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Clinicopathological Profile of Otomycosis in Western Uttar Pradesh

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Abstract **Original Research Article**

Background: Otomycosis is the mycological infection of external auditory canal, which is common throughout the world. Its incidence differs in various geographical regions due to the different climatic conditions. To define otomycosis and determine clinical and pathological profiles of the organisms causing otomycosis in Western Uttar Pradesh and to explore specific predisposing factors and targeted treatment. ***Methods:*** In this cross-sectional descriptive study, a total of 100 immunocompetent individuals clinically suspected to have otomycosis were recruited from May 2018 to May 2019. Specimens were collected using sterile swabs. All the specimens were subjected to direct examination using 10% KOH, and culture in SDA (Sabouraud Dextrose Agar). ***Results:*** Compulsive cleaning of external ear with hard objects (42%), dirty water entering the ear (29%), instillation of mustard oil (22%) and use of topical antibiotic ear drops without prescription (7%), were mainly implicated in otomycosis. Aspergillus was 68%, Candida was 16%, Penicillium was 12% and Rhizopus was 3%. In aspergillus spp., A. nigra (48%) was the most common, while A. fumigatus complex (35%) and A. flavus complex (17%) followed behind. ***Conclusion:*** Otomycological profile of Ghaziabad district in Western Uttar Pradesh showed occurrence of Aspergillus and Candida as the most common mycological flora leading to the disease. Also, the most common precipitating factors were compulsive ear cleaning and practices like oil instillation in ears which is very common in this part of the country leading to higher incidence of otomycosis thus requiring proper awareness regarding ear care among general population.

Keywords: Otitis Externa Mycotica, Mycological flora, Western Uttar Pradesh, Candida, Aspergillus.

INTRODUCTION

Otomycosis is the mycological infection of the EAC that can sometimes affect the middle ear. Mycological infection of the external auditory canal is a common source of concern to otolaryngologist which is found throughout the world. Otomycosis may be refractory to the treatment prescribed and hence challenges the clinician. It is a common condition seen in an ENT clinic and its incidence has been reported between nine percent [1] to twenty seven percent [2, 3]in individuals presenting with features of otitis externa and up to thirty percent [4-6] in individuals with CSOM. Humid and warm climates, poor sanitation, usage of hearing aids, bacterial otitis externa, dermamycosis, long-term exposure to water, and trauma are some factors that facilitate the occurrence of otomycosis. Mainstay of therapy involves removal of fungus, thorough suction & cleaning, and use of antimycological agents and treatment of causative factor.

Present study is a descriptive analytical survey of patients clinically diagnosed as otomycosis. The study was conducted on patients with otomycosis attending ENT department of Santosh Medical College and Hospital, Ghaziabad from May 2018 to May 2019. A total of 100 cases were studied during the period. They were subjected to history taking, clinical evaluation, and investigation including mycological investigations and treated with suction & cleaning, local antimycological drugs and treatment of precipitating factors. Patients were followed up at regular intervals of 2 weeks, 4weeks and then monthly for 6 months. The data was collected in proposed proforma and subjected to suitable statistical analysis including percentage analysis. In this study the age group involved by otomycosis was between <10 to>60 years.

EXPERIMENTAL SECTION

100 patients attending the OPD of ENT&HNS at Santosh Medical College in Ghaziabad, a subtropical city in the western part of Uttar Pradesh state of India, were selected for the study. This was conducted over a one year period between May 2018 and May 2019.

INCLUSION CRITERIA

Hundred subjects with known otomycosis without presence of other ear conditions like CSOM etc. were included in the study group. Following criteria was used:

(1) Itching, pain, aural fullness, tinnitus, deafness, and local examination via otoscopy (2) the demonstration of mycological elements in 10%KOH-methylene blue preparation, (3) mycological culture

Exclusion Criteria

Cases categorised as secondary otomycosis were not inluded in this study on the following basis

(1) presence of active COM, active otitis, TM perforations, prior otosurgery or aural procedures, and diabetes, (2) co morbidities like malignancy, TB, and other chronic granulomatous conditions, (3) any immunodeficient state.

Mycological Tests: Direct microscopy using 10% KOH + methylene blue (2 : 1) was performed and studied under microscope[7] seeking for mycological evidence like septate and aseptate hyphae, yeast and conidia cells[8].

All patients underwent thorough suction & cleaning and removal of the mycological scrap. Succeeding this patients were prescribed clotrimazole antimycological preparations, four drops to be instilled three times daily for a period of 1 to 2 week. If coexisting otitis externa is present, a combination of antimycological-antibiotic was given.

