

Original Research

A retrospective analysis of fungal components in chronic otitis media using a potassium hydroxide mount

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ABSTRACT:

Aim: A retrospective analysis of fungal components in chronic otitis media using a potassium hydroxide mount. **Methods:** After receiving clearance from the protocol review committee and the institutional ethics committee, this retrospective research was carried out at the Department of ENT. Following informed permission, a comprehensive history was obtained from the patient or family. Total 100 Patients with chronic otitis media who had not used ear drops in the previous week were included in the study. Ear discharge was obtained from the middle ear and deposited in a clean container before being submitted to the microbiology laboratory for culture and potassium hydroxide (KOH) mount, respectively. **Results:** Overall prevalence rate KOH positivity was found to be 19%. Our study showed that among 100 patients of either sex between age group 11 months to 75 years diagnosed with COM, 19 (19%) patients showed KOH positivity which is clinically and statistically found to be significant and probability of KOH positive in future will be in between 9.7-20.5%. In our study, *Pseudomonas* was found to be common bacteria among 100 samples and 45 samples were showing no growth and 10 out of 45 samples were showing positive for KOH mount. Most common fungal pathogen was found to be *Aspergillus*. **Conclusions:** We conclude that in patients with COM, submit ear discharge for both culture and sensitivity and KOH mount and it should be routine and always consider combination treatment i.e., antibiotic and antifungal medicines.

Keywords: Chronic otitis media, KOH mount, Combined therapy, Prevalence

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INTRODUCTION

Chronic otitis media (COM) is an inflammation of mucosal lining of middle ear cleft. Its aetiology is numerous reasons and known for recurrence and one of the ones is fungal infection. ¹ Fungi may either be the main pathogen or be superimposed on bacterial infections or can be secondary pathogen in already ruptured tympanic membrane. Chronicity of ear discharge is essential element in the causation of fungal infection of otitis media. It promotes humid state in the ear and modifies the pH to alkaline. Epithelial detritus which ultimately aids the development of fungus. Topical use of steroid and antibiotics induce the fungal infection in the middle ear. Use of just antibiotics either locally or systemically in these individuals will not aid in removing the inflammation instead it will increase the fungus development by producing suitable environment in the middle ear. ²

The prevalence of COM is greater in the developing nations due to poor diet, unsanitary living circumstances, lack of health education and paucity of health care providers. In the current times the indiscriminate use of wide spectrum antibiotics, corticosteroids, cytotoxic chemotherapy as well as the rising occurrence of illnesses accounting for immune insufficiency has led to the rise prevalence of superadded fungal infection in COM. In a number of earlier studies it has been claimed that the illogical and excessive use of topical antibiotic and steroids for all instances with COM, increases the development of *Aspergillus* and *Candida* spp. are the most often identified fungus in patients with otomycosis. ³⁻⁷ Factors that predispose to otitis externa include lack of cerumen, excessive humidity, elevated temperature, bacterial otitis externa, corticoid treatment, swimming and local trauma –caused by sharp items like sticks or hearing aids. ⁸ Cerumen has a pH of 4 to 5 and hence

reduces bacterial but favourable for fungal development. Aquatic activities, including swimming and surfing, are especially related with otomycosis because prolonged contact to water leads in elimination of cerumen and drying of the external auditory canal. ⁹ Otomycosis is mainly unilateral,¹⁰ found in all age groups, although most of the cases of otomycosis occur in individuals aged 21-30 years with equal male – female distribution. ¹¹ This research was done to analyse the prevalence of fungal elements positive in ear discharge of the patients with COM.

MATERIAL AND METHODS

After receiving clearance from the protocol review committee and the institutional ethics committee, this retrospective research was carried out at the Department of ENT. Following informed permission, a comprehensive history was obtained from the patient or family. Total 100 Patients with chronic otitis media who had not used ear drops in the previous week were included in the study. Ear

discharge was obtained from the middle ear and deposited in a clean container before being submitted to the microbiology laboratory for culture and potassium hydroxide (KOH) mount, respectively. To ensure consistency, these swabs were collected by a single surgeon. Collected bacterial culture reports and KOH mount reports, computed all culture and KOH positive reports, and treated the patient for 3 weeks with antibiotic and antifungal or antifungal ear drops alone, based on culture and KOH reports. According to culture and KOH reports, patients who did not respond to ear drops were treated with oral antibiotics and oral antifungals or oral antifungals for 20 days in addition to ear drops.

