



## STUDY OF BACTERIAL FLORA IN CHRONIC SUPPURATIVE OTITIS MEDIA

## Arts

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## ABSTRACT

Middle ear infections of variable severity are a major health burden in ENT OPDs in India. Chronic Suppurative Otitis Media (CSOM) and its complications are among the most common conditions seen together by medical practitioners. In the current scenario, many micro-organisms have developed multiple-antibiotic resistance. This study was undertaken to know the local pattern of micro-organisms causing CSOM and their antibiotic susceptibility pattern in a tertiary care hospital. An observational cross-sectional study was conducted from June 2011 to June 2013. A total 160 patients of both sexes and from all age groups attending out-patient departments and those admitted in ENT wards were selected. Swabs from ear discharge were taken, culture and sensitivity tests done and the reports collected, recorded and analyzed. The treatment was given according to reports.

## KEYWORDS

CSOM, Microbiology, Antibiotics.

## INTRODUCTION

Chronic suppurative otitis media (CSOM) is defined as persistent or intermittent discharge through a non-intact tympanic membrane, having duration of three months or more.<sup>2</sup> It is common in infants and children of lower socio-economic groups.<sup>4</sup> Typically the disease follows a viral infection of the upper respiratory tract but soon invades middle ear with pyogenic organisms.<sup>2</sup> CSOM is a disease of multiple aetiologies, known for its persistence and recurrence in spite of treatment. It has a destructive and long-standing pathology with irreversible sequelae and can lead to serious intra - cranial and extra - cranial complications.<sup>5</sup>

In CSOM isolates, aerobic and non-aerobic bacteria are co-existent in half the cases. The predominant aerobic bacteria isolated are *Pseudomonas aeruginosa*, *Staphylococcus aureus* and other gram negative bacteria like *Escherichia coli*, *Proteus* and *Klebsiella* species. *Bacteroides* spp. and *Fusobacterium* spp. are the most common anaerobic bacteria isolated.

Tulsidas et al. in 1952, found *Proteus vulgaris* to be the most common organism affecting middle ear in 150 cases. In 1963, G. Laxmipathi et al. observed coliforms to be more than *Pseudomonas*, *Proteus*, *Staphylococcus* and others. In 1972, Nandan Singh and Radha Bhaskar concluded on *Staphylococcus* and *Proteus* as the most common pathogens. Nandy A. et al.<sup>7</sup> in 1991 found *Pseudomonas*, followed by *Staphylococcus* to be the predominant pathogens which was echoed by Charles Bluestone (2004) and Nelson (2004) in two different studies.

## OBJECTIVES:

- 1) To identify the causative microorganism/s in ear discharge of patients with CSOM.
- 2) To assess the sensitivity to the antibiotic drugs of the organism involved in CSOM.

## MATERIALS &amp; METHODS:

This cross sectional study included patients of CSOM examined from June 2011 to June 2013 in the department of ENT. A total of 160 patients of all age groups and both sexes, having CSOM, attending out-patient department and those admitted in ENT ward were randomly selected for the study.

The study included patients with age group ranging from 1 year and above. Only those patients showing active type of CSOM, diagnosed on the basis of an anamnesis of the current disease and an otoscopic examination were included in the study. Patients with age less than 1 year were excluded as breastfed children are likely to have repeated attacks of AOM which is difficult to distinguish from COM. Besides,

in infants with narrow ear canals, collection of samples becomes difficult. Patients with history of ear surgery were excluded to avoid bias by hospital acquired infections. Patients who had received topical or systemic antibiotics in the past 5 days were excluded from the study.

