Original Research Paper

Volume - 16 | Issue - 05 | May - 2026 | PRINT ISSN No. 2249 - 555X | DOI : 10.36106/ijar

Otorhinolaryngology

BACTERIOLOGICAL PROFILE AND ANTIMICROBIAL SUSCEPTIBILITY PATTERN IN CHRONIC SUPPURATIVE OTITIS MEDIA: A CROSS-SECTIONAL STUDY

Dr Shubhanki Gupta	Junior Resident, MGM Medical College and Hospital, Navi Mumbai
Dr Kalpana Rajivkumar	Professor and HOD, MGM Medical College and Hospital, Navi Mumbai
Dr Jubina P P	Assistant Professor, MGM Medical College and Hospital, Navi Mumbai
Dr Swapnil Gosavi	Associate Professor, MGM Medical College and Hospital, Navi Mumbai

ABSTRACT Inappropriate antibiotic usage and poor patient compliance have contributed to evolving antimicrobial resistance among pathogens causing chronic suppurative otitis media (CSOM), necessitating periodic evaluation of microbial profiles and their susceptibility patterns [1,4]. A hospital-based cross-sectional study was conducted over three months, including 60 clinically diagnosed CSOM cases attending the Otorhinolaryngology department. Ear discharge samples were collected under aseptic precautions and subjected to aerobic and anaerobic culture, and antimicrobial susceptibility testing was performed using the Kirby–Bauer disc diffusion method. Of 60 cases, 46 (76.7%) showed positive microbial growth, with Pseudomonas aeruginosa as the predominant isolate, followed by Staphylococcus aureus, consistent with previous studies [4,8]. Staphylococcus aureus demonstrated the highest sensitivity to erythromycin, followed by cotrimoxazole and ampicillin, while maximum resistance was observed to ciprofloxacin and amoxicillin. Pseudomonas aeruginosa showed maximum sensitivity to piperacillin, followed by gentamicin and amikacin, moderate sensitivity to ceftazidime, and resistance to carbenicillin. The increasing resistance to ciprofloxacin, despite its widespread use as a topical agent, highlights the need for routine microbiological evaluation and formulation of local antibiotic policies to ensure rational therapy and limit antimicrobial resistance in CSOM [1,6].

KEYWORDS :

INTRODUCTION

Chronic Suppurative Otitis Media (CSOM) is a persistent inflammatory disorder of the middle ear cleft, characterised by continuous or intermittent ear discharge through a perforated tympanic membrane. It represents a chronic infective process associated with irreversible pathological changes involving the middle ear and mastoid cavity, ranging from simple mucosal inflammation to more aggressive disease with bone erosion and complications [1,3].CSOM continues to be a significant public health problem, particularly in developing countries, due to its substantial impact on both individuals and healthcare systems. The condition directly leads to conductive hearing loss, thereby affecting communication and quality of life, while indirectly increasing healthcare burden through repeated hospital visits, prolonged antibiotic use, and the need for surgical interventions [2]. From a pathophysiological perspective, CSOM is characterised by a continuous cycle of infection, inflammation, and tissue damage. Chronic infection results in mucosal oedema, impaired mucociliary clearance, and structural alterations that favour microbial persistence. One of the key factors contributing to the chronic and recurrent nature of the disease is the formation of bacterial biofilms. These biofilms act as protective barriers, enabling microorganisms to evade host immune responses and reducing the effectiveness of antimicrobial agents, thereby promoting resistance and recurrent infections [7]. Microbiological evaluation plays a crucial role in the management of CSOM. Analysis of ear discharge provides valuable insight into the underlying microbial flora and helps guide targeted antimicrobial therapy. Identification of causative organisms along with their antibiotic susceptibility patterns is essential for optimising treatment, reducing therapeutic failures, and limiting the development of antimicrobial resistance (AMR) [4,6].In view of the increasing prevalence of resistant organisms and the challenges posed by biofilm-associated infections, continuous surveillance of bacteriological profiles and antibiotic sensitivity patterns is essential. Therefore, the present study was undertaken to analyse pus aspirates from patients with CSOM to identify the predominant microbial isolates and evaluate their antimicrobial susceptibility patterns. The findings aim to support rational antibiotic use, strengthen antibiotic stewardship strategies, and improve clinical outcomes in patients with this chronic condition.

