International Journal of Otorhinolaryngology and Head and Neck Surgery
Khandagale P et al. Int J Otorhinolaryngol Head Neck Surg. 2025 Jun;11(3):233-236
http://www.ijorl.com
pISSN 2454-5929 | eISSN 2454-5937

DOI: https://dx.doi.org/10.18203/issn.2454-5929.ijohns20251502

Original Research Article

Mycological potrial of otomycosis study conducted in central Maharashtra

Pranit Khandagale*, Rahul Thakur, Sanjaykumar Sonawale, Rahul Telang

Department of ENT, B.J. Govt. Medical College, Pune, Maharashtra, India

Received: 29 December 2024
Accepted: 06 May 2025

***Correspondence:**
Dr. Pranit Khandagale,
E-mail: pranitpk558@gmail.com

ABSTRACT

Background: Fungal infection of the external ear (otomycosis) is a common condition encountered by the otorhinolaryngologist in routine ENT clinic. Otomycosis associated with symptoms of itching, pain, aural fullness, aural discharge, hearing impairment and tinnitus. we have undertaken this study with the aim to describe the spectrum of fungi, clinic-pathology of patients with otomycosis.
Methods: Present study was prospective in nature conducted among 100 otomycosis patients. All patients fulfilling inclusion criteria and exclusion criteria were taken up for the study. Study was carried out over a period of 1.5 years.
Results: Majority of the patients was in the age group of 16-30 years and most of them were male. Most common presenting complaint was itching (83%) followed by otalgia (54%), ear block (34%), hearing loss (31%) and ear discharge (20%). Most common fungal spp. Isolate was Aspergillus Niger.
Conclusions: Aspergillus Niger was the commonest fungal species in otomycosis with 75% sensitivity to usually started clotrimazole and fluconazole being least efficacious antifungal.

Keywords: *Aspergillus niger*, Clinic-pathology, EAC, Ear, Otomycosis

INTRODUCTION

Otomycosis is oto i.e., Ear and mycos i.e., fungus which means fungal infection of the ear. Otomycosis usually involves the external ear and rarely it can involve the middle ear, if the drum is perforated or the mastoid cavity following an open mastoidectomy.[1-3] Prevalence of otomycosis range from 9% to 27% in patients presenting with otitis externa.[4,5] Presenting complaints would be itching and pain in the ear, ear discharge, hearing difficulty, ringing sensation and heaviness in the ear. Otomycosis may be primary or secondary. If the fungi are the primary pathogens, then it is termed primary and if it follows existing bacterial otitis externa/ media or postoperative ears or history of an existing fungal infection in other parts of the body or serious debilitating disease or in an immunocompromised patient then termed secondary.[6] Predisposing risk factors for otomycosis can be ear oil instillation, immunocompromised status, humid climate, ear instrumentation and topical antibiotic/steroid use.[5,6] Among patients with perforated tympanic membrane, middle ear involvement may result in a prolonged burden of disease requiring aggressive treatment and follow-up. Most common fungal species isolated were Aspergillus species (spp.). Candida spp., Pencillium spp. and Rhizopus spp. are among the other common fungal pathogen.[7,8] Usual treatment is aural cleaning followed by the instillation of topical anti-fungal ear drops and control of predisposing factors. However, in recent years it has been noted an increasing trend of antifungal resistance for the commonly used antifungals such as fluconazole and clotrimazole.[8,9] Drug sensitivity patterns also have shown variability across regions. Appropriate management of otomycosis requires correct identification of the underlying fungal species and the drug sensitivity pattern specific to a particular location, hence we have undertaken this study.

Objectives

The objectives of the study were the modes of clinical presentation of otomycosis, various predisposing factors, underlying fungal species and drug sensitivity pattern.

METHODS

Current study was prospective in nature, protocol of which was approved by the Institutional Ethical committee of the medical college. Written informed consent was taken from before the start of our study.

All patient of otomycosis presented to ENT OPD or admitted under ENT department of our tertiary Care Hospital constituted our study subjects. All consecutive patients fulfilling inclusion and exclusion criteria were taken up for the study until the required sample size was fulfilled. Sampling method used was universal sampling. Study was carried out over a period of 6 months from June 2023 to November 2023. Clinically diagnosed cases of otomycosis were included in the study. Exclusion criteria were patients with spinal diseases, hypertension/hypotension, heart disease, neurological disease, central lesions confirmed on history physical examinations in the form of neurological test reflexes, cranial nerve examinations, X-ray, CT, MRI etc. and pregnancy

All cases of otomycosis of ear presented ENT OPD or admitted under ENT department of our tertiary Care institute were analyzed as regard to the history, clinical presentation, predisposing factors. Clinical and laboratory finding were obtained from each case for mycological profile and drug sensitivity pattern. Complete ear, nose and throat examination was done in all patients. Routine blood and urine analysis, ELISA for HIV and random blood sugar was done.

