

# Role of Aspergillus as Major Fungal Infection in CSOM Patients Attending Ent Opd, Rajindra Hospital, Patiala

Rachna Dhingra<sup>1</sup>, Shamim Monga<sup>2</sup>, Mandeep Kaur<sup>3</sup>, Gurpal Singh<sup>4</sup>, Vivek Bansal<sup>5</sup>, Shivani<sup>6</sup>, Varun Aggarwal<sup>7</sup>

1- Senior Resident, Department Of ENT, GGS Medical College, Faridkot, Punjab.

2- PG Student, Department Of Community Medicine, GGS Medical College, Faridkot, Punjab, India

3- Lecturer, Maharaja Ganga Singh Dental College, Sri Ganganagar, Rajasthan.

4- Consultant Ophthalmologist, Rotary Eye Hospital, Raikot, Punjab.

5- Senior Resident, Department Of Orthopedic, PGIMS, Rohtak, Haryana.

6- Senior Resident, Department Of Dermatology, MAMC, Delhi.

7- MCH Resident, Department Of Neurosurgery, SCTIMST, Trivandrum, Kerala.

Correspondence to:

Dr. Rachna Dhingra,  
Senior Resident, Department Of ENT, GGS Medical  
College, Faridkot, Punjab, India.

Contact Us : editor@ijdmr.com  
Submit Manuscript : submissions@ijdmr.com  
www.ijdmr.com

## ABSTRACT

### AIM

Aim of the study was to know incidence, type and pattern of fungal floras in the patients with CSOM

### MATERIALS AND METHODS

Total 150 cases were selected in research work with history of discharge from ear along with perforation, divided in control group and study group based on use any local antibiotics or steroids for at least one month prior. Under all aseptic conditions, rubber bulb is squeezed, the needle is put in middle ear & rubber bulb is released. Secretions are sucked into the sterilized vial & sent for fungal culture to microbiology department.

### RESULTS

Incidence of chronic suppurative otitis media was observed in first decade (26%) and second decade (24%). Age ranged from 3 years to 64 years with the mean age of 22.96 years. Highest incidence in group B was seen in the first decade i.e. 40%, the incidence of chronic suppurative otitis media decreased with the increase of age. In 5th and 6th decades only incidence of 14% were found in all the groups.

### CONCLUSION

Our study concluded that chronic suppurative otitis media major fungal infection is Aspergillus.

**KEYWORDS:** Antibiotics, CSOM, Fungal Infection

## INTRODUCTION

Otitis media is an inflammation of the middle ear cleft, with or without intact tympanic membrane. Otitis media is known to be one of most common childhood infections and a leading reason for antibiotic prescriptions in the developed world.<sup>1</sup>

Fortunately with progress in medical diagnosis and antibiotic therapy, it is unusual for otitis

media to manifest its lethal potential. Nonetheless, a clear understanding of the pathology of otitis media is important for the clinician to be able to distinguish between infection that can be controlled by antibiotics and those that require surgical intervention.<sup>2</sup> Fungal infections superimposed over chronic suppurative otitis media is suspected when the discharging ear does not respond to local antibiotic ear drops.<sup>3</sup>

### *How to cite this article:*

Dhingra R, Monga S, Kaur M, Singh G, Bansal V, Shivani, Aggarwal V. Role of Aspergillus as Major Fungal Infection in CSOM Patient Attending Ent Opd, Rajindra Hospital, Patiala. Int J Dent Med Res 2014;1(3):17-23.

In ears requiring surgery, even after the removal of disease process, some cases do not become dry and continue to have otorrhoea. This has been found to be due to fungal infections of mastoid cavity.<sup>4</sup> Incidence of chronic suppurative otitis media has been reported varying from 2.55% to 9.25%. In PGI Chandigarh incidence was 11% in ENT OPD patients.<sup>5</sup> In the recent year, prevalence of fungal infections including the middle ear and inner ear is on the increase dramatically because of increased use of broad spectrum antibiotics, cytotoxic chemotherapy, increased incidence of diabetes, corticosteroids, immuno-suppressants, tuberculosis and AIDS. In addition to these factors, poor socio-economic status, swimming habits, water supply, scratching the ear canal with infected nail with fungus may also lead to superadded fungus infection.<sup>3,5</sup> Use of local steroids provoke the incidence of fungal infections. Local steroids therapy lower down resistance, makes a room for fungus growth through external auditory canal.<sup>6</sup> The present study was undertaken to know the incidence of fungal infection in chronic suppurative otitis media, to know the pattern of fungal flora in chronic suppurative otitis media, to evaluate whether the fungus is primary or secondary invader and to make an endeavour to know whether antibiotics drops with or without steroids are mainly responsible for development of fungus in chronic suppurative otitis media and their related incidence. The aim of the study was to know incidence, type and pattern of fungal floras in the patients with CSOM.

