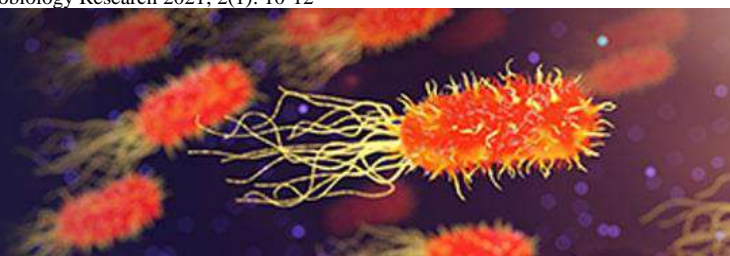


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Bacteriological Study on Chronic Suppurative Otitis Media in a tertiary care hospital

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Abstract

Chronic suppurative otitis media (CSOM) is a common hearing condition that can lead to a variety of consequences if not treated effectively. As a result, the study's goal is to identify the bacterial isolates responsible for CSOM and investigate their antimicrobial susceptibility pattern. The research was conducted over a seventeen-month period in a north coastal region of Andhra Pradesh, from December 2019 to May 2021. The study comprised 150 CSOM patients with unilateral or bilateral discharge who attended the ENT Out Patient Department at GEMS Hospital, Ragolu, Srikakulam. Swabs were collected and immediately transported to the microbiology laboratory to be processed. Standard procedures were used to identify bacterial isolates, and antibiotic susceptibility testing was performed. The most common organism isolated was *Staphylococcus aureus*, followed by *Pseudomonas* sp., *Proteus* spp., *Klebsiella pneumoniae*, and *Escherichia coli*. The current investigation aided in determining the bacteriological profile of CSOM patients. Because of the evolution of resistant organisms, empirical therapy may not be beneficial in all situations. As a result, it is recommended that an antibiogram be performed prior to beginning medication.

Keywords: CSOM, Bacteriology, Antibiotic, Microbes

Introduction

Chronic Suppurative Otitis Media is a long-term inflammation of the tympanic membrane caused by a variety of factors. It is well-known for its recurrence and persistence of infection. It is a common cause of deafness and can potentially result in permanent perforation^[1]. CSOM can arise for a variety of causes. The condition is generally caused by upper respiratory viral infections, which are then followed by an invasion of pyogenic organisms^[2]. Several investigations have revealed that the most prevalent organisms recovered from CSOM patients are *Pseudomonas* sp., *Staphylococcus aureus*, *Klebsiella pneumoniae*, and *Proteus* spp... CSOM can have serious side effects such as intra and extracranial problems, which can be fatal. Because of inadequate hygiene standards and a lack of health knowledge, the prevalence of CSOM is growing in underdeveloped nations. Because of the development of antibiotics, the consequences of CSOM have decreased to a more significant extent.

However, irrational antibiotic usage has resulted in the creation of antibiotic-resistant microbes. As a result, this study is being conducted to learn more about the bacterial aetiology of CSOM and their antibiotic susceptibility pattern. This information is critical for doctors in order to handle patients appropriately and to avoid or reduce the incidence of problems. The patients will be treated when the antibiotic sensitivity pattern has been studied.

Materials and Methods

From December 2019 to May 2021, this research was conducted in a tertiary care facility in Andhrapradesh's north coastal area. The current study comprised 150 individuals with CSOM symptoms who were not taking antibiotics. Under rigorous aseptic measures, ear discharge was collected from them using two sterile cotton swabs to aid the aural speculum and promptly processed in the microbiology laboratory. The first swab was utilised for direct Gram staining, while the second swab was cultured in nutritional agar, blood agar, and Mac Conkey agar plates for 24 – 48 hours at 37 degrees Celsius. The isolates were identified based on their cultural characteristics, Morphology and biochemical reactions Kirby Bauer's Disc Diffusion technique were used to determine the antibiotic susceptibility of the organisms identified. The National Committee for Clinical Laboratory Standards recommends

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This approach. After overnight incubation at 37 degrees Celsius, the plates were assessed by measuring the antibiotic discs' zone of inhibition. The study was carried out in a total of 150 patients comprising 66 males and 84 females.

Table No 1: Sex distribution of cases

Sex	Number	percentage
Male	66	44%
Female	84	56%

Table No 2: Organisms isolated from culture

Micro-organism	Number of cases	percentage
Staph. aureus	45	30
Pseudomonas aeruginosa	42	28
Proteus spp.	36	24
Klebsiella pneumoniae	20	13.4
Escherichia coli	7	4.6

Nine samples were culture negative. 16.9% of the samples showed mixed growth.

