

Bacteriological profile of chronic suppurative otitis media in a tertiary care hospital: A cross sectional study

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Abstract

Background: Chronic suppurative otitis media (CSOM) is the most commonly noted disease in Otolaryngology practice. Microbial isolation and its antibiotic sensitivity help in appropriate management and planning of treatment protocol. The present study was aimed to assess the bacteriological profile and to study the antibiotic sensitivity in chronic suppurative otitis media among patients visiting a tertiary care hospital. **Methods:** This cross-sectional study was done in 100 patients diagnosed with chronic suppurative otitis media. samples obtained using sterile swabs were taken and processed. Bacterial isolates were identified and drug susceptibility testing was conducted using Kirby –Bauer disc diffusion method **Results:** More than half of the patients belonged to 1-to-15-year age group. *Staphylococcus aureus* and *Pseudomonas aeruginosa* were the most common organisms isolated in this study. *Staphylococcus aureus* was most sensitive to vancomycin followed by linkomycin. *Pseudomonas aeruginosa* was most sensitive to Ciprofloxacin followed by Cefotaxime. **Conclusions:** Knowing the etiological agents of CSOM and their antibiogram is important for effective treatment and prevention of complications and antibiotic resistance.

Keywords: Chronic suppurative otitis media (CSOM), Antibiotic susceptibility, *Pseudomonas aeruginosa*, *Staphylococcus aureus*.

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INTRODUCTION

Chronic suppurative otitis media (CSOM) is a chronic inflammation of middle ear and mastoid cavity that may present with recurrent ear discharges or otorrhoea through a tympanic perforation lasting at least two weeks.¹ Inadequate and inappropriate treatment of CSOM can result in a wide range of complications. These may be due to the spread of organisms to structures adjacent to the ear

or to local damage in the middle ear itself. Such complications range from persistent otorrhoea, mastoiditis, labyrinthitis, facial nerve paralysis to more serious intracranial abscesses or thromboses.²⁻⁴ Chronic suppurative otitis media has received considerable attention not only because of its high incidence, chronicity and complication, but also drug resistance⁵ and ototoxicity⁶ with both topical and systemic antibiotics. Knowledge of local micro-organism pattern and their antibiotic sensitivity is essential for effective and low cost treatment of this disease. So the present study was done to find the bacterial responsible for CSOM and also to study the antibiotic sensitivity pattern of these bacteria.

MATERIALS

The cross sectional study was conducted in the Department of Otorhinolaryngology at Viswabharathi General hospital, Kurnool for 10 months from January, 2019 to October 2019. A total of 100 cases were selected from the

patients who attended ENT OPD on the basis of the following criteria.

Inclusion criteria: Ear discharge taken only from those patients who had clinical diagnosis of Chronic Suppurative Otitis Media both tubo-tympanic and attico-antral type of disease. Only patients who had not received parenteral or topical antibiotics 6 weeks previously were taken in the study. All age groups of patients were included in the study.

Exclusion criteria: Patients who had treatment with antibiotics within 6 weeks, Patients having intra or extra cranial complications, Pregnant and lactating women
Prior approval from the institutional ethical committee was obtained. Written consent was obtained from the patients before taking ear swabs. Ear discharge was collected from the selected patients under strict aseptic precautions using two sterile cotton swabs with the assistance of aural speculum and processed immediately in the microbiology laboratory. The first swab was used for direct Gram stain and the second swab was cultured in nutrient agar, blood agar and Mac conkey agar plates and incubated at 37°C for 24–48 hrs. The isolates grown were identified by their cultural characteristics, morphology and biochemical reactions. Antibiotic susceptibility testing of the organisms diagnosed was done by Kirby Bauer method⁷ in Muller Hinton agar. The plates were read after overnight incubation at 37°C by measuring the zone of inhibition around the antibiotic discs as per CLSI (Clinical Laboratory Standards Institute) guidelines.⁸

RESULTS

A total of 100 patients with CSOM were enrolled in the study. out of 100 patients 60 were male and 40 were female. (Table 1). They are in an age group varying from 1-70 years with the maximum patients in the age group of 1-15 years (55%) (Table 2). In our study 87% were suffering from tubo-tympanic type of chronic suppurative otitis media and 13% from attico-antral type (fig 1).