## MATERIAL AND METHODS

Total 150 cases were selected in research work with history of discharge from ear along with perforation, from OPD of ENT department, Government Medical College, Rajindra Hospital, Patiala.

### (i) Control group

50 cases of CSOM who haven't used any local

antibiotics or steroids for at least one month prior.

### (ii) Study Group

(a) 50 cases of CSOM who have used only local antibiotics

(b) 50 cases of CSOM who have used local steroids with antibiotics.

Patient was in supine position. Under all aseptic conditions, rubber bulb is squeezed, the needle is put in middle ear & rubber bulb is released. Secretions are sucked into the sterilized vial & sent for fungal culture to microbiology department of GMC, Patiala. If secretions are scanty in amount, may not come in vial, then needle is detached from tube & secretions are pushed on sterilized swab with syringe. If needed, small amount of saline can be pushed through needle to make pus come out of swabs. Fungus will be identified by: Gram staining done to see any yeast fungus. Small amount of material spreaded over glass slide with inoculating loop in solution of KOH & examination done under microscope for hyphae and spores. Material cultured on SDA medium with chloramphenicol without cycloheximide (actidione). The culture tube kept at 22°C to 25°C for 2 weeks. Isolate was identified from colony characters and microscopic examination (LCB mount) was done to identify the fungus. In case of yeast fungus, germ tube formation test was done for identification of candida albicans.

## RESULTS

In the present study highest incidence of chronic suppurative otitis media was observed in first decade (26%) and second decade (24%). This constituted half of the cases. Age ranged from 3 years to 64 years with the mean age of 22.96 years. Highest incidence in group B was seen in the first decade i.e. 40%, the incidence of chronic suppurative otitis media decreased with the increase of age. In 5th and 6th decades

only incidence of 14% were found in all the groups.

**Table No.1: INCIDENCE OF RESIDENTIAL DISTRIBUTION**

	Control group		Study group A		Study group B	
	No of cases	%age	No. of cases	%age	No. of cases	%age
Urban	14	28.0	16	32.0	12	24.0
Rural	36	72.0	34	68.0	38	76.0
Total	50	100.0	50	100.0	50	100.0

72% in control group, 68% in study group A and 76% in study group B belonged to rural areas. Rural urban ratio being 3:1 approximately.

**Table No.2: DURATION OF DISCHARGE**

Duration in years	Control group		Study group A		Study group B	
	No of cases	%age	No. of cases	%age	No. of cases	%age
0-1	8	16.0	10	20.0	6	12.0
2-5	4	8.0	6	12.0	10	20.0
6-10	18	36.0	14	28.0	16	32.0
11-20	16	32.0	18	36.0	12	24.0
>20	4	8.0	2	4.0	6	12.0
Total	50	100.0	50	100.0	50	100.0

Out of 50 cases studied under control group, majority of cases i.e. 36% fell between 6-10 years, in 32% cases, duration was 11-20 years. In study group A, duration of discharge was 11-20 years in 18 cases (36%). Longest duration was 22 years in two cases (4%). In study group B, duration of discharge was 6-10 years in 16 cases (32%).

**Table No.3: NATURE OF DISCHARGE**

Nature of discharge	Control group		Study group A		Study group B	
	No of cases	%age	No. of cases	%age	No. of cases	%age
Mucoid	0	0.0	0	0.0	0	0.0

Mucopurulent	46	92.0	44	88.0	48	96.0
Purulent	0	0.0	2	4.0	2	4.0
Dirty whitish or brownish	4	8.0	4	8.0	0	0.0
Total	50	100.0	50	100.0	50	100.0

Majority of cases were showing mucopurulent discharge (about 90%) in all the three groups. Two cases in study group A and two cases in study group B showed purulent discharge. No case with mucoid discharge was detected in our study.

**Table No.4: DURATION OF LOCAL TREATMENT**

Duration in months	Study group A		Study group B	
	No. of cases	%age	No. of cases	%age
1-3	30	60.0	34	68.0
4-6	12	24.0	6	12.0
7-12	4	8.0	8	16.0
>12	4	8.0	2	4.0
Total	50	100.0	50	100.0

In our series majority of patients were using local drops for the last 3 months i.e. 60% in study group A and 68% in study group B. Four cases in study group A and two cases in study group B, was using topical treatment more than one year though intermittently.