MATERIALS AND METHODS

This retrospective cross-sectional study was conducted on patients clinically diagnosed with CSOM who presented to the Department of Otorhinolaryngology and Head and Neck Surgery at MGM Medical College and Hospital, Navi Mumbai. A total of 60 patients were included in this study.

Inclusion Criteria

1. Patients of all ages diagnosed with CSOM based on clinical evaluation.
2. Patients who had undergone pus aspiration and subsequent microbiological testing.
3. Patients with the availability of complete medical records, including culture and antimicrobial susceptibility results.

Exclusion Criteria

1. Patients who had received antibiotic treatment within two weeks before sample collection.
2. Patients having a history of immunocompromised conditions, such as HIV or diabetes.
3. Patients with incomplete medical records or inadequate pus samples were not available for microbiological analysis.

Sample Collection: Ear discharge was collected using a cotton swab under aseptic precautions after mopping out excess discharge from the external auditory canal. The sample was then immediately placed in a sterile transport medium and sent to the microbiology laboratory for analysis. Antimicrobial susceptibility profile of the bacterial isolates to the commonly used antibiotics was determined by the Kirby–Bauer disc diffusion method. For each isolate, the zones of inhibition were measured and interpreted as susceptible, intermediate, or resistant.

RESULTS

The age of the patients ranged from 10 to 70 years, with a male predilection. Maximum incidence was observed during the second decade of life, and the incidence decreased as the age advanced.

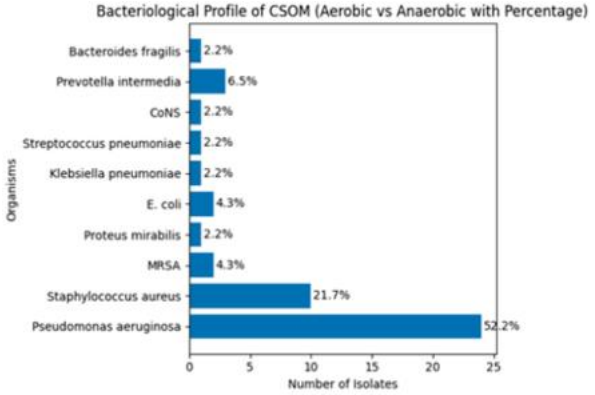
SEX	MALE	FEMALE
N	34	26

AGE	10-20	21-30	31-40	41-50	51-60	61-70
N	6	16	19	9	6	4

Out of 60 cases, 46 were culture positive. The bacteriological profile in this study showed aerobic growth in 42(91.30%) cases and anaerobic growth in 4(8.69%) cases. All the cases had mono-microbial growth. The most common aerobic organism isolated was *Pseudomonas aeruginosa,* and the most common anaerobic organism isolated was *Prevotella intermedia.* Also, out of 46 isolates identified, 37(80.43%) cases were of gram-negative organisms and 9(19.56%) cases were of gram-positive organisms

Among the gram-positive organisms, *Staphylococcus aureus* showed maximum sensitivity to erythromycin, followed by cotrimoxazole and

ampicillin. Maximum resistance was observed for ciprofloxacin, followed by amoxicillin-clavulanate. Among gram-negative organisms, *Pseudomonas aeruginosa* showed maximum sensitivity to piperacillin, followed by gentamicin and amikacin, moderate sensitivity to ceftazidime, and resistance to carbpenicillin.



DISCUSSION

The present study highlights the complex bacteriological profile and evolving antimicrobial susceptibility patterns in Chronic Suppurative Otitis Media (CSOM). The majority of patients belonged to the 21–40-year age group, indicating higher disease prevalence among young adults, which is consistent with previous reports [4,8]. A culture positivity rate of 76.7% was observed, with aerobic organisms accounting for the majority of isolates (91.3%), while anaerobic organisms constituted a smaller proportion. Gram-negative bacteria predominated over gram-positive organisms, with *Pseudomonas aeruginosa* identified as the most common pathogen, followed by *Staphylococcus aureus*.

The predominance of *Pseudomonas aeruginosa* may be explained by its minimal nutritional requirements, intrinsic resistance to multiple antibiotics, and ability to produce virulence factors such as pyocyanin and bacteriocins. Additionally, its capacity to adhere to damaged epithelium through pili and produce enzymes such as proteases and lipopolysaccharides enhances its survival and pathogenicity within the middle ear environment [5,6]. These characteristics enable it to evade host immune responses and persist as an opportunistic pathogen in chronic infections.

