

**CHRONIC SUPPURATIVE OTITIS MEDIA PROFILE OF AEROBIC PATHOGENS AND ANTIBIOTIC SENSITIVITY**G. Jyothi Lakshmi<sup>1</sup>, Geeta<sup>2</sup>, Swarajya Lakshmi<sup>3</sup>**HOW TO CITE THIS ARTICLE:**

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**ABSTRACT:** CSOM is the inflammation of middle ear or mastoid cavity characterized by recurrent or persistent ear discharge through a perforation of tympanic membrane. Mortality and disabilities are primarily related to complications particularly brain abscess. Knowledge of local pattern of infection is essential to enable efficient treatment of the disease, thereby reducing the risk of complications.

**AIM:** To study the prevalent organisms and their antibiotic sensitivity pattern among patients presenting with ear discharge in our hospital. **SETTINGS AND DESIGN:** Patients attending ENT OPD of a government hospital in South India, with complaints of ear discharge with or without pain were included in the study. **MATERIALS AND METHODS:** Total of 97 patients were studied. Ear discharge was collected on two sterile cotton swabs one used for microscopy (Grams and KOH) and another for culture (Aerobic bacterial and fungal culture). **RESULTS:** Pseudomonas aeruginosa was the most common isolate (41%) followed by Staphylococci (28.2%). Gram negative bacteria showed good sensitivity to Cefotaxime (75.9%) Gentamycin (74.5%) and Amikacin (64%). Gram positive cocci showed high degree of sensitivity to Gentamycin (98%), Amikacin (89%) and Cefotaxime (71.4%).

**CONCLUSION:** Study of local prevalence of bacteria and their sensitivity pattern helps in empirical therapy and reduces the risk of complications.

**KEYWORDS:** CSOM, Aerobic bacteria, Pseudomonas, Staphylococcus, Antibiotic sensitivity.

**INTRODUCTION:** Chronic suppurative otitis media (CSOM) is inflammation of the middle ear or mastoid cavity, characterized by recurrent or persistent ear discharge through a perforation of tympanic membrane. Bacteria can gain entry into middle ear via the external ear canal resulting in otorrhoea. CSOM and its complications are among the most common conditions seen by otologists and general practitioners. This potentially dangerous clinical condition is difficult to treat because the most common infecting organisms are often resistant to many antibiotics. In 1990's, 28000 deaths were due to CSOM primarily related to complications particularly brain abscess.<sup>(1)</sup>

CSOM has received considerable attention not only because of its high incidence and chronicity but also issues such as bacterial resistance and ototoxicity with both topical and systemic antibiotics.<sup>(2)</sup> The main stay of treatment for uncomplicated CSOM is twofold: meticulous aural toilet and instillation of a topical antimicrobial agent. Knowledge of the local micro-organisms pattern causing CSOM and their antibiotic sensitivity is therefore essential to start an effective and cost saving treatment.<sup>(3)</sup>

This study was done to determine the microbial diversity and the resistogram of aerobic bacterial isolates among the patients suffering from CSOM who attended ENT Department of our Hospital.

**MATERIALS AND METHODS:** This prospective study was carried out in Gandhi Medical College / Hospital Musheerabad, Secunderabad over a period of 6 months. Patients presenting to ENT OPD of

## ORIGINAL ARTICLE

our hospital with symptoms of ear discharge with or without pain were included in the study. Patients on antibiotics for the past 5 days were excluded. Demographic details of the patients were collected.

A total of 97 patients were included in the study. The ear discharge was collected on two swabs one used for microscopy and the second for culture. KOH mount and gram stain was performed. Culture was done on Mac Conkey Agar, Blood Agar, and Sabouraud's Dextrose Agar. Bacterial isolates were identified by standard biochemical tests<sup>(4)</sup> and antibiotic sensitivity test was done by Kirby Bauer disc diffusion method.<sup>(5)</sup> Mycelial fungal isolates were identified on LCB mount and yeast by gram stain morphology, germ tube and sugar assimilation and fermentation tests.