Data was compiled and analysed with a statistical software program. The association between the various factors (eardrops, self-cleaning, dirty waterand oil instillation) and the prevalence of otomycosis was studied.

RESULTS & DISCUSSION

Age, Socioeconomic Status, Sex, and Occupation

71 (71%) of the subjects were males and 29 (29%) were females. The maximum frequency of this condition was between 31–40 yrs and the least was seen in the less than 11 yrs and over 65 yrs of age (Figure 1).70 patients (70%) had agriculture as their profession.

Side and Laterality

The condition was preponderantly unilateral in males and females.Right side was more frequent in females (18/29 cases, 62%) while males had near equal distribution on both sides (right ear n=37, (52.11%) and left ear n=34 (47.8%)). Right side was seen to be implicated in n=55 (55%) of the subjects. 91% of the individuals in study were right handed.

Predisposing Factors

This condition is more common in subjects with habit of repetitive cleaning of ear with unsterile earbuds, metal wax picks, pen refills or rolled paper and was recorded in 42% of the cases; water entering in ear (29%), instilling hot mustard oil (22%) into the ear, and the use of over the counter topical antibiotic ear drops was found in 20% of patients (Figure 2).

Clinical Features

Itching was most frequent complaint in 73% of the subjects while aural fullness was found in 38%. Distribution of other symptoms was Otorrhea (38%), otalgia (35%), and tinnitus (8%).

Mycology

Fungus was seen in all hundred subjects constituting the study group, clinically found to have otomycosis. Aspergillus was seen in 68% cases. A. niger complex was the most frequent (forty eight percent) followed by A. fumigatus (thirty five percent) and A. flavus complex (seventen percent), Candida (sixteen percent), Penicillium (twelve percent), Rhizopus spp. (three percent), and Chrysosporium spp. (one percent) were the other isolates. Single species was seenin 90% of subjects.

Treatment

23.50% subjects were given clotrimazole and complete cure was achieved. 77.40% received mixbiotic ear drops and were cured completely.

Moharram *et al*. [9] and Abdelazeem *et al.* [10] also had more males in their studies that were affected with otomycosis (60.9% and 63.6%, respectively). Andrall and Gaverret were the first to describe mycological infections of the ear [9, 10]. The mycosis causes inflammation, exfoliation of superficial epithelium, debris masses containing hyphae and pain. This male preponderance may be explained by the fact that males in our community have more outdoor activities than females. Subacute or acute infection is characterized by severe discomfort, pruritus, scaling & inflammation.

Age, Sex, and Occupation: Mainly young adults, males more than females are affected and the ratio of male vs female was found to be 2.4: 1. In this study, subjects having otomycosis mostly worked in agrarian jobs. Wadhwani and Srivastava [10] reported that 24 fungi were isolated from earwax or otitis media of agricultural field workers

Geography: Otomycosis is found more commonly in tropical countries [2, 3, 5, 6]. Ghaziabad is a subtropical city in North India with temperature ranging from 30^{o} C to 45^{o} C. The relative humidity is not high but during the monsoon months it reaches high levels. The growth of fungi is promoted by warmth and moisture. The ocurrence of otomycosis was high in the rainy months of monsoon- August and September and lesser during other months.

Predisposing Factors: External auditory canal has skin similar to the other parts of the body, and in exposure to the air by a small meatal inlet. The EAC imitates a culture tube with skin lining and it gives a good nice for the growth of bacteria and fungi. Furthermore otomycosis is more common in anatomic aberrances like a constriction in canal .Excessive presence of earwax in subjects with poor sanitation promotes the growth of spores and conidia from commonly occuring fungi [9]. Excessive use of hard material such as wooden sticks or metal wax picks to clean the wax of the ears for relieving itch (in case of otitis media) is a common practice.

Mycological infection occurs due to buildup of mycological conidia in the wounds caused by these practices as they usually result in minor and hence unnoticed trauma to the skin of external auditory canal. Perfect growing requirements for the fungi in the external auditory canal are provided by the presence of wetness, warmness, and acidic pH. Swimming leads to higher incidence of otomycosis. Finger nail mycosis and other dermamycoses are a possible source of recurrent autoinoculation. Some females with perennial vaginal candidiasis also develop candidal otomycosis. Deficiency of conventional education in people in India has led them to believe the fad that mustard oil usage in ears is good for an assortment of ear afflictions. In this study there was a higher affiliation (22%) of otomycosis with instillment of mustard oil into the external ear. 7% of the subjects in our study used OTC antibiotic eardrops for itch and otalgia without medical advice.

