ORIGINAL RESEARCH

A clinico-mycological study of otomycosis in patients in a tertiary care hospital in Panipat district

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ABSTRACT

Background: Otomycosis is a chronic or subacute, recurrent, non-infectious, persistent superficial fungal infection of the ear, usually localized to the outer ear. The management of otomycosis depends on knowledge of the microbiology of potential pathogens and an understanding of the clinical presentation. The term otomycosis is used to describe a fungal infection of the ear, i.e. the outer ear canal and the eardrum. This condition presents as a primary infection or develops with an external bacterial infection following antibiotic treatment. This study was designed to determine the clinical symptoms and mycobacterial flora of cases of otomycosis. **Materials and Methods:** This cross-sectional study included patients attending the Otolaryngology Outpatient Department affiliated with the Department of Microbiology, N.C. Medical College and Hospital, Israna, Panipat, Haryana, India, over a two-year period, from July 2017 to June 2019. Total 100 patients diagnosed with otomycosis were included. The fungal culture and other studies were done in the microbiology laboratory by using standard methods. **Results:** Patients complained mainly of itching in 100%, followed by pain in 71 cases, purulent ear discharge in 52 cases and hearing loss in 43 cases. A total of 87 cases were caused by Aspergillus species and 7 were caused by Penicilium notatum, the remaining 6 were caused by Candida albicans. **Conclusion:** Aspergillus species appears to be the most common causative agent of otomycosis, followed by Penicillium notatum and Candida albicans. The most common manifestations of otomycosis are itching, ear pain, and ear discharge.

Keyword: Otomycosis, fungus, ear, pruritus, Aspergillus, clotrimazole

INTRODUCTION

Fungal infections of the external ear canal and pinna are a common cause of concern for otolaryngologists because of their prevalence worldwide. The incidence of otomycosis is higher in hot, humid and dusty regions of the tropics and subtropics. In the Indian subcontinent, otomycosis frequently occurs in many cases of ear discharge.[1,2]

Otomycosis is a fungal infection of the outside of the auricle, outer ear canal, tympanic membrane, and tympanic cavity.[3] Infections are often symptomatic and include itching, pain, watery ears, itching, ringing in the ears, tingling, and hearing loss.[4] Physical examination often reveals thick, gray-white and black or cheese-like debris and otitis externa. [5-10] The incidence is higher in young people, mainly women. Risk factors include wearing a hat, hot weather, ringworm, dusty work environments, and swimming.[11,12]

The disease is more common in hot and humid climates, especially during the monsoon (rainy) season.[13] the reported incidence of otomycosis is as low as 9% of cases of otitis externa and as high as 30.4% in patients with symptomatic otitis media or inflammatory conditions in the ear. Incidence is also influenced by geographic region, as otomycosis is most common in hot and humid tropical and subtropical climates.[14] Fungi may not be the primary cause but simply a secondary invader in cases of otitis externa. Therefore, otomycosis can be considered part of a mixed fungal infection with a bacterial infection.[15] The causative agents of otomycosis are various fungi, such as saprophytic hyaline molds, saprophytic dematiaceous molds, yeasts and, rarely, pathogenic fungi such as dermatophytes.[16-20] Aspergillus and Candida spp. are the fungi most frequently isolated from patients with otomycosis.[3] Risk factors for otitis externa

include lack of wax, high humidity, high temperature, bacterial otitis externa, corticosteroid treatment, swimming[21] and local trauma – from sharp objects sharp as a cane or hearing aid. Earwax has a pH between 4 and 5 and thus inhibits bacteria but promotes fungal growth. Water sports, including swimming and surfing, are particularly associated with otomycosis because repeated exposure to water results in earwax removal and drying of the outer ear canal.[22] Otomycosis is predominantly unilateral,[23] found in all age groups, but the majority of otomycosis cases occur in patients between the ages of 21 and 30 years with an even distribution between men and women. female.[24]

Infections can range from mild to severe through the external auditory orifice, in severe cases they are complicated by secondary bacterial infections. Pathogens isolated from common fungal ear infections cause fungal ear infections (Aspergillus niger, Aspergillus flavus, Aspergillus fumigatus, Candida albicans). The most common pathogenic fungus is Aspergillus niger in the otomycosis group. [24] Most fungal organisms are saprophytes in the soil and find wound sites to grow, but the growth medium in soil is different from systemic skin infections. Almost any species of fungus can grow and cause an ear infection, but few have a greater chance. [25]