Institutional ethical committee approval was obtained for the study.

### RESULTS:

Age in Years	No. of Patients	Percentage
<10	15	20.5%
11-20	22	30%
21-30	16	22%
31-40	12	16.4%
41-50	2	2.7%
>50	6	8.2%
<b>Total</b>	<b>73</b>	

Table 1: Distribution of culture positive patients based on age group

No. of patients	97
Samples with growth	73
No bacterial growth	24
Total isolates	82

Table 2: Total Isolates

	Our Study	2	3	8	9
Monobacterial growth	74%	74%	64%	39%	70%
Polymicrobial growth	4%	14%	46%	11%	15%

Table 3: Distribution of Monobacterial and Polymicrobial Growth

**Note:** 2, 3, 8, 9 indicate reference numbers.

## ORIGINAL ARTICLE

Microorganisms		Number	Percentage
<b>GNB</b>	Pseudomonas	32	41%
	Esch.coli	04	5.1%
	Klebsiella	03	3.8%
	Proteus vulgaris	06	7.6%
	Citrobacter	02	2.5%
<b>GPC</b>	CPS	22	28.2%
	CONS	02	2.5%
	S.pneumoniae	03	3.8%
<b>Fungi</b>	Candida	01	1.3%
	Aspergillus niger	03	3.8%
	<b>Total</b>	<b>78</b>	<b>100%</b>

**Table 4: Type of organisms isolated from CSOM patients**

Antibiotic	Sensitivity Percentage
Ampicillin	15%
Cotrimoxazole	18%
Amikacin	68%
Ofloxacin	75%
Cefotaxime	71.8%
Ceftazidime	75%
Gentamycin	69%

**Table 5: Antibiotic sensitivity of Pseudomonas (n=32)**

Antibiotic	Sensitivity Percentage
Ampicillin	20%
Cotrimoxazole	13.3%
Amikacin	60%
Cefotaxime	80%
Ceftazidime	60%
Gentamycin	80%

**Table 6: Antibiotic sensitivity of coliforms [(n=15)  
E.coli-4, Kleb-3, Proteus-6, Citrobacter-2]**

## ORIGINAL ARTICLE

Antibiotic	Sensitivity Percentage
Amikacin	89%
Ofloxacin	65%
Netilmicin	70%
Erythromycin	54%
Rifampicin	50%
Vancomycin	28%
Oxacillin	16.6%
Cefotaxime	71.4%
Ampicillin	62.5%
Cotrimoxazole	12.5%
Gentamycin	98%

**Table 7: Antibiotic sensitivity of gram positive cocci (n=27)**

**DISCUSSION:** CSOM is defined as chronic inflammation of the middle ear and mastoid cavity which presents with recurrent ear discharges or otorrhoea through a tympanic membrane perforation. It is classified into 2 types tubotympanic and attico antral depending on whether the disease process affects the pars tensa or pars flaccida of tympanic membrane. Tubotympanic is called as a safe type or benign type as there is no serious complication whereas attico-antral is called as the unsafe or dangerous type because of associated complications. Infection can spread from middle ear to vital structures such as mastoid, facial nerve, labyrinth, lateral sinus, meninges and brain leading to mastoid abscess, facial nerve paralysis, deafness, lateral sinus thrombosis, meningitis and intra cranial abscess. Of all the complications, hearing loss associated with chronic ear discharge is nearly always significant reported in 50% of cases and tending to be more severe than those reported in other types of otitis media.<sup>(6)</sup>

Early microbial diagnosis in all cases is important for prescribing appropriate treatment.

Of 97 patients included in the study, maximum patients were in the age group of 11-20 years (30%), 50% of cases were in the age group of less than 20 years. High prevalence of CSOM in children and young adults is because, the eustachian tube is short and wider and so are more prone to upper respiratory tract infection. (Table-1).