From the included cases, two samples from external auditory meatus debris/secretion were collected with sterile swabs. Samples were transported to the microbiology department, within 60 min, for mycological investigations. One sample was for KOH wet mount, which was examined under X10 and X40 light microscopy for direct visualization of fungal elements. The other sample was for fungal culture on 2 Sabourauds dextrose agar with chloramphenicol at 25°C and 37°C.

If growth was seen, the morphology of fungal isolates was further demonstrated by Lacto phenol cotton blue staining. The Candida identification was made by using the Germ tube test. Anti-fungal susceptibility testing was done by disk diffusion method using medium Muller–Hilton agar with glucose and methylene blue. All the patients were treated by removal of fungal debris by aural toileting, followed by topical Clotrimazole 4 drops, 3 times a day for 7 days. Patients were followed up after 7 days and a repeat ENT examination was done. Repeat ear swabs were sent for KOH wet mount and sabouroud dextrose agar culture. For symptomatic patients and positive KOH wet mount after 7 days, treatment was changed according to anti-fungal susceptibility test

Data was collected in pre-structured proforma which was pilot tested and after ensuring it's validity. The data collected was then analyzed by appropriate test of significance.

Sample size was calculated with n=(DEFF×Np(1-p))/((d2/Z21-α/2×(N-1)+p×(1-p)) using OPENEPI software version 3.

In a study by Anusheela Howlader et al, their study found that most prevalent fungal species of otomycosis was *Aspergillus niger* in 50% cases, considering this prevalence and 10% absolute error, at 95% confidence interval, sample size came out to be 97 but for convenience of calculation we have rounded up the figure to 100.

RESULTS

We have conducted this prospective study, on 100 clinically diagnosed cases of otomycosis. Majority 40 (40%) of the patients were from the age group of 16-30 years followed by 34 (34%) from the age group of 31-45 years, 16% from 46-60 years & least 5% from 0-15 and >60 years each. Majority (58%) of the patients were male. 52 (52%) of the cases had right ear otomycosis followed by left ear otomycosis in 48%. Most common predisposing factor among our study participants was CSOM (47%) followed by ear wax (38%), trauma (23%), diabetes mellitus (12%) and putting oil in ear (18%) (Table 1).

In this study, most common presenting symptom was itching reported by 83 (83%) patients followed by otalgia in 54 (54%), ear block in 34 (34%), hearing loss in 31 (31%) and ear discharge among 20 (20%) (Figure 1).

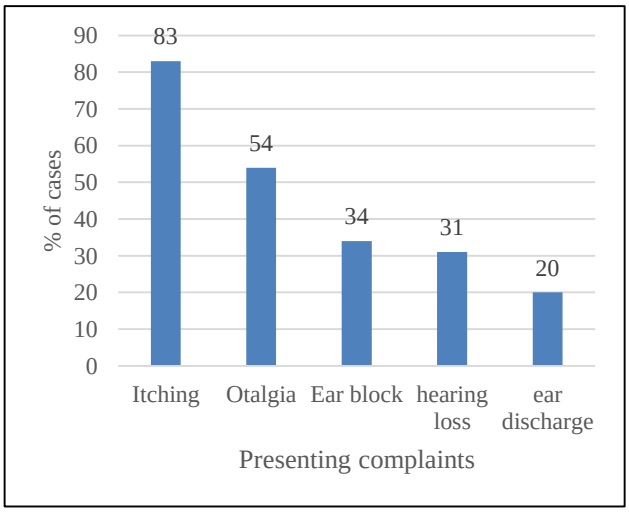

Figure 1: Presenting complaints among study participants (n=100).

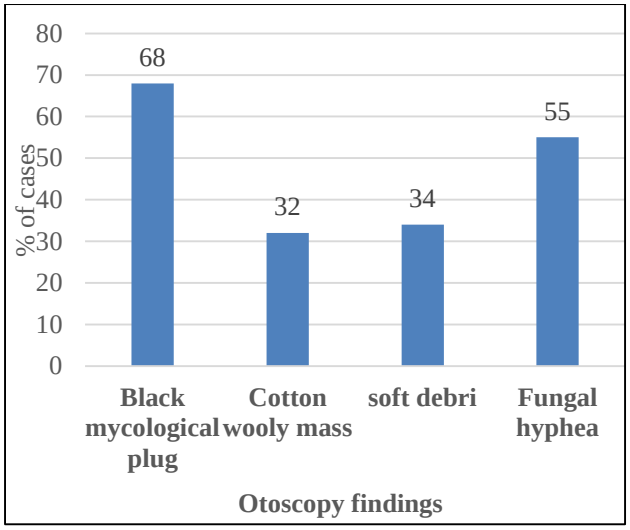

Figure 2: Otoscopic examination findings of cases (n=100).