Investigations and Organisms Involved

In our study, Candida (16%) was the second most common isolate after Aspergillus with Penicillium constituting 12%. Compared to earlier reports from India and other parts of the world the involvement of Penicillium spp. in this study was also found to be higher [7, 8] Characteristic criteria including the identification of asexual or sexual composition and their characteristics such as shape, size, color, ornamentation, and/or mode of attachment is relied upon in clinical microbiological labs to a great extent on morphology-based determination methods for Aspergillus species. Unfortunately, such a phenotype-based scheme is not effective in identifying the species because largely these characteristics are volatile, and clinical aspergilli sometimes manifest typically with slow sporulation and aberrant conidiophore formation [3, 5]. In addition, members of the species A. fumigatus have related morphological characteristics, with several genetically well-defined species existing within a single morphospecies. For determining the choice of befitting antimycological treatment it is important to identify Aspergillus species because various species have variable susceptibleness to multiple antimycological drugs. In spite of the shift of mycological designation formats into the molecular domain there is no agreement on the gene/genes that can be used for species determination in the genus Aspergillus. Also, this methodological analysis involves evidential cost and phylogenetic skillfulness that are confining factors in most clinical microbiology labs. In addition, mentation should also be given to the fact that most of these isolates may not be true causative agents of disease and therefore may not warrant species level identification in diagnostic labs.

Treatment: Treatment involves removal of causative elements. Ototopical drops must be stopped. The ear canal must be exhaustively cleaned of all visible rubble. It is our practice to avoid syringing and clear the debris by suctioning alone. Antifungal drops are the most favoured form of treatment [2, 6]. Clotrimazole has an antibacterial effect, and this is an added advantage when treating mixed bacterial-mycological infections [6]. Antimycological ointment with ketoconazole or fluconazole is used [6]. A promptly accessible and usually efficacious provision for Candida is tolnaftate. Nystatin is another useful drug against Candida.

Table-1: Demographic profile of the subjects in the study (otomycosis)

AGE	SEX	No. of Individuals
<10years	Male	3
	Female	1
11 - 20 years	Male	10
	Female	8
21-30 years	Male	15
	Female	7
31 - 40 years	Male	22
	Female	10
41-50 years	Male	8
	Female	4
51-60 years	Male	6
	Female	2
>60 years	Male	4
	Female	4

Table-2: Mycological Distribution

ASPERGILLUS SPECIES	**68%**	**A. niger**	48%
		A. fumigatus	35%
		A. flavus	17%
Candida albicans			16%
Penicillium spp.			12%
Rhizopus spp.			3%
Chrysosporium spp.			1%

Table-3: Percentage of various fungi in otomycosis as reported by different workers over the last few decades

	Reports from the Indian subcontinent							Reports from other parts of the world							
Authors	Joy et al. [32]	Jain and Agrawal [21]	Jaiswal [42]	Kaur et al. [7]	Pradhan et al. [5]	Viswanatha et al. [8]	Present study	Geaney [43] UK	Yassin et al. [44] S. Arabia	Pontes et al. [2] Bahrain	Yehia et al. [15] Iraq	Fasunla et al. [3] Nigeria	Pontes et al. [2] Brazil	Jia et al. [17] China	Barati et al. [14] Iran
Year	1980	1992	1990	2000	2003	2012	2014	1967	1978	2009	1990	2008	2009	2012	2011
Asp. niger	44.3	56.3	34	36.9	25.5	56	38	13.2	51.2	54.4	70.1	48.35	20	54.77	41.6
Asp. fumigatus	15.7	15.6	—	41.1	6.6	18	27	7.5	—	25.1	5.6	33.96	5	2.61	5.5
Asp. flavus	23.2	4.7	—	1.4	37.7	—	14	9.2	18.3	—	15.6	5.43	10	6.09	49
Other aspergilli	—	3.1	—	—	0.9	—	—	34.9	13.7	—	—	—	—	9.57	3.7
Candida sp.	7.6	6.3	46	13.7	10.4	16	4	35.2	4.6	17	7.3	12.26	55	24.35	7.6
Mucor sp.	5.4	6.3	—	1.4	—	—	—	—	2.3	—	—	—	—	—	—
Penicillium sp.	1.1	4.7	—	1.4	—	10	8	—	5.3	3.5	—	—	—	—	—
Rhizopus	—	—	12	2.7	—	—	1	—	—	—	0.6	—	—	—	—
Chrysosporium	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—
Other fungi/mixed fungi	2.7	3	8	1.4	—	—	6	—	4.6	—	—	—	10	2.61	0.9
No growth	—	—	—	—	18.9	—	—	—	—	—	—	—	—	—	—