Male to female ratio was found to be 1:1. Of 97 patients samples processed, 73 yielded growth and 24 showed no growth. Fungi were isolated in 4%. (Table-2)

S. No	Isolates	Present Study	1	3	7	8	9	10	11
1.	Pseudomonas	<b>41%</b>	19.5%	18%	41%	54%	34%	27%	45%
2.	E.Coli	<b>5.1%</b>	2.4%	3.1%	9.5%	3.2%	2.6%	7%	4.7%
3.	Klebsiella	<b>3.8%</b>	ND	6.2%	10%	8%	13%	10.4%	6.3%
4.	P. vulgaris	<b>7.6%</b>	3.7%	25%	5.5%	6%	6.5%	7%	4.7%
5.	Citrobacter	<b>2.5%</b>	1.8%	ND	ND	ND	ND	ND	ND
6.	CPS	<b>28.2%</b>	56%	28.6%	30%	11.3%	27%	28.6%	22%
7.	CONS	<b>2.5%</b>	5.5%	15.6%	ND	8%	15.8%	15.6%	7.9%

## ORIGINAL ARTICLE

8.	S.pneumoniae	3.8%	ND	1.5%	ND	1.6%	ND	1.5%	ND
9.	Aspergillusniger	3.8%	ND	ND	ND	ND	ND	6.9%	ND
10.	Candida	1.3%	ND	ND	ND	ND	ND	2.6%	ND

**Table 8: Comparison of isolation rates of pathogenic organisms in patients of CSOM from various studies**

**Note:** 1, 3, 7, 8, 9, 10, 11 indicate reference numbers ND-No Data.

74% samples yielded monobacterial isolate in our study. This was in agreement with the studies of Shazia et al and Raakhee et al. Shresta et al reported much lower rates of single bacterial isolate 39%. In our study polybacterial isolates were observed in 4% of samples tested. However other studies showed a range between 11% to 46%. (Table-3)

Among the fungi aspergillus species was isolated in 3.8% of cases Shresta et al reported 6.9% isolates of the same.

The most common bacterial isolate was Pseudomonas n=32% (41%) which correlated with study of Arvind N et al, Prayaga N Srinivas Moorthy et al and Shazia Parveen. Pseudomonas is the most prevalent organism in tropical region like ours. It does not usually inhabit upper respiratory tract. Its presence in middle ear cannot be ascribed to an invasion through Eustachian tube but should be considered as secondary invader gaining access to middle ear via defect in Tympanic Membrane (Rajat Prakash). (Table-8)

Staphylococcus aureus was the next common isolate in our study. This pattern was in tandem with the study of Sateesh Kumar. However S. aureus as the predominant isolate was reported by AH Singh et al, Shamweel Ahmed et al, Arvind et al and Shresta et al. This difference in results of various authors could have been due to the difference in the patient population studied and geographical variations. (Table-8)

24% of samples did not yield growth of bacteria or fungi.

Gram negative bacteria were the predominant isolate 60.4% followed by gram positive cocci 34.5% and 5.1% of isolates were fungi including yeast. GNB isolated in this study showed a high sensitivity to cefotaxime (75.9%) and gentamycin (74.5%) followed by Amikacin (64%). (Table-4, 5, 6)

Staphylococci showed a high degree of sensitivity to Gentamycin (98%) Amikacin (89%) followed by Cefotaxime (71.4%). (Table-7)

**CONCLUSION:** Continuous and periodic evaluation of microbiological pattern and antibiotic sensitivity of isolates is necessary to initiate effective treatment protocols for the study population. It also decreases the potential risk of complications by early institution of appropriate treatment. Untreated cases of CSOM can result in a broad range of complications like persistent otorrhoea, mastoiditis, labyrinthitis, meningitis and facial nerve palsy. Some patients may develop life threatening complications like lateral sinus thrombosis or brain abscess also. Hence treatment has to be initiated early and effectively.

As higher incidence of CSOM was seen among children, educating parents and guardians on possible risk factors of the disease may be a preventive strategy that might reduce disease occurrences.

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