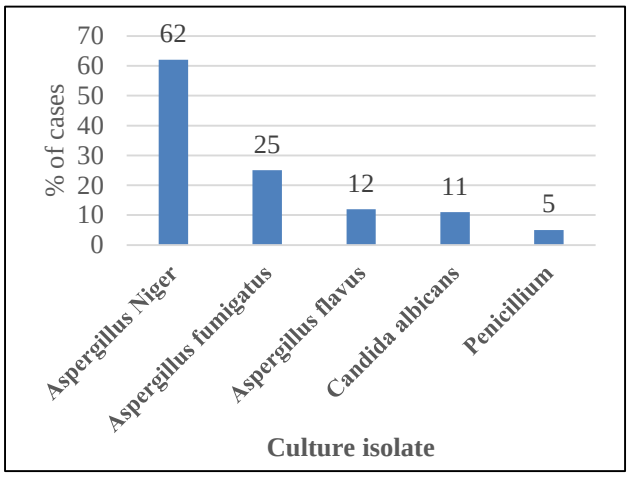

Figure 3: Distribution of cases according to culture isolate (n=100).

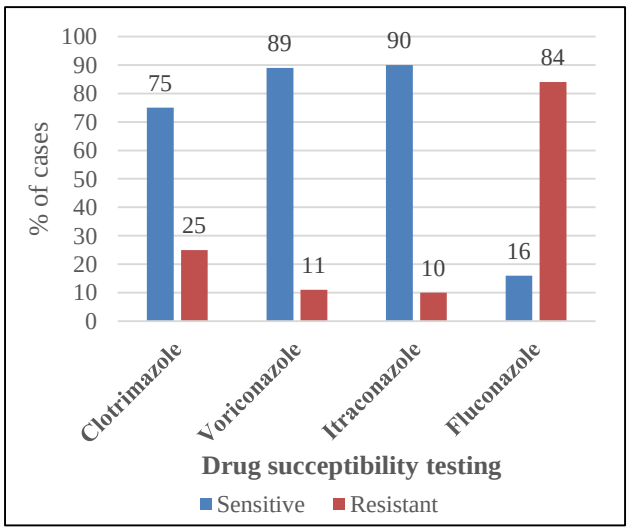

Figure 4: Distribution of cases according to drug susceptibility testing (n=100).

On otoscopic examination most common finding was black mycological plug in 68% cases which is consistent with *Aspergillus niger* fungal infection followed by fungal hyphae in 55%, soft debris in 34% and cotton wooly mass in 32% patients (Figure 2). On culture analysis, most common fungal species isolated was *Aspergillus niger* in 62% cases followed by *Aspergillus fumigatus* 25%, *Aspergillus flavus* in 12%, *Candida albicans* 11% and *Penicillium notatum* among 5% (Figure 3). On drug susceptibility testing we have observed that Itraconazole and voriconazole had highest sensitivity while fluconazole had least sensitivity (Figure 4).

Table 1: Distribution of otomycosis patients according to baseline characteristics (n=100).

S. no.	Baseline characteristic		Frequency	(%)
1	Age groups (in years)	0-15	05	05
		16-30	40	40
		31-45	34	34
		46-60	16	16
		>60	05	05
2	Gender	Male	58	58
		Female	42	42
3	Laterality	Right	52	52
		Left	48	48
4	Predisposing factors	DM	12	12
		CSOM	47	47
		Trauma	23	23
		Ear wax	38	38
		Putting oil in ear	18	18

DISCUSSION

Fungal infection of external ear often known as otomycosis is one of the commonest clinical presentations to outpatient department of ENT. Due to ear wax or manipulation of the for the relief of itching with the hard objects, such as wooden sticks or metal pins, leads to unnoticed minor trauma and deposition of fungal conidia in the wound, which may create fungal infection of the external ear. Majority (40%) of the patients in our study were from the age group of 16-30 years followed by (34%) the age group of 31-45 years with majority (58%) being male. Right ear otomycosis (52%) more common than the left ear otomycosis.

