

Original article:

Otomycosis : A Clinical and Mycological Study

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Abstract

Background: Otomycosis is a fungal infection of the external ear with bothersome symptoms. The aim of this study was to evaluate the prevalence of fungal agents, predisposing factors and characteristics of patients.

Material and Methods: Between February 2015 to October 2016, 150 patients with clinical suspicion of otomycosis were enrolled and the samples from their external ear were examined for any mycological infection.

Results: Otomycosis was confirmed after mycological diagnosis in 69.3% of clinically suspected patients. The highest incidence of otomycosis was in autumn and in patients aged 21-40 years old. Working in dry dusty environment was a major predisposing factor. Pruritus was the most common symptom. *Aspergillus flavus*(46.2%) was the most common fungus in otomycosis followed by *A. niger*(38.4%), *Candida albicans* (7.7%), *A. fumigatus*(4.9%), *A. nidulans*(1.9%) and *C. parapsilosis*(0.9%).

Conclusion: Clinical suspicion of otomycosis is important to prevent unnecessary use of antibiotics. Etiology of fungal pathogens in dry dusty regions is not similar to hot humid areas and this needs to be considered in future susceptibility tests and treatment of patients with otomycosis.

Keywords: Otomycosis, Aspergillus, Candida, Pruritus

Introduction

Otomycosis [Gr.oto = ear + mycosis = fungal infection] also known as fungal otitis externa is a fungal infection often involving the pinna and the external auditory meatus, however in the presence of a perforated tympanic membrane, it can also involve the middle ear.^{[1][2][3][4]} The mastoid cavity can also be involved following open cavity mastoidectomy.^[5] The main symptoms include pruritus, otalgia, aural fullness, hearing impairment, otorrhea and tinnitus.^{[6][7][8][9]}

The disease is worldwide in distribution. It is estimated that approximately 5-25% of the total cases of otitis externa are due to otomycosis

The prevalence of otomycosis is related to the geographic area with higher rates in tropical and subtropical climates.^[4] Predisposing factors include alterations in immunity, use of steroids, dermatological diseases, loss of cerumen, use of broad-spectrum antibiotics and hearing aids.^{[3][9][10][11][12]}

Literature search reveals that most of studies about the etiology of otomycosis have been carried out in tropical and subtropical areas. Our study was carried out to evaluate clinical and mycological features of otomycosis .

Materials And Methods

Study group: The samples were obtained from 150 patients attending the Otorhinolaryngology clinic

of Adesh Medical College And Hospital, Bathinda between february 2015 to October 2016 with the clinical diagnosis of Otomycosis. The clinical diagnosis was made based on the following symptoms- pruritus, hearing loss, otalgia, ear fullness, otorrhoea, and tinnitus.

Collection of Samples: The samples were collected from the patients with the help of a sterile cotton Swab from the external auditory canal or a sterile scalpel blade.

Mycological Investigation:

1. Direct Microscopy: For detection of fungal elements using KOH [10%] preparation Gram's Stain *2. Culture:* Samples were inoculated on Sabouraud's Dextrose agar [SDA] with and without antibiotics and incubated at 250° and 370c for a minimum of 4 weeks. Identification is done by lactophenol cotton blue preparation and Gram's Stain. *3. Slide Culture:* Done for differentiation of morphology of different Species. *4. Biotyping :*

Biotyping for Candida species was done by Carbohydrate fermentation tests and chlamyospore formation on corn meal agar.^{[13][14]}

However, Bacteriological media was also inoculated for isolation of bacterial pathogens.

Results

One hundred and fifty patients with the clinical diagnosis of otomycosis were evaluated; among them 50.3% were females and 49.7% were males. The average age of patients was 35.8 (9-78) years old. Patients in their fourth decade of life made up the biggest group (30.4%) followed by 21-30 age group (22.2%). The majority of the patients 50% showing Symptoms of otomycosis visited the clinic between july to November [i.e. rainy season] followed by 31% in summer and minimum 18% in winter season.

The common symptoms presenting solely or in combination of each other encountered in the study group have been summarized in **Table:1**.

Table 1: Symptomatology of Otomycosis. N = 150

Symptoms	Incidence
Aural pruritus	53%
Otalgia	64%
Ear discharge	20%
Headache	10%
Hearing impairment	15%
Feeling of aural blockage	6%

Out of 150 patients, no organism was isolated in 9 patients (5.8%) and bacterial pathogens were isolated in 37(24.6%) subjects. In 104 patients (69.3%), mycological isolation was positive. The most common fungal isolates belonged to the species of Aspergillus accounting for 95(91.5%) of all fungal isolates. Out of Aspergillus positive samples, *A.flavus* was the most common, followed by *A.niger*, *A.fumigatus* and *A.nidulans* . Species of *Candida* constituted 8.5% of fungal isolates.

Table 2 shows the results of all fungal isolates obtained in the study.