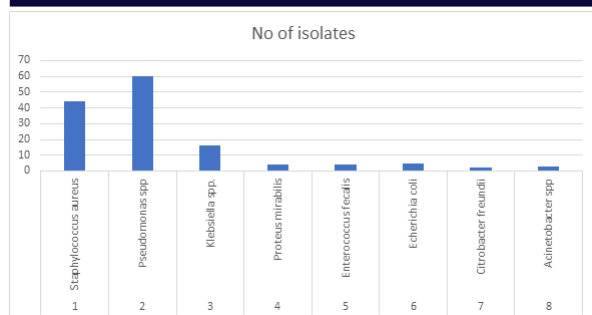
All selected patients underwent a complete evaluation of history and clinical examination as per protocol. With utmost care to avoid surface contamination, swabs from ear discharge were collected and sent to microbiology laboratory. Microbial Culture and Sensitivity reports collected, recorded and analysed using software.

## OBSERVATIONS AND RESULTS

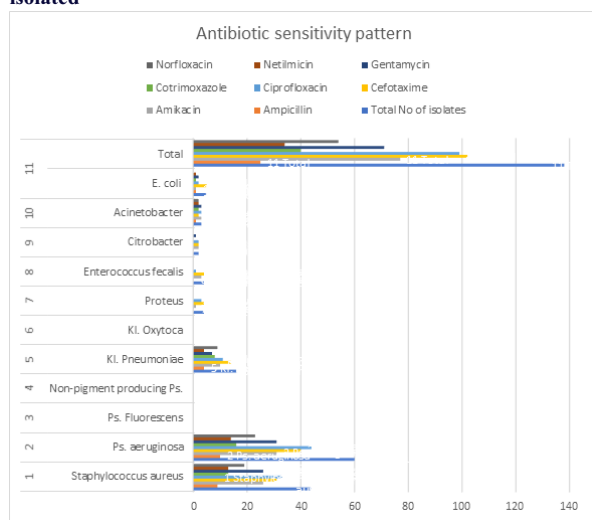
- 1) 160 patients of CSOM during period from June 2011 to June 2013 were examined.
- 2) Maximum number of patients belonged to age group 21-30 years i.e. 48 (30%).
- 3) Male patients were slightly higher in number than female patients i.e. 100 (62.5%) male patients and 60 (37.5%) female patients.
- 4) Of all the cases studied, right ear was affected in most of them, 88 (55%).
- 5) The predominant organism isolated was *Pseudomonas* spp (43.5%) followed by *Staphylococcus aureus* (31.9%) and *Klebsiella* spp (11.6%).
- 6) Out of 138 positive culture smears, 90 (65.2%) were Gram negative and 48 (34.8%) were Gram positive.
- 7) *Pseudomonas* were most sensitive to Ciprofloxacin (71.66%) and Cefotaxime (66.66%).
- 8) *Staphylococcus* was most sensitive to Ciprofloxacin (75%) and Cefotaxime (68.18%).
- 9) Out of 160 cases, 105 (65.62%) were of tubotympanic types and 55 (34.38%) were of attico-antral types.
- 10) Of the 105 tubotympanic cases, most common organism was *Pseudomonas* 47 (47.76%). In the attico-antral disease, out of 55 cases, most common was *Staphylococcus aureus* 20 (36.36%).

Table No 1 : Different bacterial isolates

Sr No	Organisms	No. of isolates	Percentage
1	<i>Staphylococcus aureus</i>	44	31.9
2	<i>Pseudomonas</i> spp.	60	43.5
a	<i>Pseudomonas aeruginosa</i>	52	37.7
b	<i>Pseudomonas fluorescens</i>	2	1.4
c	Non-pigment producing Ps.	6	4.3
3	<i>Klebsiella</i> spp.	16	11.6
a	<i>Kl. Pneumoniae</i>	13	9.4
b	<i>Kl. oxytoca</i>	3	2.2
4	<i>Proteus mirabilis</i>	4	2.9
5	<i>Enterococcus faecalis</i>	4	2.9
6	<i>Echerichia coli</i>	5	3.6
7	<i>Citrobacter freundii</i>	2	1.4
8	<i>Acinetobacter</i> spp	3	2.2
	TOTAL	138	100



**Graph No 1 : Antibiotic sensitivity pattern of aerobic organisms isolated**



## DISCUSSION

The wide spread use of antibiotics has accentuated the emergence of multiple strains of bacteria which can produce both primary and post-operative infections. The indiscriminate, haphazard use of antibiotics and the non-compliance and poor follow-up of patients has resulted in persistence of low grade infections. In our country, antimicrobial drugs are often prescribed irrationally by non-allopathic doctors and many patients also tend to buy antibiotic drugs without proper consultation (or use the unused drugs of another patient).

