CLINICAL AND MICROBIOLOGICAL STUDY OF OTOMYCOSIS

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ABSTRACT

BACKGROUND

Otomycosis is a superficial fungal infection of the external auditory canal. Its main presenting symptoms are itching, aural fullness, earache and hearing loss.

The aim of the study is to identify the most common fungal pathogen and predisposing factors for otomycosis and observe the response to treatment.

MATERIALS AND METHODS

We conducted an institution-based prospective study on 50 clinically-diagnosed cases of otomycosis attending the ENT Outpatient Department. According to a predesigned proforma, each patient was studied for gender, age, occupation, presenting symptoms, predisposing factors, co-existing systemic diseases, fungal species identified and response to treatment with conventional antifungals.

RESULTS

Out of 50 patients, 30 were females and 20 males. In this study, age group 11-20 years were more affected. Otomycosis was found to be predominantly unilateral with the left side of ear being more affected when compared to right. However, bilateral infection was also observed and few cases reported negative for growth of fungi after microbiological study. In this study, Aspergillus niger (52%) was the commonest isolate followed by Candida (16%). Most of the clinically-diagnosed cases responded to topical antifungal ear drops with only few cases requiring additional treatment at follow up.

CONCLUSION

In this study, we found that otomycosis is more common in adolescent age group and in females than males. Aspergillus niger is the major aetiological agent. The major predisposing factors for otomycosis are hot and humid climate repeated manipulation with unsterile sticks and swabs in the external auditory canal, use of unsterile coconut oil and swimming. Thorough cleaning of external auditory canal and instilling topical antifungal drops still remains the gold standard treatment option for otomycosis per se.

KEYWORDS

Otomycosis, Aspergillus, Candida.

HOW TO CITE THIS ARTICLE: Suraneni VR, Kapilavaya N, Rayapu SB, et al. Clinical and microbiological study of otomycosis. J. Evid. Based Med. Healthc. 2017; 4(51), 3098-3102. DOI: 10.18410/jebmh/2017/615

BACKGROUND

The term otomycosis is used to describe a superficial, diffuse and fungal infection of the ear canal.[1] Otomycosis has been a challenging and frustrating entity for both patients and otolaryngologists over the years as it requires long-term treatment and follow-up. The disease per se is commonly encountered in Otolaryngology OPD and 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%[5-7] in patients with discharging ears. Higher prevalence is noted in the hot, humid and dusty areas of the tropics and subtropics.[3,4,6,7] Otomycosis is found to be a common medical problem in India.[8,9] The disease can be seen existing only in the external auditory canal or as superimposed fungal on bacterial infection in conditions like Chronic Suppurative Otitis Media (CSOM).

Majority of the patients of otomycosis present with severe itching and aural fullness. There may be associated earache, hearing loss, tinnitus and ear discharge. Otomycosis is most commonly caused by Aspergillus species, particularly A. niger, A. flavus, A. fumigatus and Candida species particularly C. albicans, C. parapsilosis and C. tropicalis.[2,5,8,10] Several predisposing factors have been proposed for otomycosis with a hot and humid climate being the main culprit. Presence of cerumen, constant manipulation with ear swabs or other crude implements, immunocompromised status, swimming, use of unsterile coconut oil and injudicious use of topical antibiotic/steroid

Financial or Other, Competing Interest: None.
Submission 03-06-2017, Peer Review 10-06-2017,
Acceptance 19-06-2017, Published 23-06-2017.
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DOI: 10.18410/jebmh/2017/615

drops have all been attributed to the development of otomycosis.

Treatment options for otomycosis include elimination of predisposing factor, thorough cleaning of external auditory canal and use of antifungal agents. Topical antifungals are specific (clotrimazole, miconazole, econazole, nystatin, tolnaftate, potassium sorbate) and nonspecific (acetic acid, alcohol, boric acid, m-Cresyl Acetate and gentian violet).[11]

In this study conducted in a hot and humid north coastal city in Andhra Pradesh, South India, we aim to identify the most common organisms involved in otomycosis, various predisposing factors of the disease and the response to treatment.