**Table No.5: ISOLATED FUNGAL GROWTH**

	Control group		Study group A		Study group B	
	No of cases	%	No. of cases	%age	No. of cases	%age
Asp niger	4	8.0	6	12.0	6	12.0
Asp flavus	4	8.0	4	8.0	8	16.0
Candida albicans	-	-	2	4.0	2	4.0
	8	16.0	12	24.0	16	32.0

In control group, fungus was positive in 8 cases (16%). In study group A and study group B, incidence was 24% and 32% respectively.

**Table No.6: SPECTRUM OF FUNGUS**

	Control group		Study group A		Study group B	
	No of cases	%age	No. of cases	%age	No. of cases	%age
Asp niger	4	50.0	6	50.0	6	37.5
Asp flavus	4	50.0	4	33.33	8	50.0
Candida albicans	-	-	2	16.67	2	12.5
Total	8	100.0	12	100.0	16	100.0

Control group showed Asp. niger in 4 cases (50%) and Asp. flavus in four cases (50%) equal ratio, no case of Candida was detected in our control study. Study group A showed Asp. niger in 6 cases (50%) and Asp. flavus in 4 cases (33.33%), only two cases (16.67%) showed Candida albicans. Study group B showed 6 cases (37.5%) of Asp. niger, 8 cases (50%) of Asp. Flavus and 2 cases (12.5%) of Candida species.

## DISCUSSION

In the present study highest incidence of chronic suppurative otitis media was observed in first decade (26%) and second decade (24%). This constituted half of the cases. In 5th and 6th decades only incidence of 14% were found in all the groups.

Baruah (1969) noted the highest incidence of CSOM in the first and second decade (>80%). There was decline in 5th and 6th decade and as in present study where as Mohammed Shafique Islam(2010) noted the highest incidence of CSOM in the first and third decade(50%).

**Fungal incidence - age group relationship-** Among 36 fungal positive cases, maximum

incidence is in age between 31-40 [10 cases, 27.7%], second highest in age group is between 21-30 [8, 22.20%], minimum incidence is in age above 60 [2, 5.5%]

### **Sex Incidence**

Among 36 fungal positive cases, male constituted 44% and female 56%. Ratio being approximately 5:7. Baruah (1969) reported this sex ratio as 5:4.

Males showed higher incidence of fungal infections (55.5%) than female (44.45%). Present study was comparable with Laxmipati and Baskaran (1965) and Nigeria EO Nwankwo (2005). Gulati et al (1969) showed higher incidence in males i.e. 67.5%. The male predominance could be because of their more exposed ways of life.

### **Occupation**

Majority of cases of chronic suppurative otitis media in present study were agriculturists (32%), labourers (17.33%) and house wives (13.30%). This constituted about 2/3 of total patients. Incidence of fungal infections was also more common in agriculturists, housewives and labourers.

High incidence in labourers and agriculturists can be explained on the fact that they come in contact with soil and dust more often and work in humid conditions.

### **Rural versus Urban and Socio-economic Status**

In fungal positive cases, most of patients belonged to rural areas (72%), only in 28% cases urban patients were involved. Ratio being U:R 2:5. Most of patients (88%) belonged to average (32%) and poor (56%) socioeconomic status. Only approximately one-fifth cases belonged to rich socio-economic status. Unhygienic condition, poverty, illiteracy, lack

of treatment, overcrowding, malnutrition, way of life style have been suggested as basis and predisposing factors for chronic suppurative otitis media.

No doubt, all these above said factors also predisposed to super added fungal infection.

### ***Symptomatology***

Almost all the patients had profuse otorrhoea. Patients presented with various permutations and combinations of symptoms. Otorrhoea was present in 100% of cases, deafness 80%, otalgia 9.3%, itching 26.6%, vertigo 2.6%, tinnitus 6.6% and urc 6.6%.

Sen Gupta reported that all cases of *Asp. niger* had pain in the ears and itching was related to fungal infections. These symptoms (otalgia and itching), according to him, indicated the presence of fungus invasion in chronic suppurative otitis media.

In the present study, out of total 40 cases, who complained of itching, 24 cases (60%) found to fungal positives and 14 cases who complained of pain, 8 cases (57%) grew to be fungus. Thus itching and pain is an important symptom of fungal infections in cases of chronic suppurative otitis media.

