

Bacteriological Profile and Antibiotic Sensitivity in Chronic Suppurative Otitis Media: A Cross-Sectional Study

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ABSTRACT

Background: Chronic suppurative otitis media (CSOM) is one of the leading causes of hearing loss in developing countries. Timely identification of the causative organisms and their antibiotic sensitivity is essential for effective management.

Objective: To identify the common aerobic bacterial pathogens in CSOM and assess their antibiotic sensitivity patterns.

Methods: A cross-sectional study conducted over one year in the ENT outpatient and Microbiology departments of Indira Hospital. A total of 99 ear swabs from 80 clinically diagnosed CSOM patients were analyzed.

Results: *Pseudomonas aeruginosa* (37.5%) and methicillin-sensitive *Staphylococcus aureus* (31.2%) were the most commonly isolated organisms. Resistance to several commonly used antibiotics was observed.

Conclusion: Regular monitoring of microbial trends and antibiotic resistance in CSOM is crucial to guide effective treatment.

Keywords: CSOM, SWABS

INTRODUCTION

Chronic suppurative otitis media (CSOM)¹ is a long-standing infection of the middle ear with persistent ear discharge through a perforated tympanic membrane. It is a condition where there is a prolonged inflammation of the mucosa in the middle ear and mastoid space. It persists for more than two months, which causes a hole to form in the eardrum and results in ongoing discharge from the ear canal. This persistent ailment can cause profound health implications, such as complications within the intracranial area and significant morbidity among those affected. There is no common consensus regarding symptom duration, although some of classifications called it as "otorrhea through a perforated tympanic membrane persisting for at least two weeks," whereas others define it 'chronic' symptoms persisting beyond six weeks. It remains a major public health issue, especially in low- and middle-income countries². CSOM is known to cause significant morbidity, especially due to hearing loss, and can result in life-threatening complications if not treated appropriately³.

The importance of understanding the local bacteriological profile cannot be overstated, as the causative organisms and their resistance patterns vary by region. This study aims to investigate the bacterial profile in CSOM cases and determine the antibiotic sensitivity of the isolated organisms⁴.

MATERIALS AND METHODS

Study Design and Setting

This observational, cross-sectional study was conducted from January 2024 to December 2024 at the ENT outpatient department and the Department of Microbiology, Indira Hospital.

Participants

Patients with clinical diagnosis of CSOM were included in our study from these patients, 99 ear swabs were collected. Inclusion criteria were patients of all age groups with active ear discharge lasting more than 6 weeks⁵.

Sample Collection

Ear swabs were collected aseptically using sterile cotton swabs. The swabs were immediately transported to the microbiology lab for processing^{9,10,11}.

Laboratory Procedures

Culture: Samples were inoculated on Blood agar and MacConkey agar and incubated at 37°C for 24–48 hours for aerobic bacterial growth^{6,7,8}.

Identification: Bacterial isolates were identified based on colony morphology, Gram staining, and standard biochemical tests.

Antibiotic Sensitivity Testing: Performed using the Kirby-Bauer disc diffusion method on Mueller-Hinton agar according to CLSI guidelines^{5,8,12}.

