

Original Research Article

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Retrospective study of fungal elements by potassium hydroxide mount in chronic otitis media*

Santosh U. P., Sanjay V. C.*

Department of Otorhinolaryngology and Head and Neck Surgery, J. J. M Medical College, Davangere, Karnataka, India

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***Correspondence:**

Dr. Sanjay V. C.,

E-mail: sanjay.shetty.vijapur@gmail.com

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ABSTRACT

Background: Chronic otitis media is defined as persistent disease of middle ear. Fungi can either be the primary pathogen or be superimposed on bacterial infections or can be secondary pathogen in previously perforated tympanic membrane. Keeping view of high prevalence of fungal infection of middle ear in hot, humid and dusty areas, retrospective study was done to detect the potassium hydroxide (KOH) mount positive in ear discharge of chronic otitis media and treat these patients.

Methods: This was a retrospective study based on Bapuji Hospital records between 1 January 2018 to 26 July 2019 attached to the teaching college JJM Medical College, Davangere. Patients of either sex between age group 18 months to 87 years who diagnosed with chronic otitis media and given ear discharge sample for bacterial culture and KOH mount which is taken by a single surgeon. Collected bacterial culture reports and KOH mount reports and calculated all positive reports of KOH mount reports and treated accordingly and all reports were analysed statistically.

Results: We found that 15.8% KOH rate positive with 9.8-21.8% probable range for KOH positivity 95% CI which will impact in modification of treatment in chronic otitis media and were effectively treated with antibiotic and antifungal ear drops and 8 patients were required oral antibiotics as well.

Conclusions: We conclude that in patients with COM, send ear discharge for both culture and sensitivity and KOH mount and it should be routine and always consider combined therapy i.e., antibiotic and antifungal drugs.

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

INTRODUCTION

Chronic otitis media (COM) is an inflammation of mucosal lining of middle ear cleft. Its etiology is multiple factors and known for recurrence and one of the factors is fungal infection.¹ Fungi can either be the primary pathogen or be superimposed on bacterial infections or can be secondary pathogen in previously perforated tympanic membrane. Chronicity of ear discharge is important factor in the cause of fungal infection of otitis media. It causes humid condition in the ear and alters the pH to alkaline. Epithelial debris which eventually helps the growth of fungus. Topical use of steroid and

antibiotics cause the fungal infection in the middle ear. Use of only antibiotics either topically or systemically in these patients will not help in clearing the inflammation instead it will promote the fungal growth by making favorable environment in the middle ear.² This study was taken to assess the prevalence of fungal elements positivity in ear discharge of the patients with COM.

Objectives

The objective of the study was to assess the prevalence of fungal elements positivity in ear discharge of the patients with COM and to treat patients with COM.

METHODS

This retrospective study was based on Bapuji Hospital records between 1 January 2018 to 26 July 2019 attached to the JJM Medical College, Davangere. Institutional ethical committee clearance was taken. Patients of either sex with age group (18 months to 87 years) who diagnosed with chronic otitis media were included with no history using ear drops for last one week, informed consent was taken and using two sterile swab without touching the external auditory canal, ear discharge was taken from middle ear and placed in sterile container and sent for microbiology laboratory for culture and potassium hydroxide (KOH) mount respectively. These swabs taken by a single surgeon to maintain uniformity. Collected bacterial culture reports and KOH mount reports and calculated all culture and KOH positive reports and treated the patient with antibiotic and antifungal or antifungal ear drops alone for 3 weeks according to culture and KOH reports. Patients who were not resolved from ear drops, treated with oral antibiotics and oral antifungals or oral antifungals for 15 days along with ear drops, according to culture and KOH reports. All patients ear was become dry after our treatment. All collected reports were analyzed statistically with IBM SPSS version 22.0 for windows.

