhoea, aural fullness, hearing impairment and tinnitus⁶.

The fungal agents responsible for otomycosis are found as saprobes in the environment. The most common fungi isolated are *Aspergillus* species and *Candida* species⁷.

Although the climate of Rajasthan is hot and dry, the last few years have seen adequate rainfall in this region, creating increased humidity. Moreover, S.M.S. hospital is a tertiary care hospital with influx of patients from other parts of the country too. Therefore this study was proposed to determine the prevalence and spectrum of fungi responsible for otomycosis & associated predisposing factors.

Materials & Methods

The present study was conducted on 192 clinically suspected cases of otomycosis attending the ENT OPD at SMS Medical College & Hospital, Jaipur, Rajasthan from May 2016 to April 2017, to assess clinicomycological profile of otomycosis.

All clinically suspected patients presenting with symptoms and signs of otomycosis i.e. ear pain, pruritis, ear discharge and fungal debris in the external auditory canal were included in the study.

Informed consent was obtained from all patients. The study protocol was approved by the institutional ethics committee.

SAMPLE PROCESSING

Ear discharge specimens were collected aseptically using two sterile cotton swabs from each diseased ear canal and sent immediately to microbiology laboratory. Of these, one swab was subjected to direct microscopic examination in 10% KOH wet mount & the other was inoculated on Sabouraud Dextrose Agar with antibiotic (Gentamycin & Chloramphenicol) in duplicate and incubated at 25°C & 37°C 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 & Slide culture⁸. All *Candida* isolates were identified by Germ tube test, chlamydospore formation on Corn meal agar & colour differentiation on CHROM Agar *Candida* medium⁹.

Results & Observations

Out of 192 cases clinically suspected of otomycosis, fungus was isolated from 168 (87.5%) cases.

Table 1: Correlation of Microscopy (KOH mount) and Culture

Positivity	Culture Positive	Culture Negative	Total
KOH Positive	142	8	150
KOH Negative	26	16	42
Total	168	24	192

Of these 168 cases, 142 were both microscopy and culture positive whereas 26 cases were microscopically negative for fungal elements but fungal culture positive. 16 cases were both microscopy and culture negative & 8 cases were positive only by microscopy. Thus true positive cases were 142 & true negative were 16 by KOH preparation when compared to culture (gold standard). Sensitivity & specificity of KOH preparation was 84.5% & 66.6% respectively.

The highest incidence was noted in the age group of 21-30 years (27.38%) followed by 31-40 years (21.4%). The incidence of otomycosis was higher in females (53%) than in males (47%). The male to female ratio was 1: 1.12 showing slight female predominance.

Table 2: Predisposing factors of otomycosis

S. No.	Predisposing factors	No. of Cases	Percentage (%)
1	Ear picking	122	72.6%
2	Topical antibiotic/steroid ear drops	98	58.3%
3	Associated ear disease (CSOM, OE)	51	30.3%
4	Swimming/ Excessive exposure to water	22	13%
5	Topical instillation of oil in ear	20	11.9%
6	Previous ear surgery	18	10.7%
7	Diabetes mellitus	12	7.1%
8	Fungal infection elsewhere in body	8	4.7%
9	Nothing suggestive	13	7.7%

The most common predisposing factor was ear picking (72.6%) followed by long term use of antibiotic &/or steroid ear drops (58.3%). Itching in the ear (88%) was the commonest clinical presentation.

The distribution of otomycosis was predominantly unilateral (92.8%) with bilateral involvement in only 12 (7%) cases. Maximum number of cases had otomycosis of left ear (52.3%). Among occupational incidence, maximum number of cases were students (35.7%) followed by housewives (22.6%) and labourers/ farmers (20.2%). The seasonal distribution of otomycosis was highest in monsoon i.e. July to October (62.5%), followed by summer i.e. March to June (24.4%) and least in winter i.e. November to February (13%).

Table 3: Fungal etiological agents

S. No.	Isolated Fungal species	No. of infected ears (cases)	Percentage (%)	
1	<i>Aspergillus niger</i>	82	45.5%	
2	<i>Aspergillus flavus</i>	48	26.6%	
3	<i>Aspergillus fumigatus</i>	27	15%	
4	<i>Aspergillus terreus</i>	5	2.7%	
5	Mixture of <i>Aspergillus</i> species	<i>A.niger</i> + <i>A.flavus</i>	5	4.4%
		<i>Aniger</i> + <i>A.fumigatus</i>	3	
6	<i>Candida</i> species	<i>C.albicans</i>	5	3.3%
		<i>C.tropicalis</i>	1	
7	<i>Penicillium</i> species	2	1.1%	
8	<i>Mucor</i>	1	0.5%	
9	<i>Scopulariopsis</i>	1	0.5%	
	Total	180 (168)	100%	