MATERIALS AND METHODS

This cross-sectional study included patients attending the Otolaryngology Outpatient Department affiliated with the Department of Microbiology, N.C. Medical College and Hospital, Israna, Panipat, Haryana, India, over a two-year period, from July 2017 to June 2019. A total of 100 clinically diagnosed otomycosis cases aged 11 years to 60 years (55 females, 45 males) between age group 10-60 years were considered. Out of 100 cases, 55 (55%) are housewives, 31 (31%) are farmers, 9 (9%) are students and 5 (5%) are safaikarmi. Cases with signs and symptoms of otitis media, otitis externa related to otitis, itching, ear pain, associated with chronic purulent otitis media were included and cases without signs were excluded. otoscopy of the fungus. When taking a clinical history, particular attention is paid to documenting the nature of symptoms, history of similar episodes, and history of using ear drops, wooden sticks, or metal waxed toothpicks for removal earwax. Among suspected cases of otomycosis, debris from the external ear canal was collected with sterile gauze. All samples are shipped to the laboratory within 30 to 60 minutes for fungal and bacterial studies. Direct microscopy with 10% potassium hydroxide framework was performed, followed by samples inoculated on Sabourauds dextrose agar on the same day and the cultures were incubated at 25°C in biological oxygen demand (BOD) incubator and observed for one week. Fungal growth was then examined microscopically by Lactophenol cotton blue (LPCB) stain, Gram stain and germ tube test.

RESULTS

In the present study, patients with otomycosis between the ages of 11 and 60 were included. The youngest patient was 15 years old and the oldest patient was 59 years old.

In total, 100 patients (87%) had only one ear. The right ear was affected in 46 cases (46%) and the left ear in 40 cases (40%). In 10 cases (10%) both ears related. Out of 100 cases, 55 (55%) are housewives, 31 (31%) are farmers, 9 (9%) are students and 5 (5%) are safaikarmi. In this study, the incidence of otomycosis was highest among housewives and lowest among safaikarmi. Relative strength of housewives in outpatient care is higher than other groups. In this study, smears cultured on Sabouraud dextrose agar showed that 47 cases (47%) were caused by Aspergillus niger, 28 cases (28%) were caused by Aspergillus fumigatus, 12 cases (12%) were caused by Aspergillus flavus, 7 cases (7%) was caused by Penicillium notatum and 6 cases (6%) were due to Candida albicans.

In the present study, age wise distribution was maximum in age group 11 to 20 years i.e. 30% followed by 21 to 30 years i.e. 28%, 31 to 40 years i.e. 19%, 41 to 50 i.e. 16% and lowest was in age group 51 to 60 years i.e. 7%. The highest number of cases is from 11 to 30 years old (58%). [Table 1 & Fig.1]

Table 1: Age wise distribution of otomycosis cases

Age in years	Number ofcases	Percentage
11 - 20	30	30
21 -30	28	28
31 -40	19	19
41 -50	16	16
51 -60	7	7
Total	100	100