### ***Nature of Discharge***

Kunelskaya stated that the clinical picture of fungal lesions of middle ear has a number of specific peculiarities which are mostly determined by the properties of genus or even the species. The ear is full of debris looking like plug of wet news-paper and among the debris, sometimes black headed conidiophores are identified indicating *Asp. niger* infection while the *Asp. flavus* gives pale blue tinge.

In the present study, majority of cases (92%) presented with mucopurulent discharge which

did not differentiate between bacterial and fungal etiology. Only eight cases (5.33%) showed dirty whitish brownish discharge and only 4 cases (2.67%) had purulent discharge. All the eight cases with dirty brownish discharge grew to be fungal. Nature of the discharge usually does not help in the diagnosis of fungal infection. Only when it is either wet looking debris or dirty brownish discharge, then suspicion regarding fungus can be made.

### ***Duration of Local Treatment***

There was a definite correlation between the duration of use of local drops and fungal positive cases. Patients using local drops for longer duration grew more fungal positives as compared to short duration of treatment. There were only four fungal positive cases out of 30 cases where the duration of treatment was 1-3 months, whereas half of the cases were fungal positives when the duration was more than 4 months.

### ***Type of Local Antibiotics and Steroids***

In our studies, patients used Gentamycin, Chloramphenicol, Norfloxacin, Ciprofloxacin, Neomycin, Ofloxacin and Neosporin as antibiotic drops, Steroids in combination with antibiotic drops used were Dexamethasone, Hydrocortisone, Betamethasone. Most of the patients had used these drugs repeatedly. No relationship could be obtained between the type of antibiotic or steroid used and fungal positive cases.

### ***Analysis of Fungal Growth Incidence***

Mycological investigations of 150 discharging ears, under three different groups had revealed as under:

Control group: Eight cases out of 50 (16%)

Study group A: Twelve cases out of 50 (24%)

Study group B: Sixteen cases out of 50 (32%)

It has been found that incidence was much

higher in study group B (using antibiotic-steroids drops) than study group A (using only antibiotics drops) which was again higher than the control group (no topical drops).

Average incidence of fungal positives (without taking into consideration the topical treatment) was found to be 24%. Baruah (1969) conducted study of 100 cases of CSOM and found fungal positive in 18 cases (18%). Pasternale (1973) who conducted systematic study of 215 cases of chronic suppurative otitis media, found fungal positives in 42 cases (19.53%). Sen Gupta et al (1978) in his study reported bacterial and fungal growth in 13.6% and pure fungal growth in 11.2% making total fungal positives 24.8%. Talwar P et al (1988) isolated 168 (49%) of the fungal positive cases out of total 344 cases. Ashok Mittal et al (1997) isolated 42 (40.77%) fungal positive cases out of total 103 cases of CSOM. Nigeria EO Nwankwo et al (2005) conducted study of 501 cases of CSOM and found 20 (3.9%) cases as fungal positive. Irfan Ali Mirza et al (2008) in his study reported 14 (11%) fungal positive cases out of total 178 cases. Khanna V et al (2010) conducted study of 110 cases of CSOM and found fungal positive in 26 cases (23.63%).<sup>7-9,11-15</sup>

Above comparison shows that incidence of fungal infections is on rise. This may be attributed to use of systemic broad spectrum antibiotics, steroids, cytotoxic drugs and topical applications of antibiotic- steroid drops.

### ***Pattern of Fungal Flora***

In our study, Aspergillus was commonest fungus. Out of 36 fungal positives, 32 cases (88.8%) showed Aspergillus growth. Only 4 cases (11.2%) showed Candida growth. Out of 32 cases, Aspergillus flavus and Asp. niger were found in equal number (6 each). Only in 4 cases (11.2%), Candida could be cultured.

These fungal isolates were compared with those of Baruah (1969), Pasternale (1973) and Sen Gupta (1978). Baruah (1969) reported Aspergillus (50%), Candida (27.78%) and others (22.22%). Pasternale (1973) reported Aspergillus (30.95%), Candida (42.86%) and others (26.19%) Sen Gupta (1978) reported Aspergillus (74.19%), Candida (19.35%) and others (6.46%). Present study is comparable with Sen Gupta (1978).<sup>3,7,11</sup>

### ***Fungus whether primary or secondary invader***

As to the question whether fungus infection is the causative factor or secondary invader in chronic suppurative otitis media, it is highly unlikely that fungus is the primary invader. Acute cases of suppurative otitis media due to fungal infection has not been reported in the literature where there was no disseminated fungal infection. In none of our cases disseminated fungal infection was present. Although in control group, there were eight cases of fungal positives, the presence of fungal infection could be due to the presence of chronic discharge. Chronicity of the discharge plays an important role in the causation of fungal otitis media as it causes humid conditions in the ear and alters the pH of the media to alkaline epithelial debris. Both these factors help in the growth of fungus. It appears that greater the duration of discharge, more is the incidence of fungal infection. Another reason could be the use of local antibiotics in the past.