The most common fungal isolates were *Aspergillus* species forming 93.8% of the total fungal isolates. Among *Aspergilli*, *A.niger* (45.5%) was the commonest isolate followed by *A.flavus* (26.6%), *A.fumigatus* (15%) and *A.terreus* (2.7%). A mixture of two *Aspergillus* species was isolated in each of 8 (4.4%) ears. The next common group isolated was *Candida* species (3.3%), especially *C.albicans* (2.7%) and *C.tropicalis* (0.5%). Other fungal isolates found in a small percentage of cases were *Penicillium* (1.1%), *Mucor* (0.5%) & *Scopulariopsis* (0.5%).

Discussion

Otomycosis is a significant mycotic infection of external auditory canal, 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.

In our study, otomycosis was evident in 87.5% of the suspected

patients, very similar to the findings of Gokhale et al.³, Nandyal CB et al.⁹ & Sarvan RR et al.¹⁰ where it was seen in 85%, 85.9% and 86% cases respectively.

Considering the fact that otomycosis can occur at any age, the most common age group affected were 21-30 years (27.3%) and 31-40 years (21.4%) i.e. young adults which constituted the working population. This observation is in accordance with Desai KJ et al.⁵, Nandyal CB et al.⁹ and most other studies from India.

Higher incidence was found among females than males (M: F ratio 1: 1.12), this is in agreement with studies by Aneja KR et al.¹¹ and Panchal et al.⁶. However other studies from India found higher incidence in males.

Among occupational incidence, most of the study subjects were students (35.7%), who spent most of the time outdoor playing in grounds and exposed to airborne fungal spores. This observation is in agreement with a recent study by Ahuja S et al.¹² where maximum cases affected were students (29%). But our observation is different from most other studies from India including Prasad SC et al.¹, Deshmukh et al.¹³ where farmers or labourers involved in agricultural activities was the predominantly affected group.

Majority of the cases i.e. 92.8% presented with unilateral involvement of the ear with left ear (52.38%) predominantly involved, coinciding with the findings of Nandyal CB et al.⁹. Bilateral disease was observed in 12 (7%) cases, similar to observations by Jyoti Swaroop R et al.¹⁴ in 6.4% cases.

The most common predisposing factor in present study was ear picking (72.6%), similar to observations by Prasanna V et al.¹⁵ & Nandyal CB et al.⁹ in 75.9% and 71% cases respectively. Use of topical antibiotic &/or steroid ear drops was the second commonest predisposing factor reported in 58.3% cases. A significant increase in otomycosis due to antibiotic/ steroid ear drops was also observed by Prakash SB et al.¹⁶ & Kumaran SS et al.¹⁷

Pruritis (88%) was the most common complaint, as also seen by Nandyal CB et al.⁹ and Kumaran SS et al.¹⁷ in 93.3% & 84% cases respectively. Other complaints were otalgia (80%), aural fullness (72.6%), ear discharge (60.7%), impaired hearing (47.6%) and tinnitus (36.9%).

Highest incidence of otomycosis was observed in monsoon (62.5%), followed by summer (24.4%) and least in winter (13%). Most other studies from various parts of India including Prasad SC et al.¹ and Gupta S et al.¹⁸ also reported higher incidence in monsoon.

Aspergillus is the most commonly reported isolate in otomycosis across the world, followed by *Candida*⁸. This is not different from reports from the Indian subcontinent, including our study. *Aspergillus* species (93.8%), especially *A.niger* (45.5%) was the commonest fungi isolated in our study which is in accordance with studies by Sarvan RR et al.¹⁰, Panchal P et al.⁶, Nandyal CB et al.⁹ and Rao RP et al.¹⁹ where *A.niger* was isolated in 45%, 56.5%, 55.9% and 44.7% cases respectively. Other *Aspergillus* species isolated were *A.flavus* (26.6%), *A.fumigatus* (15%) and *A.terreus* (2.7%).

After *Aspergillus*, the second common isolate was *Candida* (3.3%), especially *C.albicans* (2.7%) and *C.tropicalis* (0.5%). Other less common isolates were *Penicillium* (1.1%), *Mucor* (0.5%) and *Scopulariopsis* (0.5%).

The isolation of *Scopulariopsis* in present study is an uncommon finding, which has not been reported much in literature except in a study by Ahmad YM et al.²⁰ where it was reported in 1.2% cases.

Conclusion

The present study has reported fungal otomycosis in 87.5% of clinically suspected patients. Thus otomycosis is a common problem even in this part of country and is often misdiagnosed for chronic otitis conditions. Thus high index of clinical suspicion, accurate laboratory diagnosis and prompt treatment is the need of the hour.

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