MATERIALS AND METHODS

This institution-based prospective study was conducted on 50 clinically-diagnosed cases of otomycosis attending the ENT Outpatient Department from August 2016 to December 2016. All patients presenting to OPD meeting, the inclusion criteria were included in the study. Patients of both sexes and all age groups were included in the study. Patients with otitis externa due to other causes and history of trauma to external auditory canal were excluded from the study.

A predesigned proforma was put forward to the patients presenting with itching, pain and fullness in ear. Any history of trauma, use of cotton swabs or any other objects in an attempt to remove wax from ear, swimming, use of unsterile oils, topical antibiotic ear drops and/or other aural preparations were noted. Age, sex, socioeconomic status and occupation of the patient were recorded. Co-morbid conditions like diabetes and any immunocompromised state of patients were noted. The patients presenting with active CSOM and otomycosis and postoperative ears with otomycosis were also noted. Informed consent was obtained from all patients.

Clinical findings in both ears were recorded using otoscopes and interesting cases followed by otoendoscopy. The diagnosis of otomycosis was based upon the clinical history and finding of fungal debris and spores in the ear. It was further confirmed by microscopic examination showing fungal spores and hyphae. Immediately after establishing a clinical diagnosis of otomycosis, the specimen was collected by sterile swab or in sterile containers containing sterile water. This specimen was sent to the microbiology laboratory for mycological study.

Processing

Ear discharge was obtained from the diseased ear of the patient using two separate pre-sterile swabs. One of the swabs was inoculated on one slant of Sabouraud's Dextrose Agar (SDA) with chloramphenicol (0.05%) and incubated at 37°C for the isolation of yeast-like fungus. The second swab was inoculated on another slant of SDA with chloramphenicol (0.05%) and incubated at 22-28°C for the isolation of filamentous fungi. The slants were later examined for the gross morphology of the fungus grown. The microscopic morphology of the isolated fungus was identified by lactophenol cotton blue wet mount stain method for filamentous fungi and Gram staining for yeast-like fungus.

All the patients clinically diagnosed with otomycosis were subjected to a thorough aural toilet by suctioning and removal of the fungal debris. Cases with overt CSOM were also suctioned for discharge. Patients were prescribed clotrimazole antifungal preparations, 3 drops to be instilled 3 times a day in the affected ear for a minimum of 7 days. Tablet Levocetirizine 5 mg was added to majority of cases as itching was the predominant symptom at presentation. Cases of CSOM were prescribed oral antibiotics in addition. This regime was given for a week and patients were followed up later. Precautionary measures of avoidance of water entry into ears and avoidance of manipulation of external auditory canal were explained to the patients. Residual disease at one week of follow up was managed with meticulous aural toileting and continuation of topical antifungals till the patient was disease-free. Numerical data was presented as frequencies and percentages and the data tabulated.

RESULTS AND OBSERVATIONS

In the present study, out of the total 50 cases of clinically-diagnosed otomycosis, 20 were males and 30 females (Figure 1). The highest incidence of otomycosis was in the age group of 11-20 years and the lowest was noted in the age group of 70-80 years (Table 1 and Figure 2). Majority of the patients were students followed by females who were home makers. We found that otomycosis was predominantly unilateral both in males and in females. In the females, the left ear was most commonly involved (20/30 cases, 67%), whereas in males the distribution was found to be equal in both ears (right ear 45% and left ear 48%). Overall, the disease was predominantly unilateral and the left ear was chiefly involved.

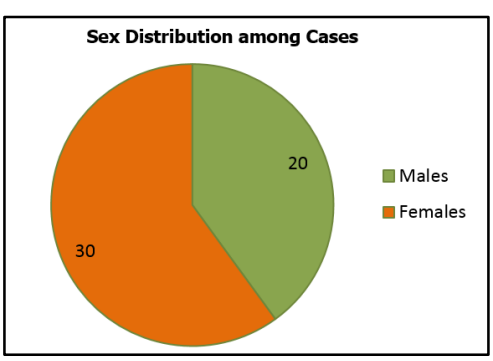

Figure 1. Sex Distribution among Cases

Age Group	Number	Percentage
0-10 years	4	8
11-20 years	13	26
21-30 years	10	20
31-40 years	9	18
41-50 years	5	10
51-60 years	4	8
61-70 years	4	8
71-80 years	1	2
Total	**50**	**100**