RESULTS

The age range of study participants was found to be 11 months to 75 years (Table 1). Females were found to be more common than males (Table 2). Overall prevalence rate KOH positivity was found to be 19% (Table 3).

Table 1: Age distribution

Age	N=100	%
Below 10	9	9
10-20	8	8
20-30	40	40
30-40	27	27
40-50	8	8
50-60	4	4
Above 60	3	3

Table 2: Sex wise distribution

Age group (years)	No. of cases	%
Male	43	43
Female	57	57
Total	100	100

Table 3: KOH mount positivity

Total no. of cases	No. of cases KOH +ve	KOH +ve rate (%)	95% CI
100	19	19	9.7-20.5

Our study showed that among 100 patients of either sex between age group 11 months to 75 years diagnosed with COM, 19 (19%) patients showed KOH positivity which is clinically and statistically found to be significant and probability of KOH positive in future will be in between 9.7-20.5%.

Table 4: Culture reports

Bacteria	No. of cases	Percentage
<i>Pseudomonas</i>	25	25
MRSA	8	8
<i>Klebisella</i>	6	6
<i>Acinetobacter</i>	5	5
CONS	3	3
<i>Staphylococci aureus</i>	3	3
<i>Coagulase positive staph</i>	2	2
<i>E. coli</i>	2	2
<i>Proteus mirabilis</i>	1	1
No growth	45	45
Total	100	100

In our study, *Pseudomonas* was found to be common bacteria among 100 samples and 45 samples were showing no growth and 10 out of 45 samples were showing positive for KOH mount.

Table 5: KOH mount reports

Fungus	No. of cases	%
<i>Aspergillus species</i>	11	57.89
<i>Candida species</i>	6	31.58
Other saprophytes	2	10.53
Total	19	100

Most common fungal pathogen was found to be *Aspergillus*

DISCUSSION

COM is the chronic inflammation of the mucosal lining of middle ear cleft and usually presents with ear discharge in affected ear. In India, due to temperate climate with heavy monsoons, CSOM is a major complaint encountered in ENT clinics. It has multiple etiological factors and recurrence of the disease is common. Due to use of antibiotic and/or steroid topical ear drops leading to favorable environment to the fungi growth in the middle ear. Fungal infection in the middle ear cleft leads to recurrences of the ear discharge in COM and if not treated the same, leads to failure in the treatment.¹²

In our study, overall prevalence rate KOH positivity was found to be 18% comparable to other studies like, Ghosh et al states that, out of 130 cases, 34 were found fungal positive having the prevalence rate 26.15%.¹³ Roy et al states that, out of 200 cases, 74 (37%) were positive on culture. Culture positivity was more in chronic otitis media (COM) without any active discharge 45.2% than in chronic suppurative otitis media (CSOM, 29.5%).¹⁴ Statistically calculated probable range of KOH positivity was not calculated any of the above studies.

In our study, out of 100 samples, 25 samples were *Pseudomonas*, 45 samples were showing no growth and other bacteria were MRSA (8), *Klebsiella* (6), *Acinetobacter* (5), CONS (3), *Staphylococci* (3), *Escheria coli* (2), *Proteus mirabilis* (1). *Aspergillus* was found to be more common among fungal growth. Similar to the study done by Gandhi et al states that, out of the 245 samples studied for bacterial and fungal isolates, 225 samples showed growth of pathogens, 20 samples did not show any growth, 201 samples showed bacterial growth, The most predominant organism was *Staphylococcus aureus*, 24 samples showed fungal growth, *Aspergillus* SPS being the predominant isolate.¹⁵

In our study, 11/19(57.89%) was found to be aspergillus, 6/18(31.58%) was found to be candida and 2/19 (10.58%) was found to be other saprophytic species. Similar to the study done by Kumar et al study reported that, among the fungal etiology in CSOM, the most commonly isolated organisms are *Aspergillus species* and *Candida species*.¹⁶ We have treated all patients were treated with 4 weeks antibiotics and antifungal ear drops for 4 weeks but 6 patients were not improved with ear drops so oral antifungals given to dry the ear.

CONCLUSION

We conclude that in patients with COM, submit ear discharge for both culture and sensitivity and KOH mount and it should be routine and always consider combination treatment i.e., antibiotic and antifungal medicines.

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