

## Antibiotic Sensitivity and Bacteriology of Chronic Suppurative Otitis Media in Department of ENT in MIMS Hospital, Vizianagaram

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### Abstract:

**Background:** Chronic Suppurative Otitis Media (CSOM) is defined as persistent inflammation of the middle ear or mastoid cavity. The aim of this study was to evaluate the antibiotic sensitivity and resistance patterns in CSOM patients attending ENT outpatient department and design an appropriate protocol to treat these patients without further increasing the incidence of resistant strains.

**Methods:** This is a prospective observational study conducted among CSOM patients who presented to the ENT outpatient department with ear discharge. Ear swabs from these patients were collected and sent to the microbiology department for bacterial culture and sensitivity along with gram staining.

**Results:** Of the 58 patients studied, 64% were males and 36% were females. Of the organisms isolated Staph aureus (53%) was most common followed by *Pseudomonas* (36%). All the gram-positive organisms were sensitive to gentamycin, amikcin and cotriamoxazole, and all gram-negative organisms were sensitive to netlimycin, amikacin and ciprofloxacin.

**Conclusions:** All CSOM patients should be advised to get their ear swab sent for pus culture and sensitivity, and they should be advised to receive antibiotic therapy based on sensitivity report and never use antibiotics randomly to reduce the incidence of antibiotic resistance.

**Keywords:** CSOM, Bacteriology, Gram Stain.

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### Introduction

Chronic Suppurative Otitis Media (CSOM) is defined as chronic inflammation of the middle ear and mastoid cavity that may present with recurrent ear discharge through a tympanic membrane perforation.[1] The incidence of the disease is higher in lower socioeconomic groups due to poor hygiene, malnutrition, and overcrowding.[2]

CSOM is of two types: safe and unsafe. Safe type is called the tubo-tympanic type, and the unsafe type is called the attico-antral type.[3] Tubo-tympanic is called safe type as there are no complications, whereas attico-antral is called the unsafe type as it is associated with complications.[4] The most common bacteria isolated from CSOM

cases are *Staphylococcus aureus*, *Pseudomonas aeruginosa*, *Klebsiella* and *Proteus* species.[5]

### Aims and Objectives

To study the antibiotic sensitivity and resistance pattern in CSOM patients attending to ENT OPD and prepare an antibiotic protocol to be used in these patients. This will help in preventing the emergence of multidrug-resistant bacterial strains.[6]

### Materials & Methods

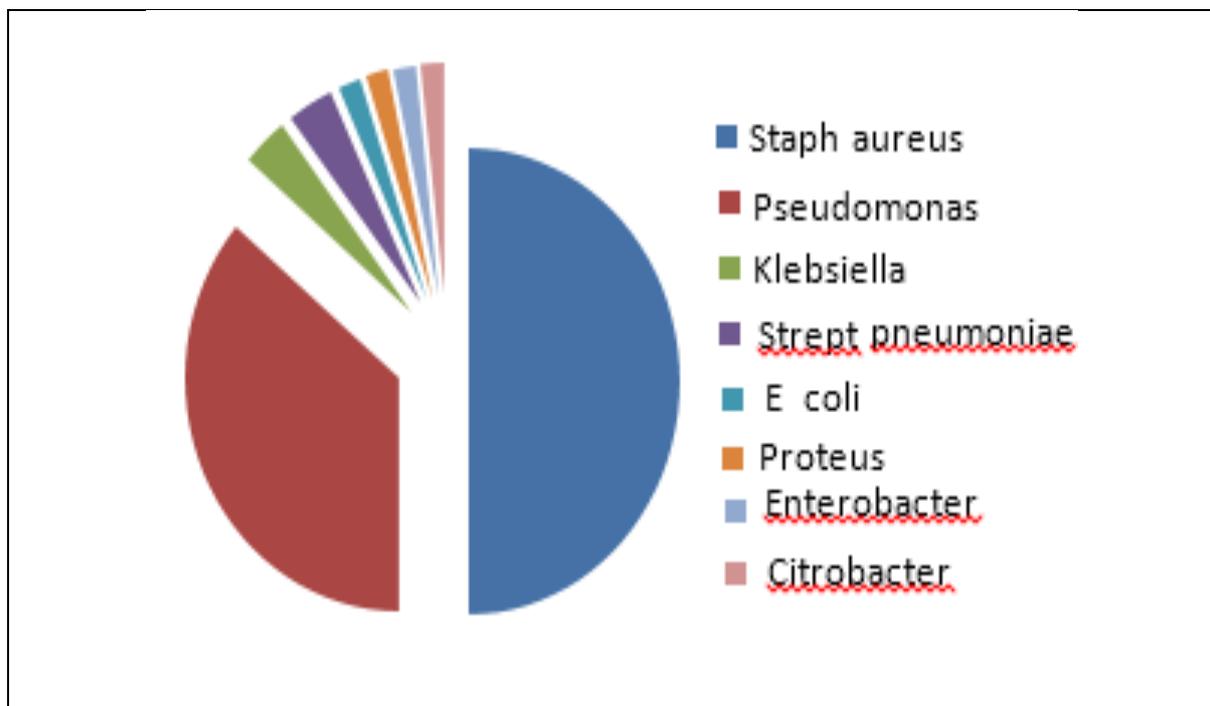
This is a prospective observational study conducted in MIMS Medical College Hospital, Vizianagaram, on patients with CSOM, both unilateral and bilateral, who presented with active ear discharge to ENT OPD from April 2021 to June 2021. Patients were of all age groups, both sexes, and had symptoms of active ear discharge for more than 6 weeks. The ear discharge is collected using sterile cotton wool swabs