Table 1. Age Group Wise Distribution of Cases

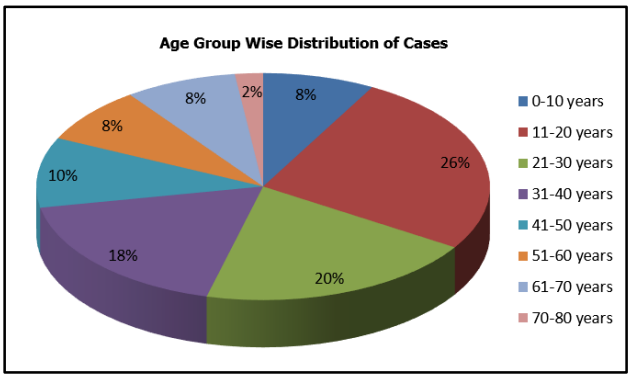

Figure 2. Age Group Wise Distribution of Cases

From the data obtained on presenting symptoms of cases (Table 2 and Figure 3), itching was the predominant symptom seen in 82% of the otomycotic patients followed by aural fullness in 74% and earache in 46%. Other symptoms were hearing impairment (36%), ear discharge (26%) and tinnitus (12%). No complaint was observed in 4% cases in which otomycosis was an incidental finding.

Presenting Symptom	Frequency	Percentage
Itching	41	82
Aural fullness	37	74
Pain	23	46
Hearing impairment	18	36
Discharge	13	26
Tinnitus	06	12
No complaint	02	04

Table 2. Presenting Symptoms of Cases

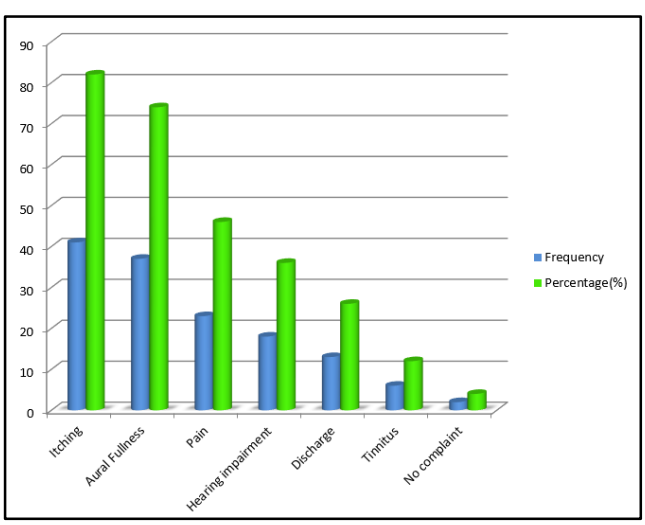

Figure 3. Presenting Symptoms of Cases

In this study, we found that almost all the cases presented during August-October months during which hot and humid climatic conditions are prevalent in South India. Data of the various predisposing factors for otomycosis studied is given in Table 3 and Figure 4. The incidence of otomycosis was high in patients with history of probing with swabs and unsterile sticks in the ear (80%). The use of unsterile coconut oil in the ear in an attempt to clean ear was found in 36% of patients. Swimming was found to be the culprit in 20%.

Predisposing Factor	Frequency	Percentage
Probing with swabs	40	80
Unsterile coconut oil	18	36
Swimming	10	20

