

# Prevalence of Fungal Infection in Chronic Suppurative Otitis Media – A Study at Tertiary Care Hospital in Western Uttar Pradesh

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## ABSTRACT

**Background:** Chronic otitis media (CSOM) is a notorious infection prevalent mostly in developing countries due to indiscriminate uses of local steroid and antibiotics in the ear either alone or combination. Humidity also plays a major contributing factor in the etiology of otitis media.

**Objective:** To know the prevalence of fungal infection in chronic suppurative otitis media.

**Method:** The study was conducted on 130 cases of recurrent discharging ear at the out patient door of Deptt of E.N.T and Dept. of Microbiology, Rohilkhand Medical College and Hospital, Bareilly.

**Results:** Out of 130 cases, 34 were found fungal positive having the prevalence rate 26.15%. The side of involvement was more common in right ear (66.66%) than left. Males are affected more (58.82%) than females. Most of the fungal infections were associated with the use of local steroid and antibiotics (79.41%). Predominant fungal isolates were *Aspergillus* spp. (32.35%) followed by other saprophytic fungi (52.94%).

**Key words:** Chronic suppurative otitis media, Fungal infection, Steroid and antibiotics

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## INTRODUCTION

Chronic suppurative otitis media (CSOM) is a disease of multiple etiology and well known for its recurrence and persistence. The wide spread use of irregular and irrational usage of antibiotics, systemic and local use of antibiotics in to ear has precipitated the fungal infection secondary to bacterial infection. As a result the prevalence of fungal infection is high among the chronic otitis media patients. Infection may occur at any age groups with a peak at 2 years of age. Generally patients with tympanic perforation which continue to discharge for periods from 6 week to 3 months are recognized as chronic suppurative otitis media (CSOM) cases<sup>[1]</sup>. Chronic suppurative otitis media is observed more frequently in the developing world with a prevalence rate ranging from 6-46% in different geographical areas and population<sup>[2]</sup>.

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<sup>[3,4]</sup>. Chronic suppurative otitis media is known to

be one of the most common childhood infection and leading reasons for antibiotic prescription in the developed world<sup>[5]</sup>. It is estimated that about 90% of the people have atleast one episode of otitis media by their second birth day. Children less than 15 years old, frequently diagnosis made in clinical practice<sup>[6]</sup>. Patient with discharging ears, is world wide distribution in particular to hot, humid, dusty areas of the tropic and subtropic<sup>[7,8,9]</sup>. The recurrent episode of discharge occurs due to superimposed fungal infection in chronic suppurative otitis media patients<sup>[4]</sup>. *Aspergillus* spp. is common pathogen in this study.

## MATERIAL AND METHODS

This hospital based prospective study was carried out for a period of six months (July 2014 to Dec 2014) in the Department of Microbiology and ENT in a Tertiary care hospital, Rohilkhand Medical College, Bareilly UP. Total 130 patients clinically diagnosed chronic suppurative otitis media having discharging ear with past history of local use of antibiotics and steroid till 7 days before were taken in account. Two sterile cotton swab of ear discharge from each patient were collected aseptically and processed in Microbiology lab. 1<sup>st</sup> swab was used for 10% KOH (potassium hydroxide) mount preparation under microscope to study the spores and hyphae. 2<sup>nd</sup> swab was inoculated in sabaud dextrose agar (SDA) with chloromphenicol (10micro gm) and kept at 22<sup>o</sup>c to 25<sup>o</sup>c for 2 weeks. Isolate was identified from colony morphology and microscopic examination with lactophenol cotton blue (LCB)

mount to identify the fungus according to standard procedures by Rippon<sup>[10]</sup>. In case of yeast, germ tube

formation test done to identify *Candida albicans*.

**RESULTS**

**Table 1: Sex distribution among the total number of fungal positive cases of CSOM [n-34]**

Sex	No of cases	Percentage	Ratio
Male	20	58.82	1.42:1
Female	14	41.17	

[Sex distribution among the positive cases, Males were dominant, 20(58.82%) than females 14(41.17%) having male /female ratio 1.5;1)].