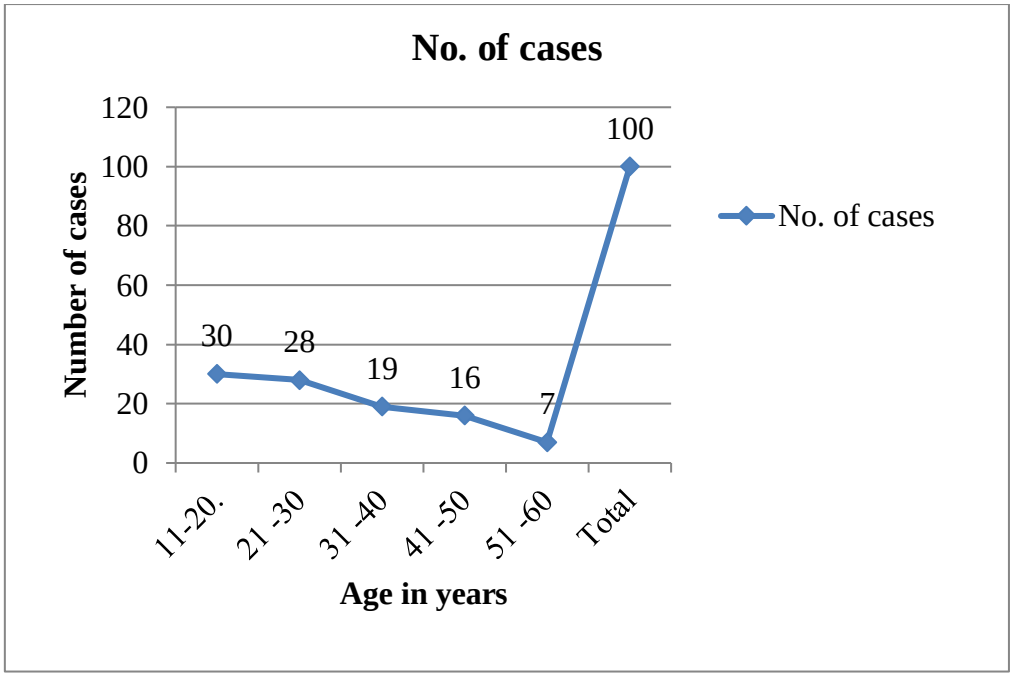

Fig.1: Age wise distribution of otomycosis cases

In our study, gender wise distribution 58 patients (58%) were female and 45 (45%) were male. According to this study, the incidence of otomycosis is higher in women. [Table 2 & Fig.2]

Table 2: Gender wise distribution of otomycosis cases

Gender	No.	%
Female	55	55
Male	45	45
Total	100	100

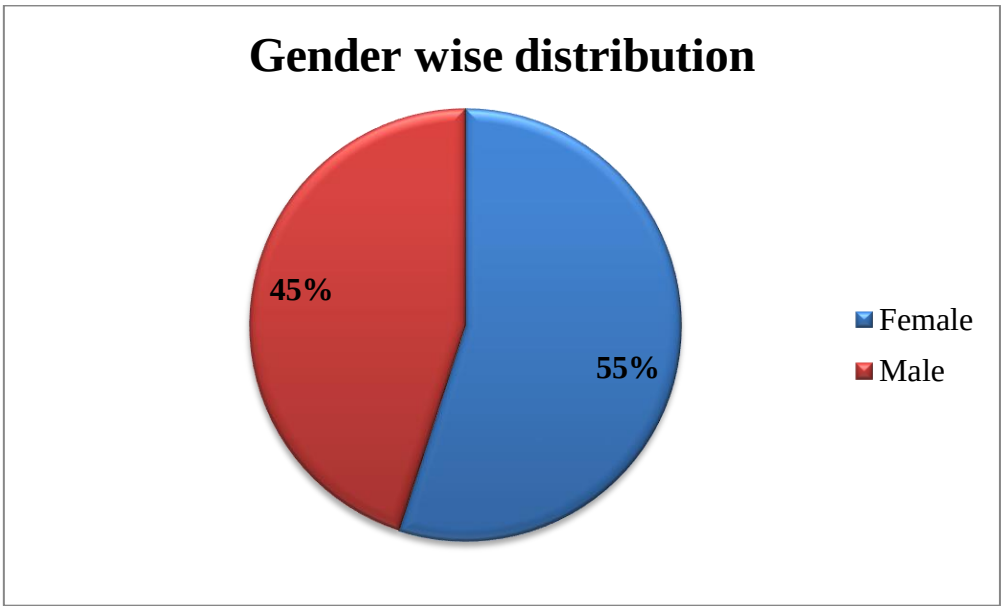

Fig. 2: Gender wise distribution of otomycosis cases

Our study showed that itching in the ear was commonest symptom in 90% of the patients, followed by ear ache i.e. 68%, ear block 62%, discharge 55%, hearing impairment 53% and tinnitus was 29%. The fungus growth mixed with the epithelial debris and cerumen forms characteristic mycotic plug. This gives rise the symptom of blocked ear. [Table 3 & Fig.3]

Table 3: Showing the various symptoms complained by the patients.

Complaints	Unilateral		Bilateral		Total	
	No.	%	No.	%	No.	%
Ear ache	39	39	29	29	68	68
Itching in theear	55	55	35	35	90	90
Ear block	37	37	25	25	62	62
Discharge	36	36	19	19	55	55
Hearing impairment	31	31	22	22	53	53
Tinnitus	11	11	15	15	26	26