under aseptic precautions with the aid of an aural speculum before the instillation of any topical medication. Swabs are then transported to the laboratory. Patients suffering from MOE (Malignant Otitis Externa) who are on systemic antibiotics and topical medications to the ear were not included in the study.

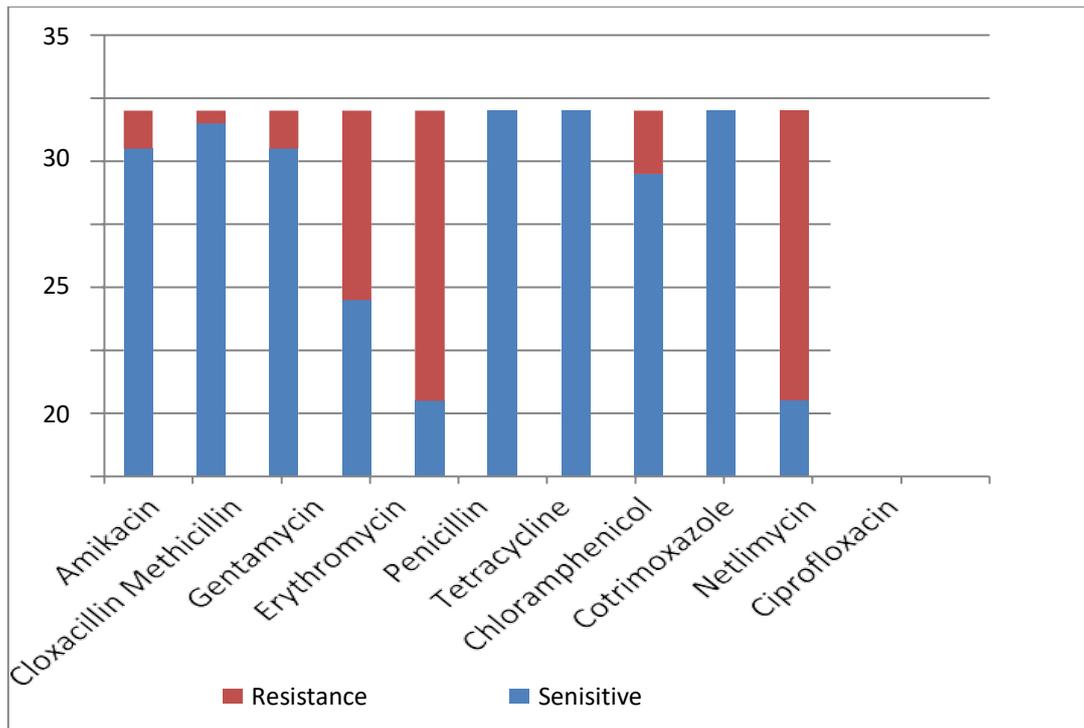
The first swab is used for Gram staining, and second swab is used for aerobic culture. MacConkey agar and blood agar are the culture media used for aerobic culture. Antibiotic sensitivity testing is done by using Kirby-Bauer disc diffusion method.