Table 1: Gender distributed

Sex	No. ofCases	Percentage (%)
Male	60	60
Female	40	40

Table 2: Showing age distribution

Age in Years	Number of cases	Percentage (%)
1-15	55	55
16 - 30	25	25
31 - 45	06	06
46- 60	8	8
61 - 75	06	06

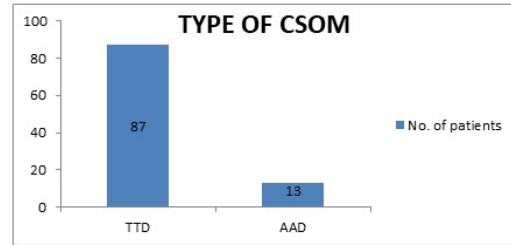


Figure 1: Type of CSOM

Out of 100 tested, 95 (74.7%) samples had at least one organism was isolated and 5 (17.9%) samples had no isolates (Table - 3)

Table 3: Summary of culture results of 105 samples tested

	No. of cases (100)	Percentage(%)
Atleast one organism isolated	95	95
No organism	5	5

Among the bacterial isolates, *Staphylococcus* (44%) was the commonest, followed by *Pseudomonas* 24%, *Escherichia coli* 7%, *Enterococcus* 6%, *Proteus* 6%, *Klebsiella* 5%, *Citrobacter* 2% and *cornnebacterium* 2%. (Table-4)

Table 4: Details of organisms isolated among the culture positive samples (N=105)

Organisms isolated (n=100)	No. of cases	Percentage %
<i>Staphylococcus aureus</i>	44	44
<i>Pseudomonas Aeruginosa</i>	24	24
<i>E.Coli</i>	7	7
<i>Enterococcus</i>	6	5
<i>Proteus</i>	5	6
<i>Klebsiella</i>	5	5
<i>Citrobacter</i>	2	1
<i>Corynebacterium</i>	2	1
No growth	5	5

On observing the bacterial sensitivity pattern of *Staphylococcus aureus*, we found that Vancomycin was 100% sensitive. linkomycine 84% Cefotaxime 80%, Ceftriaxone 77%, Amikacin 75%, Ofloxacin 63%, Cephalexin 52%, Erythromycin 52%, Ciprofloxacin 48%,Norfloxacin 34%, Gentamycin 34%, Amoxicillin 30%, Ceftazidime 20%. *Pseudomonas aeruginosa* was most sensitive to Ciprofloxacin 75% followed by Cefotaxime 64%, Amikacin 64%, Ceftazidime 62%, Ceftriaxone 60%,Ofloxacin 58%, Gentamycin 58%, , Norfloxacin 37%, Cephalexin 4%. It was observed that most of the isolates were sensitive to Cefotaxime followed by Amikacin and Ceftriaxone and least sensitive to Amoxicillin (Table:5)

Table 5: Antibiogram

Organism	No. of patients	amikacin	amoxycilin	cephalexin	cefotaxime	ceftazidime	ceftriaxone	chloramphenical	ciprolox	erythromycin	gentamycin	lincomycin	norflox	offlax	vancomycin
<i>Staphylococcus Aureu</i>	44	33	13	23	35	9	34	30	21	23	15	37	15	28	44
<i>Pseudomonas Aeruginosa</i>	24	16	-	1	17	15	13	7	18	-	14	-	9	14	-
<i>E.Coli</i>	7	5	-	2	2	3	4	4	4	-	3	-	-	3	-
<i>Enterococcus Proteus</i>	6	6	-	2	5	4	3	1	4	-	2	-	3	3	-
<i>Klebsiella</i>	5	5	-	-	5	5	5	2	4	-	3	-	3	4	-
<i>Citrobacter</i>	5	3	-	2	4	3	3	2	3	-	3	-	3	3	-
<i>Corynebacterium</i>	2	-	-	-	-	-	-	1	1	-	-	-	-	1	-
<i>Corynebacterium</i>	2	-	-	-	2	1	-	-	-	-	-	-	-	-	-
Total	95														

DISCUSSION

The CSOM is defined as a longstanding infection of a part of whole of middle ear cleft characterized by ear discharge and a permanent perforation¹⁰ Gender wise, relatively high proportion of males (60%) had CSOM compared to females (40%). These findings are resembling the previous study¹¹ in which 51.54% of males and 48.46% of females were affected and Chirwa, *et al.*¹² observed a higher prevalence among males (61.5%) compared to females (38.5%). Among the study participants prevalence of CSOM was particularly high among children accounting for more than 50% among those aged between 1 and 15 years. The same findings are reported by the previous studies.¹³⁻¹⁶ Among the organisms *Staphylococcus aureus* formed the predominant isolates as reported by the previous studies.¹⁷⁻²⁰ Due to the wide spread nature and resistant strain in the external auditory canal and upper respiratory tract, there is high presence of *Staphylococcus aureus* in middle ear.²¹ Antibiotic susceptibility testing was carried out for all the microorganisms isolated. *Staphylococcus aureus* isolates were most sensitive to vancomycin and *Pseudomonas* isolates were most sensitive to ciproflaxaiin. It was observed that most of the organisms were sensitive to Cefotaxime, the same results are reported by the previous studies.²²⁻²⁴

CONCLUSION

The most common organisms isolated were *Staphylococcus aureus* and *P. aeruginosa* and. *Staphylococcus aureus* is most sensitive to Vancomycin followed by Lincomycin and Cefotaxime. *Pseudomonas aeruginosa* was most sensitive to Ciprofloxacin followed by Cefotaxime. Having the knowledge of etiological

agents causing CSOM and their antibiogram is important for effective treatment and prevention of complications and antibiotic resistance.

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