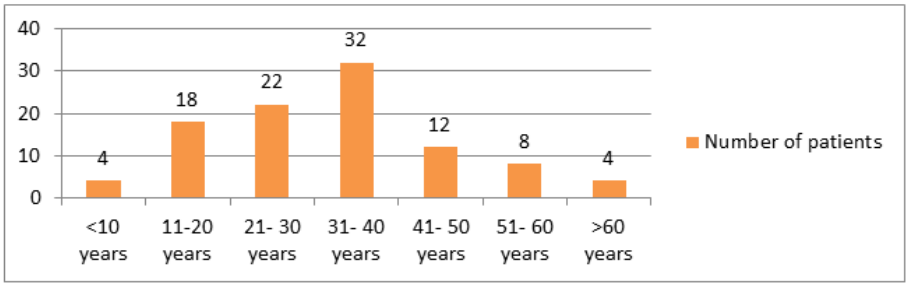

Fig-1: Age distribution of subjects in the study (otomycosis) group

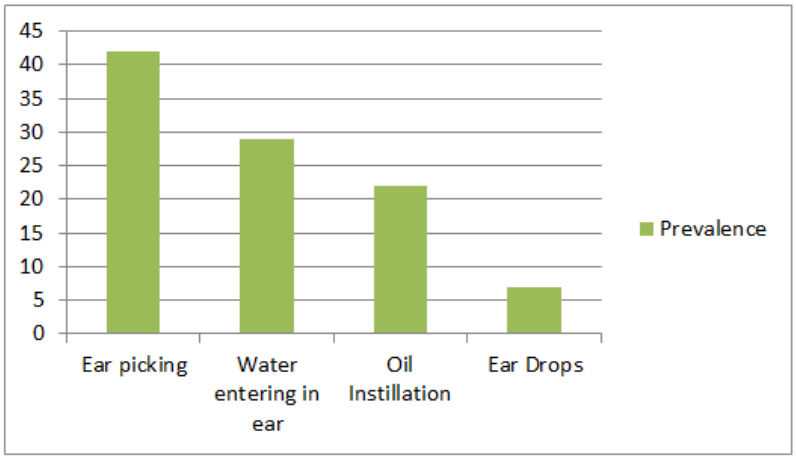

Fig-2: Comparison of predisposing factors

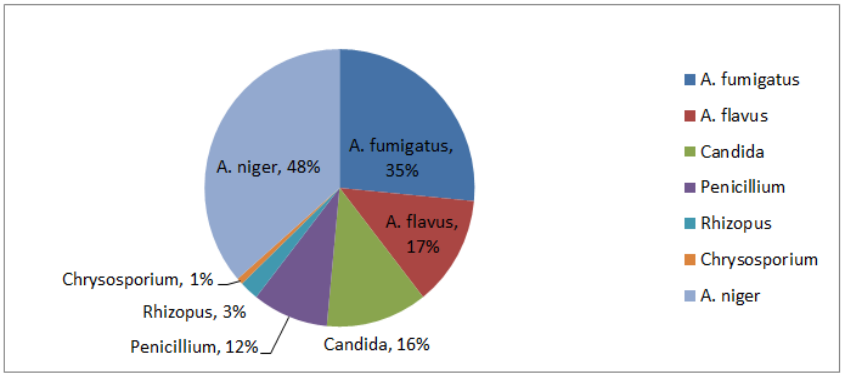

Fig-3: Mycological Distribution

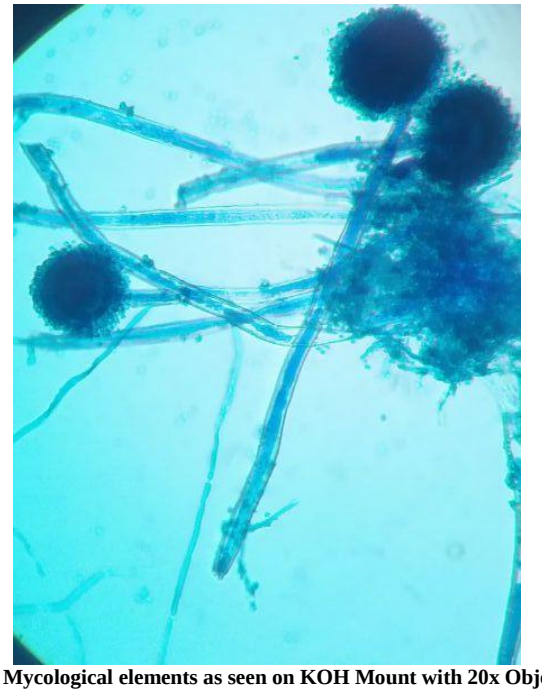

Fig-4: Mycological elements as seen on KOH Mount with 20x Objective

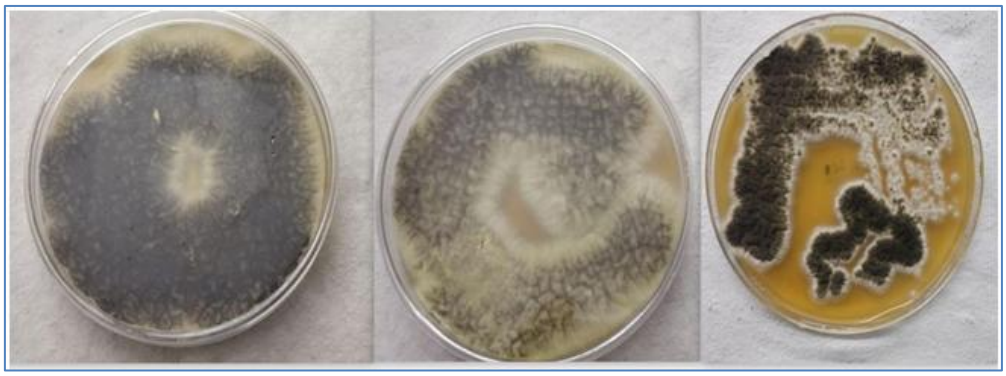

Fig-5: Mycological culture plates showing different growths on Sabouraud's Dextrose Agar

CONCLUSION

Otomycosis is seen across the world with a high incidence especially in tropical countries. In this study we analyzed the growth of fungi in 100 otomycotic ears which provided the first report on otomycosis in Ghaziabad district, western UP. However, due to the limited number of patients investigated, our results could not be generalized. Furthermore, the antimycological susceptibility pattern of isolates was not determined in our study, which is another disadvantage. Thus, additional studies incorporating larger study populations, antimycological susceptibility testing, and treatment follow-ups are necessary. In conclusion, the incidence of otomycosis in this study was 71% males and 29% females and the most common causative agent was A. niger. The isolation of Chrysosporium has not been reported before in otomycosis in our laboratory. This indicates the necessity for ENT specialists to be aware of the leading causal agent in each geographical region in order to prescribe antimycological drugs appropriately. Also, the high incidence of different clinical complaints from patients with and without proven otomycosis highlights the need for mycological examination in addition to clinical examinations in the diagnosis of otomycosis. Fungi are also present in a significant number of healthy external auditory canals. The use of terms "primary" and "secondary" otomycosis is important to standardize reporting.