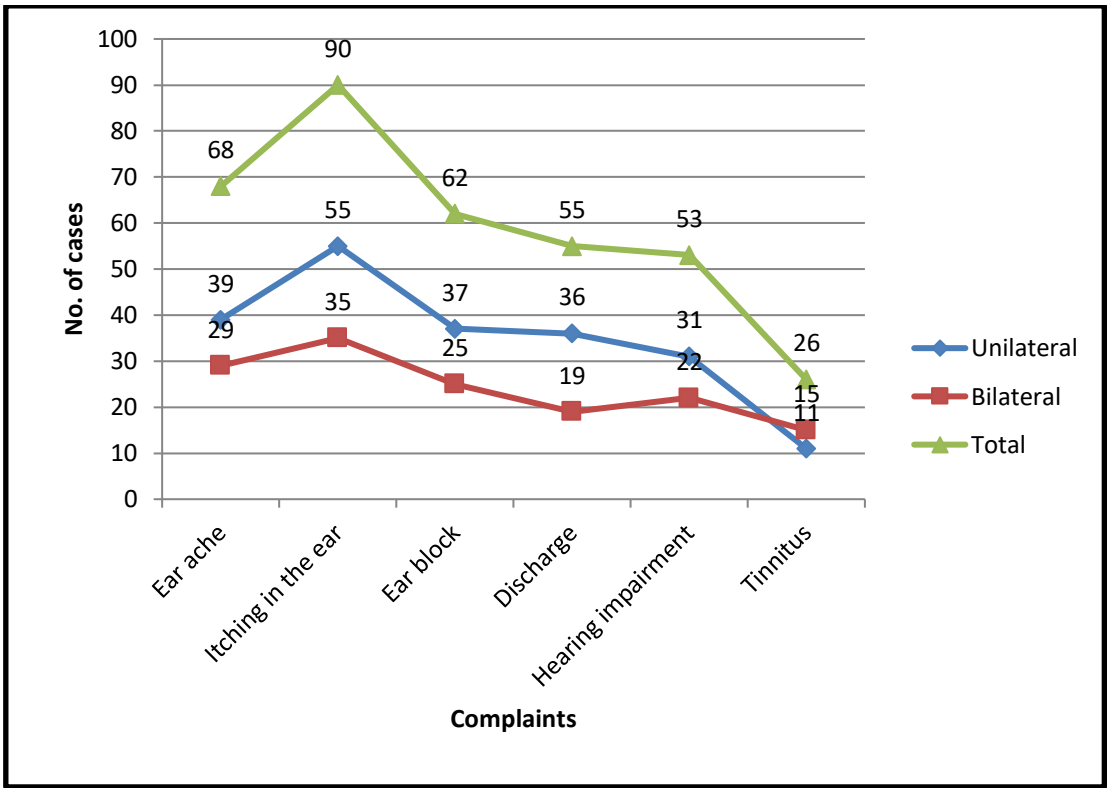

Fig. 3: Showing the various symptoms complained by the patients.

In the present study, positive fungal growth was seen in 100% cases. Aspergillus species was the common isolate in 87% cases comprising Aspergillus niger 47%, followed by Aspergillus fumigatus 28%, Aspergillus flavus 12%, Penicillium notatum in 7% cases and Candida albicans in 6% cases. [Table 4 & Fig.4]

Table 4: Types of fungal isolates in otomycosis cases.

Types of fungus isolated	No. of cases	%
Aspergillus niger	47	47
Aspergillus fumigatus	28	28
Aspergillus flavus	12	12
Penicillium notatum	7	7
Candida albicans	6	6
Total	100	100