Staphylococcus aureus was the second most commonly isolated organism and demonstrated high sensitivity to erythromycin and cotrimoxazole, with moderate sensitivity to ampicillin. Ciprofloxacin, a widely used topical agent due to its availability and low ototoxicity, has traditionally been effective in CSOM management; however, the present findings indicate increasing resistance, which has also been reported in recent studies [4,6].

Although anaerobic organisms were isolated less frequently, their role in sustaining chronic infection should not be underestimated. Variations in their isolation rates across studies may be attributed to differences in sampling techniques, timing of specimen collection, and prior antibiotic exposure [7].

CONCLUSION

Chronic Suppurative Otitis Media (CSOM) remains a common condition with considerable clinical significance, particularly in developing countries where the disease burden is higher [1,2]. The findings of the present study demonstrate a predominance of aerobic organisms, with *Pseudomonas aeruginosa* emerging as the most frequent isolate, followed by *Staphylococcus aureus*, which is consistent with previously reported literature [4,8]. The detection of methicillin-resistant *Staphylococcus aureus* further underscores the growing challenge of antimicrobial resistance in the management of CSOM [6]. Although anaerobic organisms were isolated less frequently, their role in maintaining chronic infection cannot be overlooked [7]. These observations highlight the necessity of routine microbiological evaluation, including culture and antimicrobial susceptibility testing, to guide appropriate treatment strategies. Empirical antibiotic therapy without microbiological evidence may lead to suboptimal outcomes and contribute to the development of resistance. Therefore, the adoption of targeted, culture-directed antibiotic therapy is essential for improving clinical outcomes, preventing complications, and supporting global efforts toward antimicrobial stewardship, in accordance with recommendations from the World Health Organisation.

REFERENCES

1. Acuin J. Chronic suppurative otitis media. BMJ Clin Evid. 2007;2007:0507. [PMC free article] [PubMed] [Google Scholar]
2. Adhikari P, Joshi S, Baral D, Kharel B. Chronic suppurative otitis media in urban private school children of Nepal. Braz J Otorhinolaryngol. 2009;75:669–672. doi: 10.1016/S1808-8694(15)30516-4. [DOI] [PMC free article] [PubMed] [Google Scholar]
3. Varshney S, Nangia A, Bist S, Singh R, Gupta N, Bhagat S. Ossicular chain status in chronic suppurative otitis media in adults. Indian J Otolaryngol Head Neck Surg. 2010;62:421–426. doi: 10.1007/s12070-010-0116-3. [DOI] [PMC free article] [PubMed] [Google Scholar]
4. Wasihun AG, Zemene Y. Bacterial profile and antimicrobial susceptibility patterns of otitis media in Ayder Teaching and Referral Hospital, Mekelle University, Northern Ethiopia. Springerplus. 2015;4:701. doi: 10.1186/s40064-015-1471-z. [DOI] [PMC free article] [PubMed] [Google Scholar]
5. Sena RB, Gandham P. Antibiotic susceptibility pattern among CSOM patients attending AIMSR. Natl J Integr Res Med. 2016;7:108–111. [Google Scholar]
6. Okesola A, Fasina O. Trends in the resistance pattern of bacterial pathogens of otitis media in Ibadan, Nigeria. Afr J Clin Exp Microbiol. 2012;13:416–450. [Google Scholar]
7. Brook I, Frazier EH. Microbial dynamics of persistent purulent otitis media in children. J Pediatr. 1996;128:237–240. doi: 10.1016/S0022-3476(96)70397-9. [DOI] [PubMed] [Google Scholar]
8. Yogeesha B, Venkatesha B. Study of bacteriological profile and antibiotic sensitivity pattern in chronic otitis media-mucosal type in a tertiary care hospital. IOSR J Dent Med Sci. 2016;1:82–86. [Google Scholar]
9. Smith JA, Danner CJ. Complications of chronic otitis media and cholesteatoma. Otolaryngol Clin North Am. 2006;39:1237–1255. doi: 10.1016/j.otc.2006.09.001. [DOI] [PubMed] [Google Scholar]