**Table 2: Age distribution of fungal infection of chronic suppurative Otitis media**

Age in Years	Number of Cases	Percentage (%)
< 10	01	2.94
11-20	04	11.76
21- 30	12	35.29
31 - 40	10	29.41
41 - 50	04	11.76
51 -60	02	5.88
Above 60	01	2.94

[Fungal infection was more prevalent among 21 -30 years of age 12(35.29%) followed 31 -40 years 10(29.41%). Over all incidence Among 20 -40 years age group was 22(64.70 %)].

**Table 3: Predominant side of Chronic Suppurative otitis media**

Ear Discharge	Number	Percentage (%)
Right Ear	90	66.66
Left Ear	40	29.62

[Involvement of right sided ear infections in chronic suppurative otitis media, was 90 (66.66%), the occurrence in the right ear was more than left ear 40 (29.6%)].

**Table 4: Distribution of antibiotic, steroid, and steroid and antibiotic as Local application into the ear among Positive Cases-(n-34)**

Steroid	%	Antibiotic	%	Steroid + antibiotic	%
20	58.82	15	44.11	27	79.11

[Topical usage of antibiotic and steroids in combination into the affected ear was 27(79.11%). More than antibiotic and steroids application].

**Table 5: Overall prevalence rate of fungal infection among 130 cases of chronic suppurative otitis media**

Culture Positive	%	Culture Negative	%	Total no of cases	Overall Prevalence Rate
34	26.15	96	73.84	130	26.15

[Out of 130 positive cases of chronic suppurative otitis media 34 cases were fungal positive in culture with overall prevalence rate of fungal infection 26.15%. 96 cases (73.84%) were found culture negative]

**Table 6: Positive fungal Isolate in culture (n-34)**

Fungal Isolate	Number	Percentage (%)	Overall %
<i>Aspergillus</i> spp.	11	32.35	26.15
<i>Candida</i> spp.	05	11.76	
Others Saprophytic fungi	18	52.94	

[Among the total 34 positive fungal culture cases, *Aspergillus* spp. was most predominant 11(32.35%) followed *Candida* spp 5(11.76%)].

**Table 7: Distriution of *Aspergillus* spp. (n-11)**

<i>Aspergillus</i> spp.	No	Percentage (%)
<i>Aspergillus niger</i>	5	45.54
<i>Aspergillus flavus</i>	3	27.27
<i>Aspergillus terrus</i>	1	9.09
<i>Aspergillus fumigatus</i>	2	18.18

[Among the total Isolates of *Aspergillus* species, *Aspergillus Niger* was found, in most of the cases 5 (45.55%), followed *Aspergillus flavus* 3(27.27%), and *Aspergillus fumigates* 2(18.18%) *Aspergillus terrus* 1(9.09%) respectively].

**Table 8: Distribution of other saprophytic fungal islates (n-18)**

Others saprophytic fungi	No	Percentage
<i>Penicillium</i>	5	27.77
<i>Mucor spp.</i>	4	22.22
<i>Rhizopus spp</i>	4	22.22
<i>Fusarium spp</i>	3	27.77
<i>Exophiala spp</i>	2	11.11

[Among the saprophytic fungi *Penicillium* was common 5(27.77%), followed *Mucor*, *Rhizopus*, each isolate having same number 4(22.22%) and next to that *Fusarium spp* 3(27.77%), and *Exophiala spp* 2(11.11%) respectively].

## DISCUSSION

Overall prevalence rate of fungal infection among the chronic suppurative patients in this study was 26.15%. The same observation was made by Reena Roy et al 29.5%<sup>[11]</sup>. Our study also commensurate with Dr. Rachna Dhingra et al, who studied 150 cases of CSOM and found the positivity rate of fungal infection 36(24%)<sup>[12]</sup>. Others like Sengupta et al found 24.8% and Khanna V, et al reported 23.63% fungal infection in their studies which are in agreement with present study<sup>[4,13]</sup>. Baroah et al and Pasternik et al were observed little lower incidence of fungal infection rate from our study 17.5% and 19.5%<sup>[14,15]</sup>. Although O N Wankwo et al and Mirja I.A et al reported the lowest incidence of fungal infection rate in chronic suppurative otitis media 3.9% and 11%<sup>[16,17]</sup>. In contrast, the higher incidence of fungal infection was observed by Tawler P et al 49%<sup>[18]</sup> and Mittal A et al 40.8%<sup>[19]</sup>.