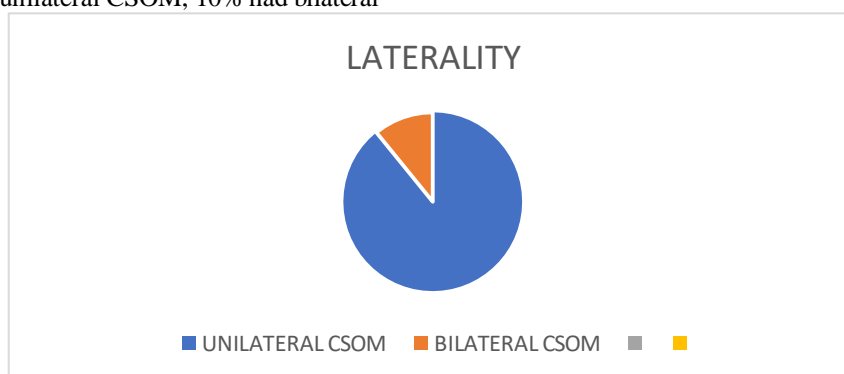
RESULTS

Demographic Profile

Average Age: 30 years

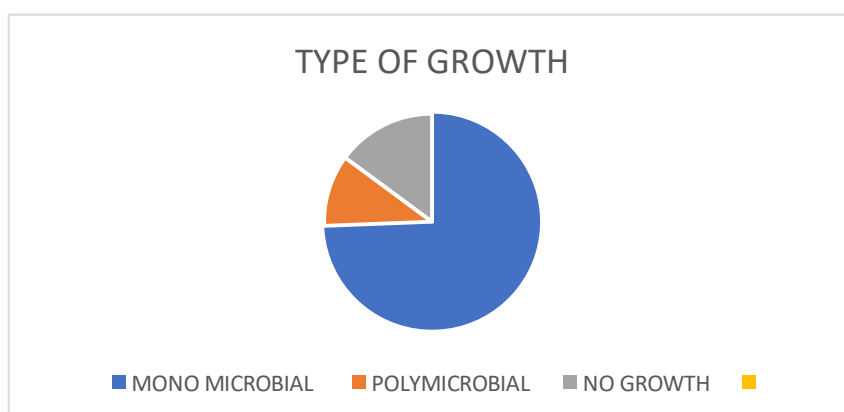
Gender Distribution: 60male and 39female.

Laterality: 90% had unilateral CSOM, 10% had bilateral



Type of CSOM: 94% tubo-tympanic (safe), 6% attico-antral (unsafe)^{13,14}

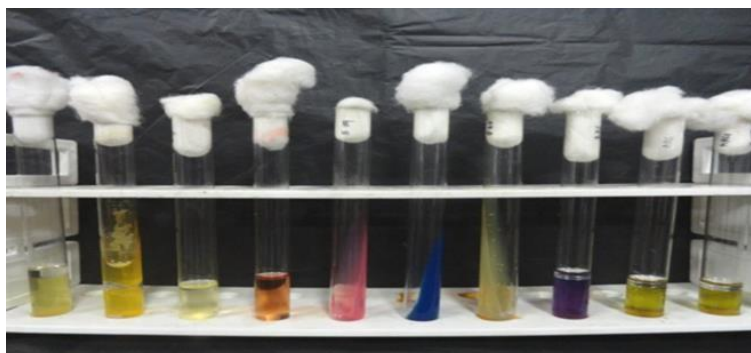
Culture Results



Type of Growth	Number of Samples	Percentage
Mono-microbial	70	70.7%
Poly-microbial	10	10.1%
No Growth	9	9%

Bacterial Isolates		
Organism	Number of Isolates	Percentage
Pseudomonas aeruginosa	30	37.5%
Staphylococcus aureus (MSSA)	25	31.2%

Coagulase-negative Staphylococcus spp. 15 18.75%
Klebsiella pneumoniae 10 12.5%



Biochemical reactions of klebsiella pneumoniae.

Antibiotic Sensitivity Patterns

Table 1: Sensitivity of Pseudomonas aeruginosa

Antibiotic	Sensitivity %
Ciprofloxacin	40%
Ceftazidime	45%
Imipenem	40%
Meropenem	40%
Gentamycin	40%
Cefepime	40%

Resistant to Ampicillin, Chloramphenicol, Cotrimoxazole

Table 2: Sensitivity of Staphylococcus aureus (MSSA)

Antibiotics	Sensitivity %
Vancomycin	100 %
Linezolid	100%
Chloramphenicol	95%
Amikacin	86%
Doxycycline	86%

DISCUSSION

Our study confirms that Pseudomonas aeruginosa and Staphylococcus aureus are the predominant pathogens in CSOM. The presence of Klebsiella pneumoniae and coagulase-negative staphylococci also highlights the need for comprehensive culture testing^{18,19,20,21}.