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DECLARATIONS

Conflict of Interests

The authors declare that there is no conflict of interests regarding the publication of this paper.

Ethical Approval

Obtained from the Ethical Committee of Santosh Medical College, Ghaziabad

REFERENCES

1. Ozcan KM, Ozcan M, Karaarslan A, Karaarslan F: Otomycosis in Turkey: Predisposing factors, aetiology and therapy. J Laryngol Otol. 2003; 117, 39–42.
2. Akobjanoff L, Carruthers, C and Senturia, B. H. J. invest. Derm.1954; 23, 43.
3. Viswanatha, B, Sumatha, D, Vijayashree, MS. Otomycosis in immunocompetent and immunocompromised patients: comparative study and literature review. *Ear Nose Throat J*. 2012;91(3):114–121.
4. Segretain G, Drouhet E, Mariat F. Diagnostic de laboratoire en mycologie médicale. Ed. de la Tourelle; 1958.
5. Ensaios de micologia. Contribuição ao conhecimento dos cogumelos patogênicos em Minas Gerai Mem Inst Oswaldo Cruz. 1945; 42. 41-55
6. Jackman A, Ward R, April M. Topical antibiotic induced otomycosis. *Int J Pediatr Otorhinolaryngol*. 2005; 69:857–60.
7. Jia X, Liang Q, Chi F, Cao W. Otomycosis in Shanghai: aetiology, clinical features and therapy. Mycoses. 2012;55(5):404–409.
8. Saki N, Rafiei A, Nikakhlagh S, Amirrajab N, Saki S: Prevalence of otomycosis in Khouzestan Province, south-west Iran. J Laryngol Otol.2013; 127: 25–27
9. Fischer F, Cook MB, Fischer F, Cook M. Some opportunistic fungi and yeasts and yeast-like fungi. Fund Diagn Mycol. 1998:35-225.
10. Martin, TJ, Kerschner, JE, Flanary, VA. Fungal causes of otitis externa and tympanostomy tube otorrhea. *Int J Pediatr Otorhinolaryngol*. 2005; 69:1503–8.