## **TOPICAL TREATMENT**

Incidence of fungal infection in patients not using any topical drops was much less (16%) as compared to the patients using local drops (28%). Further the incidence was much higher in patients using steroid drops (32%) as compared to the cases using only antibiotic drops (24%). Thus the higher incidence was

obtained in patients using antibiotic and steroid drops as compared to antibiotic drops or without any local treatment.

Statistically the difference between the 3 groups was not significant while applying the test of significance for difference in two binominal proportions, although the number of cases increased significantly in the three groups i.e. 8, 2 and 6 respectively in Control Group, Study Group A and Study Group B. This may be because of the total number of the cases studied in each group is less. But it appears certain from this study that if large number of cases were to be studied, the difference would definitely be statistically significant. Similarly, Kunelskaya (1969) reported that in most cases, the fungal process in middle ear developed as a result of topically treatment with antibiotics and steroids. Sen Gupta (1978) concluded in his study that all the cases of fungal otitis media received topical antibiotic ear drops previously.<sup>3,4</sup>

The antibiotic drops apart from moist and alkaline medium of discharge appears to be mainly responsible for fungal growth and when steroids are added the fungal growth incidence is increased. Thus local drops should be used with great care in treating chronic suppurative otitis media. Local drops with some anti-fungal agents may be the ideal treatment in chronic cases which certainly requires further study.<sup>8,10,15</sup>

## CONCLUSION

Our study concluded that chronic suppurative otitis media major fungal infection is *Aspergillus*.

## REFERENCES

1. Healy GB. Otitis media and middle ear effusions. In: Ballenger JJ. The Ear, Williams and Williams. Baltimore: 1996;1003-9.
2. Glasscock ME, Gulya AJ. Pathology and clinical course of inflammatory diseases of middle ear. In: Glasscock-Shambaugh Surgery of the ear. 5th ed. Indian Reprint. 2006;422-33.
3. Sen Gupta RP and Kacker SK. Otomycosis. Ind Jour Med Scien 1978;32:5-7.
4. Kunelskaya YYa. Fungal infections of post-operative cavities of the ear. Vestn. Otorhinolaryngol 1967;29:55-59.
5. Sachdev VP and Bhatia JN. A survey of otitis media in PGI Chandigarh. Ind Jour Otolaryngol 1965;17:134-139.
6. Goodman LSS and Gilman A (Ed). The pharmacological basis of therapeutics. 4th Edition, 1970
7. Baruah PC, Aggarwal SC, Arora MML and Mehra YN. Clinical and microbiological studies in suppurative otitis media in Chandigarh. Ind Jour Otolaryng 1972; 24: 151-160.
8. Laxmipati G, Baskaran CS. Bacteriology of chronic suppurative otitis media, J Ind. Med.Assoc. 1965; 45: 436.
9. Nwankwo EO, Salisu AD. Bacteriology of chronic discharging ear of patients in Kano, Nigeria. J of Med lab sci.2005; 14(1): 57-62.
10. Gulati J, Tandon PL, Singh W and Bais AS. Study of bacterial flora in chronic suppurative otitis media. Indian J of Otolaryngology. 1969; 21(4): 198.
11. Pasternale NI, Brysin VG and Danilova RD. Sensitization to mould and yeast like fungi in chronic purulent otitis media. Vestn. Otorhinolaryngol 1973; 35: 35-38.
12. Talwar P et al. Role of fungus in ear infections. Jour of Otolaryngology 1988; 104(1): 47-50.
13. Mittal A, Mann SBS, Panda NK, Mehra YN, Talwar P. Secondary fungal infection in chronic suppurative otitis media. 1997; 49(2): 112-116.
14. Mirja IA, Ali L, Arshad M. Microbiology of chronic suppurative otitis media – Experience at bahawalpur. 2008; Iss. No -4, ISSN0030-9648.
15. Khanna V et al. Spectrum of micro organisms in patients with active stage CSOM (tubotympanic type). J Otolaryngol 2010; 29(3): 148-53.

Source of Support: Nil

Conflict of Interest: Nil