

Original research article

A Retrospective study to detect the potassium hydroxide (KOH) mount positive in ear discharge of chronic otitis media patients.**Dr. Amit Prakash****Senior Resident, Department of ENT, Darbhanga Medical College & Hospital,
Darbhanga, Bihar, India****Corresponding Author: Dr. Amit Prakash****Abstract**

Background: Otomycosis is a superficial mycotic infection of the external auditory canal that is caused by opportunistic fungi. It is common fungal infection of the ear that is worldwide in distribution. It presents with nonspecific symptoms of itching, earache, ear discharge, hearing loss, aural fullness and tinnitus.

Aim: to detect the potassium hydroxide (KOH) mount positive in ear discharge of chronic otitis media and treat these patients.

Material and Methods: This retrospective study conducted in the Department of ENT, Darbhanga Medical College & Hospital, Darbhanga, Bihar, India for 1 year. Total 200 Patients chronic otitis media were included with no history using ear drops for last one week 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.

Results: Most of the patients from 20-30 years 69 (34.5%) and followed by 30-40 years 59 (29.5%). Females 115(57.5%). were found to be more common than males 85(42.5%). Overall prevalence rate KOH positivity was found to be 20.5%. Our study showed that among 200 patients of either sex between age group 9 months to 62 years diagnosed with COM, 41 (20.5%) patients showed KOH positivity which is clinically and statistically found to be significant and probability of KOH positive in future will be in between 9.2-22.6%. Most common fungal pathogen was found to be *Aspergillus* 26 (63.41%), and followed by *Candida species* 11(26.83%), other saprophytes 4(9.76%).

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.

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

Introduction

Chronic otitis media is a widespread disease of developing countries such as India, especially in rural areas, and the prevalence ranges from 2% to 15%.¹ Its etiology is multiple factors and known for recurrence and one of the factors is fungal infection. 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.²

Otomycosis is an acute, sub acute or chronic fungal infection of the Pinna, the external auditory meatus and the ear canal.³ The infection is usually unilateral and characterized by inflammation, pruritis, scaling and severe discomfort such suppuration and pain. Andrall and Gaverret were the first to describe fungal infections of the ear.⁴ Approximately over 200 species can affect man.⁵ It is estimated that otitis external makes up 5 to 20% of ear related visits to ENT; most of them caused by bacteria and in 9-25% otomycosis is the causative agents.⁶ The

fungal agents responsible for this clinical entity are found as saprobes in the environment. Various fungi which contribute to otomycosis includes saprophytic fungi, *Aspergillus niger*, *A.fumigatus*, *A.flavus*, *Penicillium*, *Mucor*, *Rhizopus*.⁷ In addition candida spp.among yeast is most common. predisposing factors of otomycosis includes chronic infection of ear, use of oils, ear drops, excessive accumulation of cerumen , steroids, swimming, fungal infection elsewhere in the body like dermatomycosis or vaginitis, immunocompromised state, malnourishment in children and hormonal changes precipitating flaring up of the infection as seen during pregnancy or menstruation. Following above mentioned factor encourages infections like changes in epithelial covering , increase in PH (bathing), alteration of cerumen, systemic factors(alteration in immunity, debilitating disease, steroids, antibiotic, neoplasia), environmental factor ,Chronic secretory otitis media, broad spectrum antibiotic therapy, history of bacterial infections etc.⁸ *Aspergillus* and *Candida* spp. are the most frequently isolated fungi in patients with otomycosis.⁹ Factors that predispose to otitis external include absence of cerumen, high humidity, increased temperature, bacterial otitis external, corticoid therapy, swimming¹⁰ and local trauma –caused by sharp objects like sticks or hearing aids. Cerumen has a pH of 4 to 5 and so suppresses bacterial but conducive for fungal growth. This study was taken to assess the prevalence of fungal elements positivity in ear discharge of the patients with COM.

Material and Methods

This retrospective study conducted in the Department of ENT, Darbhanga Medical College & Hospital, Darbhanga, Bihar, India for 1 year. after taking the approval of the protocol review committee and institutional ethics committee. total 200 Patients chronic otitis media were included with no history using ear drops for last one week 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 20 days along with ear drops, according to culture and KOH reports.

Results

Most of the patients from 20-30 years 69 (34.5%) and followed by 30-40 years 59 (29.5%).The age range of study participants was found to be 9 months to 62 years (Table 1). Females 115(57.5%). were found to be more common than males 85(42.5%) (Table 2). Overall prevalence rate KOH positivity was found to be 20.5% (Table 3).

Table 1: Age distribution

Age in years	N=200	%
Below 10	23	11.5
10-20	19	9.5
20-30	69	34.5
30-40	59	29.5
40-50	20	10
50-60	6	3
Above 60	4	2

Table 2: Sex wise distribution

Age group (years)	No. of cases	%
Male	85	42.5
Female	115	57.5
Total	200	100

Table 3: KOH mount positivity

Total no. of cases	No. of cases KOH +ve	KOH +ve rate (%)	95% CI
200	41	20.5	9.2-22.6

Our study showed that among 200 patients of either sex between age group 9 months to 62 years diagnosed with COM, 41 (20.5%) patients showed KOH positivity which is clinically and statistically found to be significant and probability of KOH positive in future will be in between 9.2-22.6%.

Table 4: Culture reports

Bacteria	No. of cases	Percentage
<i>Pseudomonas</i>	51	25.5
MRSA	11	5.5
<i>Klebisella</i>	10	5
<i>Acinetobacter</i>	9	4.5
CONS	7	3.5
<i>Staphylococci aureus</i>	6	3
<i>Coagulase positive staph</i>	5	2.5
<i>E. coli</i>	3	1.5
<i>Proteus mirabilis</i>	1	0.5
No growth	97	48.5
Total	200	100

In our study, out of 200 samples, 51(25.5%) samples were *Pseudomonas*, 97(48.5%) samples were showing no growth and other bacteria were MRSA 11(5.5%), *Klebisella* 10(5%), *Acinetobacter* 9(4.5%), CONS 7(3.5%), *Staphylococci* 6(3%), *Escheria coli* 3(1.5%), *Proteus mirabilis* 1(0.5%) and 23 out of 97 samples were showing positive for KOH mount.

Table 5: KOH mount reports

Fungus	No. of cases	%
<i>Aspergillus species</i>	26	63.41
<i>Candida species</i>	11	26.83
Other saprophytes	4	9.76
Total	41	100

Most common fungal pathogen was found to be *Aspergillus* 26 (63.41%), and followed by *Candida species* 11(26.83%), other saprophytes 4(9.76%).

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.¹¹

In our study, overall prevalence rate KOH positivity was found to be 20.5% 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%.¹² 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%).¹³ Statistically calculated probable range of KOH positivity was not calculated any of the above studies.

In our study, out of 200 samples, 51(25.5%) samples were *Pseudomonas*, 97(48.5%) samples were showing no growth and other bacteria were MRSA 11(5.5%), *Klebsiella* 10(5%), *Acinetobacter* 9(4.5%), CONS 7(3.5%), *Staphylococci* 6(3%), *Escheria coli* 3(1.5%), *Proteus mirabilis* 1(0.5%). Most common fungal pathogen was found to be *Aspergillus* 26 (63.41%), and followed by *Candida species* 11(26.83%), other saprophytes 4(9.76%). 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.¹⁴

In our study, Most common fungal pathogen was found to be *Aspergillus* 26 (63.41%), and followed by *Candida species* 11(26.83%), other saprophytes 4(9.76%). 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*.¹⁵ 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.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, 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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