The periodic update of the prevalence of micro-organisms and their sensitivity to antibiotics in CSOM would be helpful to provide correct therapy to patients and also help to prevent the emergence of resistant strains in the community.

In the present study, the age group with highest percentage of presentation were 21-30 (30%) and 11-20 (29.3%) years, and these findings were consistent with Arya S.C et al<sup>1</sup> and Loy A.H.C. et al<sup>6</sup>. The basis of delayed presentation could be due to ignorance of and / or the economic restraints on the patients', with regard to them seeking health services from an early stage of developing complaints.

CSOM was more common in males (62.5%) as compared to females (37.5%). An analogous conclusion was seen by workers like Chandra and Mishra, Mukherjee et al. and Hossian et al. The predominant cause of disease in males was due to their outdoor working habits, exposing them to contamination and contagion.

In our study, no growth was found in 22 (13.75%) cases. Similar studies by Gulati and Kumar et al. showed 22% such cases and Nikakhlagh et al. showed 18% such cases. The low positivity rate in our study could be because of the fact that this is a tertiary hospital and that the fact that they have not revealed to us the prior administration / instillation of antibiotics elsewhere, that could have hampered microbial growth in these cases.

Among the 138 micro-organisms identified on a bacterial culture, the commonest isolate was Pseudomonas (43.5%) followed by Staphylococcus (31.9%).

The findings of the current study is correlated with other workers like

Saurabh V et al., Hiremath et al.<sup>3</sup> and Loy A.H.C. et al<sup>6</sup>.

In the current study, 73.9% of organisms were sensitive to Cefotaxime, followed by Ciprofloxacin (71.7%), Amikacin (53.6%), Gentamycin (53.6%), Norfloxacin (39.1%), Cotrimoxazole (29.9%), Netilmicin (24.6%) and Ampicillin (18.1%).

The most effective drugs in the present study are Cefotaxime, Ciprofloxacin, Amikacin and Gentamycin. Similar sensitivity was reported by Gulati et al., Varshney et al.<sup>8</sup> and Hiremath et al<sup>3</sup>. However Nandy A. et al.<sup>7</sup> and Rao B. N. et al. have found Gentamycin as the most effective drug.

In the present study, majority of the isolates showed multiple drug resistance for Ampicillin, Cotrimoxazole and Netilmicin, which correlates with the study of Nandy A. et al.<sup>7</sup>, Rao B.N. et al, Saurabh V et al. and Hiremath et al<sup>3</sup>.

## CONCLUSION

In the present era, the emergence of antibiotics resistance is becoming a routine menace. The predominant factor responsible here, is human negligence, like patients taking incomplete treatment.

In any case of CSOM, not responding to empirical therapy, swab should be sent for culture and sensitivity. Periodic evaluation of microbiological pattern and their antibiotic sensitivity pattern in local area becomes important and helpful in prescribing empirical antibiotics for successful treatment of CSOM and thus minimizing its complications and emergence of resistance strains.

The resistance pattern of the microorganisms usually keeps changing, subject to genetic mutations, environmental factors and prescription trends of particular hospitals. Thus, it is essential that all doctors should be updated about the changing pattern of causative agents and their antimicrobial susceptibility through regular CMEs and standard research articles. Such knowledge will guide in administering appropriate / correct antibiotic therapy for effective treatment and for preventing development of resistant strains.

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- Plagiarism – not done

## Role of contributors for the article:

All authors contributed equally in all sections of the article.

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