Other fungal species like Penicillium were not isolated. Out of thirty seven patients positive for bacteria, *Staphylococcus aureus* was reported as the predominant microbial pathogen in 16 patients(43.2%) , *Pseudomonas aeruginosa* in 10 patients (27.02%) and in 11 patients (29.7%) mixed flora was reported.

Table 2: Results of mycological examination in clinically suspected otomycosis (N=104)

Name of fungal species isolated	Number	Percentage
<i>Aspergillus flavus</i>	48	46.2%
<i>Aspergillus niger</i>	40	38.4%
<i>Candida albicans</i>	8	7.7%
<i>Aspergillus fumigatus</i>	5	4.9%
<i>Aspergillus nidulans</i>	2	1.9%
<i>Candida parapsilosis</i>	1	0.9%
Total	104	100%

In the study group 100/150(66%), samples were both KOH preparation and culture positive. Table 3. shows results of KOH examination and culture.

Table 3: Results of KOH examination and culture

Positivity	Culture positive	Culture negative	Total
KOH Positive	100	24	124
KOH Negative	4	22	26
Total	104	46	150

Discussion

Otomycoses is frequent in tropical and subtropical climates because of heat and humidity.^{[11][15][16]}

Diagnosis of otomycosis is usually made by clinical findings with pruritus being the most common symptom followed by otalgia.^{[3][6][8]} In this study, presumed diagnosis of otomycosis was confirmed by laboratory findings in 104/150(69.3%). Aneja et al^[17] reported 78% of the patients positive for otomycosis, Kaur et al^[8] reported otomycosis in 74.7% patients, Ozcan et al.,^[18] in 65% patients and Chin and Jegathesan^[19] in 74.6% patients. Pontes et al^[6] reported otomycosis in 19.4% patients.

Higher incidence of otomycosis was reported in females than males in previous studies ^{[6][17][18][20]} similar to the findings of our study. Highest prevalence of otomycosis in summer has been reported by Paulose et al.,^[5] Ozcan et al.,^[18] Ghiacei et al.,^[20] and Pontes et al.^[6] However, seasonal

distribution in our study was highest in autumn probably due to dry dusty winds in this season. Male to female ratio was also highest in autumn and those working in dusty environments (construction workers and farmers) were the biggest group among male patients.

In this study, the species of *Aspergillus* were the largest taxon isolated from patients. *A. flavus* was the most common fungal pathogen followed by *A. niger*, *A. fumigatus* and *A. nidulans*. Araiza et al.,^[21] also reported *A. flavus* to be the most common pathogen in Mexico City. This was different from studies conducted in hot humid regions where *A. niger* was the most common mycological pathogen.^{[11][17][18][22][23]} Kaur et al^[8] reported *A. fumigatus* as the most common cause of otomycosis. Darko et al.,^[24] and Pontes et al.,^[6] reported *Candida* genus as the predominant pathogen in otomycosis. Occurrence of *A. nidulans* in our region with dry dusty winds was not reported

in hot humid areas.^{[17][18][19]} *Aspergillus* species are common saprophytic organisms in the environment. The human external auditory canal is an ideal environment for this fungus to grow and abundance of proteins, carbohydrates, favorable humidity and temperature explain this finding.^[25] Other fungal species like *Penicillium* were not isolated in our study.

Otomycosis was seen more frequently between the age group 21-40 years old and had a higher incident in females than males, a finding similar to that of Aneja et al.,^[17] Fasunla et al.,^[9] and Pontes et al.,^[6] Earlier studies from hot humid areas had considered wearing head covering as a predisposing factor in otomycosis.^{[5][15][17][18]} In the current study, all female patients regularly wore head covering and we could not confirm it as a possible predisposing factor. Swimming was revealed in 5% of patients while others have reported higher rates and considered it as a predisposing factor for otomycosis.^{[5][9][17][18][24]}

Clinical suspicion of otomycosis can prevent unnecessary use of antibiotics and mycological confirmation of otomycosis in 69% of patients indicating the importance of proper clinical

diagnosis. Etiology of fungal pathogens in dry dusty regions is not similar to hot humid areas and this needs to be taken into account in the treatment of patients. Further research is needed to determine the susceptibility of fungal agents and appropriate treatments.

Prevalence of otomycosis during moist and humid conditions has been reported by other study^[26]. Our study reveals higher incidence in rainy season followed by summer and minimal in winter season. Moist and humid conditions coupled with suitable temperature facilitate fungal growth, are the factors responsible for the higher incidence of otomycosis in this part of the country.

Conclusion

Clinical suspicion of otomycosis can prevent unnecessary use of antibiotics and potent steroids for prolonged periods, which might lead to the alteration of the local flora of the ear and leads to the morbidity like hearing loss. Keeping in view the high prevalence of otomycosis in India, Critical diagnosis of the causative agent and susceptibility testing for proper treatment of otomycosis is the need of the hour.

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