Table 3. Various Predisposing Factors for Otomycosis

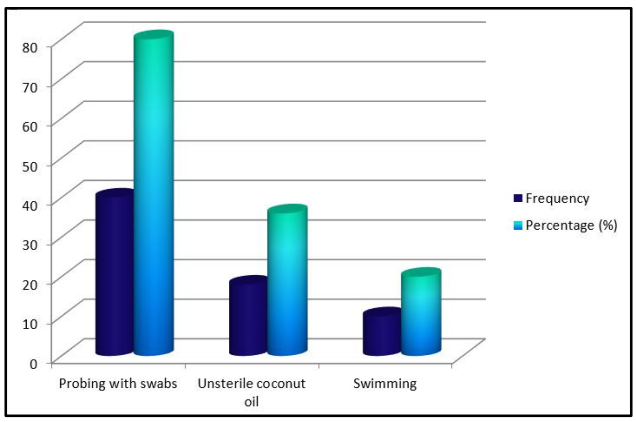

Figure 4. Various Predisposing Factors for Otomycosis

As observed from Table 4 and Figure 5 and 6, through this study, we found that fungi were isolated from 45 out of 50 clinically diagnosed cases of otomycosis. Species of Aspergillus (Figure 7) were isolated in 70% cases. A. niger was the commonest organism isolated (52%) followed by A. flavus (12%) and A. fumigatus (06%). Candida species (Figure 8) was the next commonest organism following A. niger isolated in only 16% of cases. Penicillium sp. was isolated in 2 cases (4%) and was co-existent with A. niger in one case and with A. flavus in the other. Single fungus was isolated from 96% of cases. In 5 cases (10%), no fungus was isolated.

Isolated Organism	No. of Cases	Percentage
Aspergillus niger	26	52
Candida sp.	8	16
Aspergillus flavus	6	12
Aspergillus fumigatus	3	06
Penicillium sp.	2	04
Negative for growth	5	10

Table 4. Different Organisms Isolated

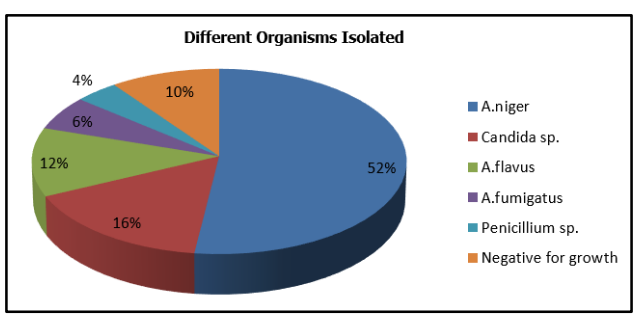

Figure 5. Different Organisms Isolated

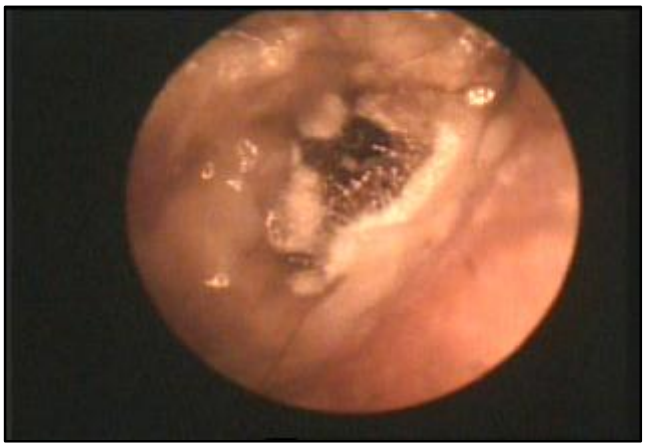

Figure 6. Fungal Debris in External Auditory Canal

Figure 7. Aspergillus sp.

Figure 8. Candida sp.

In this study, all the cases responded to treatment given. All the cases of clinically-diagnosed otomycosis were advised to use topical clotrimazole ear drops (1% w/v) coupled with antihistaminic oral preparation like levocetirizine for 1 week and followed up. Cases with overt CSOM were given oral antibiotics. Cases with symptom of earache were given additional oral analgesic. At 1 week of follow up, only 7 cases out of the 50 (14%) had residual disease and required additional treatment. Most of them were either cases of CSOM with otomycosis or were treatment defaulters. Even these cases responded to the treatment and were disease-free after 2 weeks.