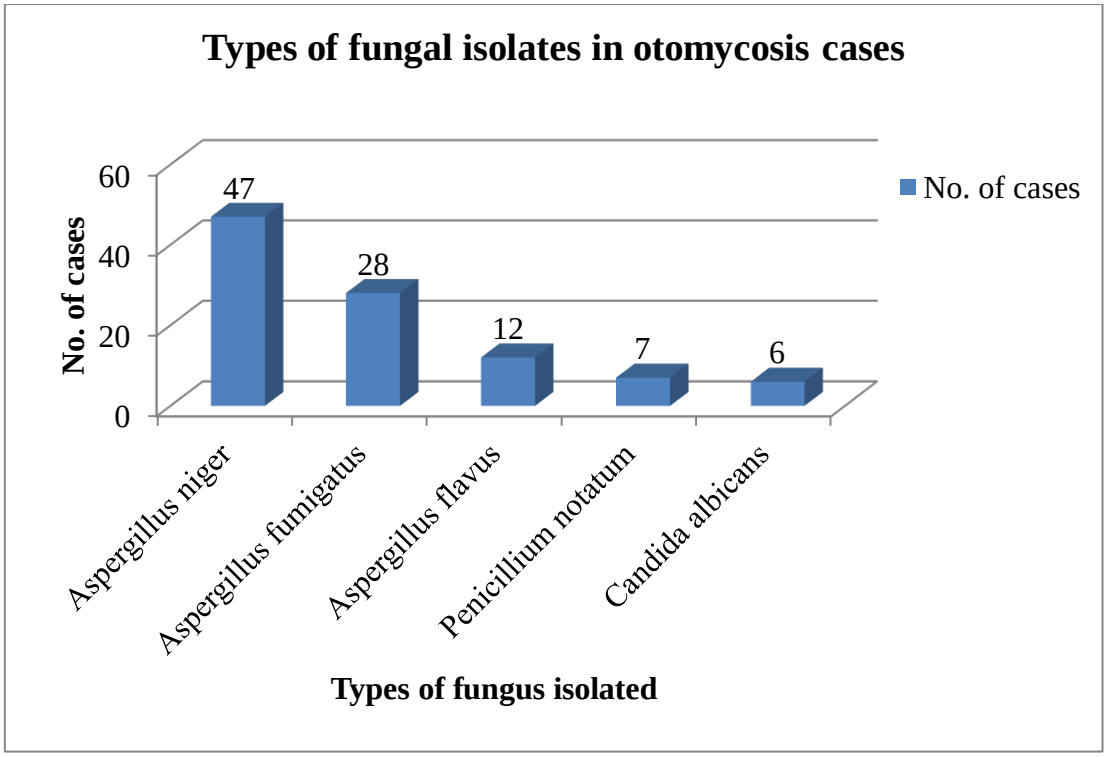

Fig. 4: Types of fungal isolates in otomycosis cases.

DISCUSSION

Otomycosis is a common problem encountered by otolaryngologists and can often be diagnosed by physical examination and laboratory testing. Fungal infections of the outer ear are common in tropical countries due to humidity and temperature. Fungi can be mentioned as a normal microflora of the external ear canal that plays an important role in otitis media. Various factors allow these saprophytic organisms to form themselves in the external auditory canal. Ear infections are on the rise, especially due to indiscriminate use of topical antibiotic/steroid preparations and poor hygiene habits. Treatment of otomycosis includes adequate auditory grooming, altering the pH of the external ear canal with topical acidifiers and antifungals.

Otomycosis is a superficial fungal infection of the external ear, which needs long term treatment and tends to relapse. This study was aimed to assess the relationship between the fungal appearance and clinical symptoms of otomycosis, and to determine most prevalent microbial isolate in otomycosis. A total 100 cases (55 females, 45 males) between age group 11-60 years were considered. Incidence was highest in young adults. In some studies, the incidence of the disease was significantly higher in females, mainly housewives, than in males. [12,26]

Itching in the ear was commonest symptom in 90% of the patients. The fungus growth mixed with the epithelial debris and cerumen forms characteristic mycotic plug. This gives rise the symptom of blocked ear. A study by Kaur R et al stated that ear blockage is the commonest symptom (93.7%) followed by itching (71.5%). [27] Whereas the other studies reported that the itching (88%) was the most common symptom, followed by an ear block (87.5%), discharge (30%) and tinnitus (22%) [12,28]

In this study, the main complaint was pruritus (90%) and the least common complaint was tinnitus (26%). This is comparable to other studies. Ali K et al. reported that the most common symptoms of ENT disease were itching (92.16%), ear pain (50.98%), hearing loss (23.53%) and discharge. atrium (20.59%). [29] In a study by Prasad SC et al., pruritus was the prominent symptom observed in 73% of patients with otitis externa, followed by ear obstruction (38%), purulent discharge (38%). ear pain (35%) and tinnitus (8%). [30]

In our study, positive fungal growth was seen in 100% cases. Aspergillus species was the common isolate in 87% cases comprising Aspergillus niger 47%, followed by Aspergillus fumigatus 28%, Aspergillus flavus 12%, Penicillium notatum in 7% cases and Candida albicans in 6% cases. In a study Prasad SC et al. reported Aspergillus (80%) was the most frequently isolated genus, Penicillium (8%) was the second most frequently isolated genus, and Candida albicans accounted for only 4%. [30] Rao et al. reported that Aspergillus niger (44.7%) was the dominant species isolated, followed by Aspergillus flavus (29.8%), Aspergillus fumigatus (11.7%), Candida species (8.5%), Mucor (2.1%) and Penicillium species (2.1%). [31] Ali K et al. reported that Aspergillus niger (50.98%) was the most common organism isolated, followed by Aspergillus flavus (33.33%) and Candida species (14, 7%). [29]

CONCLUSION

The right ear is more commonly affected than the left ear because predominantly right-handed patients have a higher risk of self-injury. The most common symptoms associated with otomycosis are itching in the ear, ear ache, ear block and discharge. Tinnitus and dizziness are caused by the pressure of the fungal plug on the eardrum. Aspergillus species was found to be the most common causative agent of otomycosis, followed by Penicillium notatum and Candida albicans. Ear hygiene habits leading to damage to the external ear canal are believed to be the most common risk factor. The most common manifestations of otomycosis are itching, ear pain, and ear discharge. Most patients respond to clotrimazole.

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