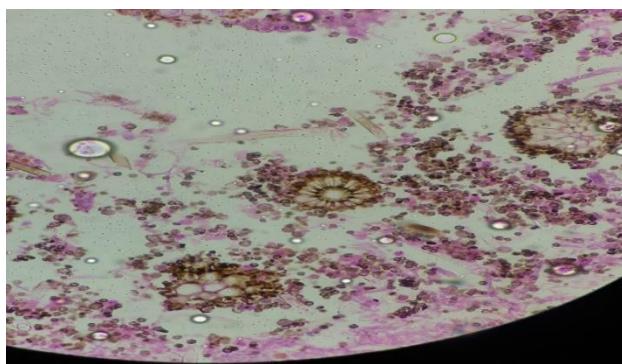


Figure 1: Fungal elements by KOH mount with 10X magnification.

RESULTS

The age range of study participants was found to be 9 months to 87 years (Table 1). Females were found to be more common than males (Table 2). Overall prevalence rate KOH positivity was found to be 15.8% (Table 3).

Table 1: Age distribution.

Age group (years)	No. of cases
<1	3
1-5	17
6-15	20
16-45	82
46-60	18
61-87	12
Total	152

Table 2: Sex wise distribution.

Age group (years)	No. of cases
Male	66
Female	86
Total	152

Table 3: KOH mount positivity.

Total no. of cases	No. of cases KOH +ve	KOH +ve rate (%)	95% CI
152	24	15.8	9.8-21.8

Our study showed that among 152 patients of either sex between age group 9 months to 87 years diagnosed with COM, 24 (15.8%) patients showed KOH positivity which is clinically and statistically found to be significant and probability of KOH positive in future will be in between 9.8-21.8%.

Table 4: Culture reports.

Bacteria	No. of cases	Percentage
<i>Pseudomonas</i>	54	22.4
<i>MRSA</i>	12	7.9
<i>Klebisella</i>	8	5.3
<i>Acinetobacter</i>	5	3.3
<i>CONS</i>	5	3.3
<i>Staphylococci aureus</i>	5	3.3
<i>Coagulase positive staph</i>	3	2.0
<i>E. coli</i>	7	1.3
<i>Proteus mirabilis</i>	3	1.3
No growth	50	46.1
Total	152	100.0

In our study, *Pseudomonas* was found to be common bacteria among 152 samples and 50 samples were showing no growth and 8 out of 50 samples were showing positive for KOH mount.

Table 5: KOH mount reports.

Fungus	No. of cases
<i>Aspergillus species</i>	12
<i>Candida species</i>	9
<i>Other saprophytes</i>	3
Total	24

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.³

In our study, overall prevalence rate KOH positivity was found to be 15.8% 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%.⁴ 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%).⁵ Statistically calculated probable range of KOH positivity was not calculated any of the above studies.

In our study, out of 152 samples, 54 samples were *Pseudomonas*, 50 samples were showing no growth and other bacteria were MRSA (12), *Klebsiella* (8), *Acinetobacter* (5), CONS (5), *Staphylococci* (5), *Escherichia coli* (7), *Proteus mirabilis* (3). *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.⁶

In our study, 12/24 was found to be aspergillus, 9/24 was found to be candida and 3/12 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*.⁷ Chauhan et al states that a total of 70 samples with 36.36% (12/33) *Aspergillus fumigatus* was found to be predominant fungal isolate. While, 30.30% (10/33) *Aspergillus niger*, 18.18% (6/33) *Candida albicans*, 6.06% (2/33) *Aspergillus terreus*. A few i.e., 3.03% (1/33) each of *Candida tropicalis*, *Rhizopus species* and *Paecilomyces species* were also observed.⁸

We have treated all patients were treated with 3 weeks antibiotics and antifungal ear drops for 3 weeks but 8 patients were not improved with ear drops so oral antifungals given to dry the ear.

CONCLUSION

We conclude that in patients with COM, send ear discharge for both culture and sensitivity and KOH mount and it should be routine and always consider combined therapy i.e., antibiotic and antifungal drugs.

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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