DISCUSSION

Otomycosis is one of the most common presenting diseases at the Otorhinolaryngology Outpatient Department particularly in the tropical and subtropical countries. It can be clinically diagnosed in majority of cases with only few cases requiring laboratory confirmation. Otomycosis contributes about 10% of all cases of otitis externa. Otomycosis are frequent infections in tropical countries, because of humidity and heat.[6,12-14] In the current study, we found that otomycosis occurred in 90% of the suspected patients as confirmed by the microbiology laboratory.

In this study, we found that otomycosis is more common in females (60%) than in males (40%). Similar results were observed in several other studies.[3,15-17] We found that otomycosis was more common in adolescents and young adults between ages 11-30 years. We had 46% of the cases in patients of 11-30 years of age, which was similar to the results obtained by Kaur et al[8] who reported 41.1% occurrence of otomycosis in patients in the age range of 16-30 years.

The occurrence of bilateral otomycosis is very low.[8,13,18] In this study, bilateral involvement was found in 4% cases, which is consistent with the findings of Ho et al (2006)[19] who observed bilaterality in 7% of the patients. The most common presenting symptom was itching followed by aural fullness and otalgia, which was similar to the findings of Kurnatowski and Filipiak who observed pruritus to be most common followed by sensation of fullness.[5]

The most common aetiological agent for otomycosis in the present study was A. niger (52%) probably due to its high preference for the external auditory canal and its ability to produce a great amount of conidia. This finding is similar to what was observed by Fasunla et al[4] in their study. It is also compatible with some other worldwide studies.[5,20-22] This result is also comparable to another study conducted by Ozcan et al[17] on 87 patients with the clinical diagnosis of otomycosis in which the most common pathogenic fungus was A. niger (44.8%). However, the results obtained by Kaur et al[8] show that in the tropical regions, the commonest aetiologic agents accountable for otomycosis are A. fumigatus (41.1%) and A. niger (36.9%). Candida sp. was the second most common organism isolated in this study. Other fungi that have been associated with otomycosis in our study were A. flavus, A. fumigatus and Penicillium sp.

Treatment of otomycosis includes local debridement, discontinuation of topical antibiotics and local/systemic antifungal agents.[19] In this study, thorough aural toilet followed by prescription of topical clotrimazole eardrops (1% w/v) thrice daily was given to all patients and followed up a week later. Residual cases were continued with the same treatment after further ear cleaning until the patients were disease-free, which typically took 2 weeks. Although, multiple in vitro studies have examined the efficacy of various antifungal agents, there is no consensus on the most effective agent.[21,23]

Azole group has been shown to be quite effective in treating otomycosis.[24] It is observed that efficacy of azoles seems to depend on the duration of treatment. Youssef YA et al[24] reported that 2 weeks of treatment with oxiconazole cured only 27% of patients. One week of treatment with clotrimazole cured only 35% of patients, whereas 4 weeks of treatment cured 70%. However, in this study, we found that almost all the patients were disease free after 2 weeks of treatment with clotrimazole ear drops. Clotrimazole is the most widely used topical azole.[20,23] It is available as powder, a lotion and solution form. It is considered free of ototoxic effects.[23,25,26]

We have found out that all the clinically-diagnosed cases of otomycosis responded to treatment with topical

clotrimazole alone with symptomatic treatment for itching with levocetirizine 5 mg bedtime dose and oral analgesics for otalgia. Cases of CSOM were additionally treated with oral antibiotics.

CONCLUSION

In summary, this study demonstrates that the diagnosis of otomycosis and its confirmation by fungal culture and sensitivity provides a fool-proof manner of tackling the disease as prompt treatment with topical regimes alone is able to cure the disease. Clinical suspicion of otomycosis can also prevent unnecessary use of antibiotics.

Otomycosis is common in females than males and in young adults. Major predisposing factors for the development of disease are constant probing of canal with swabs, use of unsterile coconut oil and swimming. A. niger and C. albicans are the most common causative organisms of otomycosis. Almost, all the fungi that infected the external auditory canal were sensitive to clotrimazole. Clotrimazole alone is quite effective in the treatment of otomycosis and is a better choice due to its lower cost and better patient compliance. However, recurrence is not uncommon as overall treatment outcome depends on patient education about precautionary measures, compliance to treatment and regular follow up.

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