The resistance of Pseudomonas to commonly prescribed antibiotics such as Ampicillin and Cotrimoxazole is concerning^{15,16}. These findings are consistent with studies from other regions, underlining the global trend of rising antibiotic resistance. On the other hand, Vancomycin and Linezolid showed excellent effectiveness against MSSA, making them reliable options for resistant cases. CSOM is one of the most common and important major health burden in communities leading to hearing impairment with approximately a 5 % global incidence and is particularly prevalent in developing countries^{23,24}. Upper respiratory tract and lower respiratory tract infections, poor hygiene, introduction of foreign body in ear, smoking and misuse of antibiotics were found to be the major risk factors for otitis media. CSOM had several complications associated with this ailment such as irreversible local destruction of middle ear structures facial palsy and serious intracranial and extracranial complications are seen by otologists, pediatricians and general practitioners²⁵.

These results underscore the need for ongoing microbial surveillance and revision of empirical treatment guidelines based on local data²⁵.

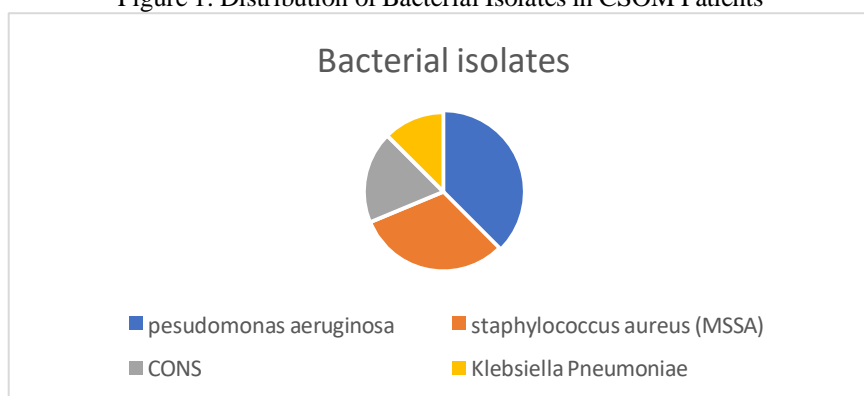
CONCLUSION

From current research, it has been speculated that the majority of the organisms showed resistance towards regularly used cell wall inhibitors such as penicillin group of drugs and cephalosporins. Thus, the clinician should have awareness of the

fact that the antibiotic susceptibility pattern of the CSOM cause organisms to keep changing and this variation is got worsen with inappropriate use of antibiotics, which is capable of creating multidrug resistance among the organisms; thus making the management of CSOM even more difficult. CSOM remains a significant chronic infectious disease with global implications on public health. A patient with persistent upper respiratory tract infection with pain in the ear has the highest chance of developing otitis media. If failed to treat timely can lead to severe complications. Understanding its microbiology, and associated complications is essential for effectively managing and preventing long-term sequelae. The complications of CSOM do affect the cognitive and educational development of the child as well as long-term effects on the child's communication. Further research is needed to enhance our knowledge of CSOM and develop targeted interventions. The findings of the present research will immensely contribute to the effective management of CSOM. Furthermore, a future study *Pseudomonas aeruginosa* and *Staphylococcus aureus* are the leading causes of CSOM in our setting. Antibiotic resistance is a growing challenge, making culture and sensitivity testing essential for effective treatment. Regular monitoring of local bacterial trends is necessary for developing antibiotic policies and avoiding complications in CSOM patients.

Figures

Figure 1: Distribution of Bacterial Isolates in CSOM Patients



A pie chart can be created here to visually represent the percentage distribution of bacterial isolates.

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