Most common predisposing factor among our study participants was CSOM (47%) followed by ear wax (38%), trauma (23%), diabetes mellitus (12%) and putting oil in ear (18%). Similarly, Howlader et al, reported that most common age group affected age group was 20-35 years with majority affected being males (58.73%).[10] In this study, most common presenting symptom was itching (83%) followed by otalgia (54%), ear block (34%), hearing loss (31%) and ear discharge (20%). This finding is in agreement with Alam et al,

Howlader et al, who also noted itching as most common presenting symptom.[10,11] On otoscopic examination we have seen black mycological plug in 68% cases which is consistent with Aspergillus Niger fungal infection followed by fungal hyphae in 55%, soft debris in 34% and cotton wooly mass in 32% patients. Ankale et al, reported ear discharge as commonest finding (44.44%) followed by Black mycotic plug (28.70%).[12]

On culture analysis, most common fungal species isolated was *Aspergillus Niger* in 62% cases followed by *Aspergillus fumigatus* 25%, *Aspergillus flavus* in 12%, *Candida albicans* 11% and *Penicillium notatum* among 5%. On drug susceptibility testing we have observed that Itraconazole and voriconazole had highest sensitivity while fluconazole had least sensitivity.

Consistently, Alam et al, observed *Aspergillus niger* growth in 91% isolates with Itraconazole and voriconazole most efficacious while fluconazole least efficacious antifungal and Howlader et al, in their study reported high sensitivity of fungal isolates to amphotericin B, itraconazole and ketoconazole drugs but low efficacy to fluconazole drugs.[11] Similar to our study, Ali et al, reported 1% clotrimazole ear drop was more effective with very good response in 78.82% of cases (75% sensitivity in this study).[13]

CONCLUSION

From the mycological potrial we conclude that *Aspergillus niger* was the commonest fungal species in otomycosis with 75% sensitivity to usually started clotrimazole and fluconazole being least efficacious antifungal, hence cases not responding to usual line of treatment should be evaluated and started on appropriate antifungal after drug susceptibility testing.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Munguia R, Daniel SJ. Ototopical antifungals and otomycosis: a review. Int J Pediatr Otorhinolaryngol 2008;72(4):453–9.
2. Pontes ZB, Silva AD, Lima EdeO. Otomycosis: a retrospective study. Rev Bras Otorrinolaringol (Engl Ed) 2009;75(03):367–70.
3. Kaur R, Mittal N, Kakkar M, Aggarwal AK, Mathur MD. Otomycosis: a clinicomycologic study. Ear Nose Throat J 2000;79(8): 606–9.
4. Mugliston T and O'Donoghue G. Otomycosis--a continuing problem. J Laryngol Otol. 1985;99(4):327-33.
5. Fasnula J, Ibeke T and Onakoya P. Otomycosis in western Nigeria. Mycoses. 2007;51(1):67-70.
6. Prasad SC, Kotigadde S, Shekhar M, Thada ND, Prabhu P, D' Souza T, et al. Primary otomycosis in the Indian subcontinent: Predisposing factors, microbiology and classification. Int J Microbiol. 2014;4:636493.
7. Aboutalebian S, Mahmoudi S, Mirhendi H, Okhovat A, Abtahi H and Chabavizadeh J. Molecular epidemiology of otomycosis in Isfahan revealed a large diversity in causative agents. J Med Microbiol. 2019;68(6):918-23.
8. Ali K, Hamed MA, Hassan H, Esmail A and Sheneef A. Identification of fungal pathogens in otomycosis and their drug sensitivity: Our experience. Int Arch Otorhinolaryngol. 2018;22(4):400-3.
9. Nemati S, Hassanzadeh R, Jahromi SK and Abadi AD. Otomycosis in the north of Iran: Common pathogens and resistance to antifungal agents. Eur Arch Otorhinolaryngol. 2014;271(5):953-7.
10. Howlader A, Nagarajan P, Ragunathan L. Mycological Profile in Otomycosis Patients and their Drug Sensitivity: A Cross-sectional Study at Union Territory of Puducherry, India. J Clinical & Diagnostic Research. 2022;16(10):45.
11. Alam I, Gupta RK, Bhargava A, Faiz SM, Srivastava S. a study of clinico-mycological profile and treatment of primary otomycosis. Asian J Med Sci. 2023;14(8):4–9.
12. Ankale N, Anand U. Mycological Profile in Otomycosis Patients: A Cross-Sectional Hospital Based Study in Tertiary Care Centre. 2019;(7):1–6.
13. Nipa KK, Kamal AH, Imtiaj A. Prevalence and Clinicomycological studies of Otomycosis: A review. J Bio-Sci. 2020;28:121-35.

Cite this article as: Khandagale P, Thakur R, Sonawale S, Telang R. Mycological potrial of otomycosis study conducted in central Maharashtra. Int J Otorhinolaryngol Head Neck Surg 2025;11:233-6.