### Results

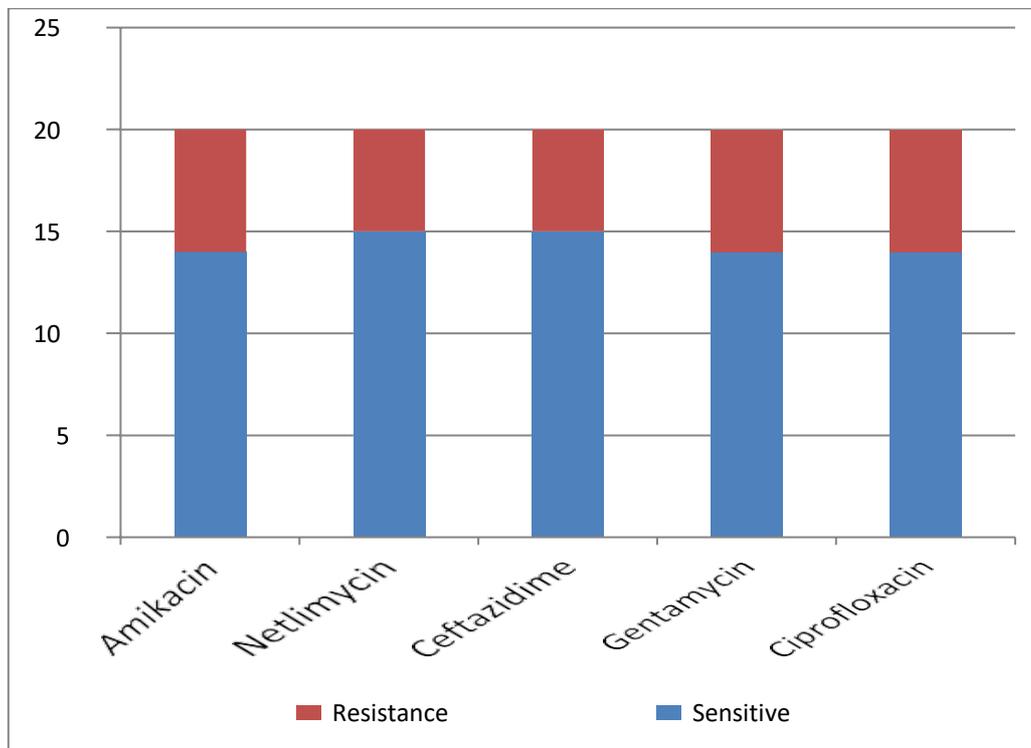
CSOM is a major public health problem, and India is one of the countries with a high prevalence where urgent attention is needed.[7] CSOM is an important cause of preventable hearing loss.[8] Of the 60 cases studied, 36 (60%) were males and 24 (40%) were females.



**Figure 1: Organisms Isolated from Middle Ear Infection Staphylococcus Aureus is the Most Common Organism Isolated Followed by Pseudomonas**



**Figure 2: Antibiotic Sensitivity Pattern in Staphylococcus Aureus Showing Sensitivity to Tetracycline, Chloramphenicol, Netlimycin and Resistance to Pencillin and Ciprofloxacin**



**Figure 3: Antibiotic Sensitivity Pattern in Pseudomonas of Sensitivity to Ciprofloxacin, Amikacin and Netlimycin**

## Discussion

In this study, a total of eight different microorganisms were isolated. Gram-positive bacteria predominated; *S. aureus* (50%) being the most common one, followed by Gram negative including *Pseudomonas* (34%), *Klebsiella* (3%), *Streptococcus pneumoniae* (3%), *E. coli* (1.5%), *Proteus mirabilis* (1.5%), *Citobacter* (1.5%), and *Enterobacter* (1.5%) Figure 1. Out of the gram-positive bacteria isolated, all (100%) were sensitive to cotrimoxazole, amikacin, gentamycin. Gram-positive bacteria showed resistance against penicillin (100%) and to azithromycin and ciprofloxacin Figure 2. Out of 29 culture samples growing *Staphylococcus aureus* 4 were methicillin-resistant and found to be sensitive only to vancomycin, netlimycin and tetracycline and resistant to penicillin, erythromycin and ciprofloxacin. Antibiotic susceptibility testing done for gram-negative bacteria like *Pseudomonas* showed higher susceptibility towards ciprofloxacin, amikacin and netlimycin (Figure 3). *Klebsiella* was sensitive to amikacin, gentamycin, ceftazidime, cefuroxime, netlimycin, ciprofloxacin, and cefotaxime and resistance to amoxicillin.

*E. coli* was sensitive to amikacin, gentamycin, meropenem, and netlimycin and resistant to amoxicillin, ceftazidime, cefuroxime, ceftazidime, and ciprofloxacin. *Proteus* was sensitive to only piperacillin, tazobactam and meropenem and resistant to amikacin, ciprofloxacin, gentamycin, amoxicillin, and netlimycin. *Streptococcus pneumoniae* was sensitive to cefotaxime and penicillin and resistant to erythromycin and cotrimoxazole. *Citobacter* was sensitive to amikacin, meropenem, ciprofloxacin, and gentamycin. *Enterobacter* was sensitive to amikacin, ceftazidime, cefuroxime, ciprofloxacin, and gentamycin and resistant to amoxicillin.[8]

## Conclusion

The result of this study showed a high

prevalence and resistance of *Staphylococcus* and *Pseudomonas* to beta-lactam and other commonly used antibiotics, and the emergence of MRSA is a worrying trend. Therefore, an appropriate knowledge of the antibiotic susceptibility of micro-organisms may contribute to the rational use of antibiotics and prevent the emergence of resistant strains of bacteria.

## Funding

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## Ethical approval

The study was approved by the Institutional Ethics Committee

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