Fungal infection of CSOM were more prevalent among males 58.82% in the present study which are closer with the observation observed by different authors in their findings like laxmipati & Baskaran 55.80%<sup>[22]</sup>, EO Nwankwo, AD salisu 57.5%<sup>[16]</sup>, Rachna et al 55.55%<sup>[12]</sup>, Gulati et al 67.50%<sup>[23]</sup>. In contrast, the findings of present study are not correlating with the observation of Reena Roy et al<sup>[11]</sup> who found females 57% were most commonly affected. Males were more affected than females because males were more exposed to field with different types of occupational work.

The highest incidence of fungal infection was accounted in between 21 -30 yrs (35.29%) followed 31 -40 yrs (29.41%) in this study which is similar with the study of Reena Roy et al<sup>[11]</sup> who found 32% and also with the findings observed by Rachna et al 24%<sup>[12]</sup> in second decade of age.

The Predominant side of involvement of chronic suppurative otitis media right and left ears were accounted 66.66% and 29.62% respectively. Ratio of CSOM in both ear equal or little variable<sup>[12]</sup>. 79.11% patients had history of local use of antibiotic and steroid in to the ear in this study. It is well established that use of antibiotic/steroid predispose to fungal infection by so many authors<sup>[4,11,12,19]</sup>.

Most dominant fungi were isolated in culture, *Aspergillus spp.* 11(32.35%) followed *Candida spp.* 5 (11.76%) with other *saprophytic fungi* 18(52.94%) in the present study. Reena Roy et al<sup>[11]</sup>, Rachna et al<sup>[12]</sup>, Kumar H et al<sup>[24]</sup>, Ioy AH et al<sup>[27]</sup> found the similar pattern of fungal growth in their studies with variation of number of isolate like saprophytic fungi.

Different isolates of *Aspergillus* species were *Aspergillus Niger* 5(45.54%), *Aspergillus flavus* 3(27.27%), *Aspergillus fumigatus* 2(18.18%) and *Aspergillus terrus* 1(9.09%). This findings are similar with the findings of Rachna et al<sup>[12]</sup> where *Aspergillus Niger* 44.4%.

*Aspergillus flavus* was found in 3(27.27%) cases next to *Aspergillus Niger*, relatively closer with Sengupta et al<sup>[4]</sup> 19.35% and Rachna et al<sup>[12]</sup> 33.33%. In contrast Kumar H et al<sup>[24]</sup> found lower occurrence comparatively 6.7%.

*Aspergillus fumigatus* was isolated in 2(18.18%) cases which were in agreement with Baruah et al<sup>[20]</sup> 22.22% and Kumar H et al 20%<sup>[20]</sup>. In contrast Sen Gupta et al<sup>[4]</sup> found 54.84%.

*Candida spp.* was isolated in 5 (11.76%) in this study, coming same with Rachna et al [12] 11.2%. In contrast Baroah et al<sup>[20]</sup> 27.78%, Pasternale et al<sup>[21]</sup> 42.8%, Sen gupta et al<sup>[4]</sup> 19.35%, Kumar H et al<sup>[24]</sup> 60% respectively.

Other saprophytic fungi like *Penicillium*, *Mucor*, *Rhizopus* etc were found in the present study. The same was documented by Pasternale et al<sup>[21]</sup> and Baroah et al<sup>[20]</sup>.

## CONCLUSION

The incidence of fungal growth in chronic suppurative otitis media was more prevalent due to use of local antibiotic and a steroid into ear; therefore indiscriminate use is to be avoided. Patient should take care to keep the ear environment dry by mopping. Awareness to be provided to patient and parents regarding associated risk factors, local care, bathing in dirty or contaminated water etc.

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