The most common organism isolated in this study was *Staphylococcus aureus* (30%) followed by *Pseudomonas* species (28%). *Proteus spp.*, *Klebsiella pneumoniae* and *Escherichia coli* were other organisms isolated. Among the *Staphylococcus aureus*, 11% were Methicillin resistant *Staphylococcus aureus* (MRSA). The organism was highly sensitive to Vancomycin, Piperacillin/Tazobactam and Aminoglycosides.

Pseudomonas spp. was 96.6 % sensitive to Imipenem. *Pseudomonas* sp. showed 92.9% susceptibility to amikacin, 68.9% susceptibility to Piperacillin/Tazobactam, 63.0% susceptibility to Levofloxacin, 58.2% susceptibility to Ceftriaxone. *Escherichia coli* and *Klebsiella pneumoniae* were 100% susceptible to Imipenem and 60 – 80% susceptible to amikacin, amoxicillin and 20-60% susceptible to cephalosporins.

Discussion

CSOM is a common ear infection that is more frequent in rural areas and among people with lower socioeconomic level [3, 4]. It is a persistent infection of the middle ear that might result in deafness. Poorly treated or untreated CSOM can result in a variety of consequences, including mastoiditis, meningitis, and brain abscess. As a result, identifying the causal organism is required for appropriate therapy of CSOM patients. The majority of the patients in our study were under the age of 20, which is consistent with earlier research [5, 6]. In contrast, Loy *et al* showed the increased prevalence of CSOM in 30- 40 years age in his study [7].

In our study, 44 percent of the participants were men and 56 percent were women. Thus, females were impacted more in our study, which is consistent with Loy *et al* [7], but differs from Ahmed *et al* [8], who found that CSOM impacted 57.3 percent of men and 42.7 percent of females. Similar to the earlier work by Agarwal *et al* [9], monomicrobial development was seen in 85 percent of patients. Nine of the samples in our analysis showed no growth. This is consistent with the findings of Vijaya *et al* [10], who discovered 7.28 percent sterile samples in their investigation, although Fatma *et al* [11] (16.9 percent) and Chakraborty *et al* (12.6%) discovered a greater number of culture negative samples in their investigations.

Staphylococcus aureus (28.2 percent) was the most common

bacteria recovered in our investigation, followed by *Pseudomonas* sp (28 percent). This is consistent with prior research [13, 14]. Taneja Mansi *et al* [15] isolated *S. aureus* as the most prevalent organism in their investigation, however the proportion of isolation (33.3%) was higher in their study than in ours. *S. aureus* was the most prevalent isolate in Kuchal *et al*'s [16] investigation of 75 patients, followed by *Pseudomonas* sp. Shyamala *et al* [17] discovered that these two organisms were the most often isolated from otitis media patients. *Pseudomonas* was shown to be the most prevalent bacterium identified from CSOM patients in several earlier research.

Staphylococcus aureus and *Pseudomonas* sp. accounted for around 52.4 percent of cases in our investigation, which is consistent with the findings of Aslam *et al* [23]. *Proteus* spp. (24 percent) was the other prevalent pathogen among the gramme negative pathogens, followed by *Klebsiella* (13.4 percent) and *Escherichia coli* (4.6 percent). All of the isolated organisms were tested for antibiotic susceptibility. Amikacin was shown to be effective against the majority of the isolates. However, over 85 percent of the organisms tested positive for amoxicillin resistance, which is consistent with the findings of Chakraborty *et al* [12] (95.4 percent) and Malkappa *et al* [21]. (90 percent). Vancomycin was discovered to be particularly effective against *Staphylococcus aureus*, which was then followed by bicillin.

Conclusion

In our investigation, *Staphylococcus aureus* and *Pseudomonas* sp. were revealed to be the most prevalent cause of CSOM. These organisms have been discovered to be less vulnerable to commonly used medications such as ciprofloxacin and cephalosporins. Also, the resistance pattern of microorganisms is always evolving. As a result, the frequent use of topical antibiotics as empirical treatment for each instance of CSOM must be reconsidered, and antibiotics should be used with caution. After a correct identification of the causal organism and its antimicrobial susceptibility pattern, appropriate antimicrobial medications should be provided. Patients should also be instructed to take the medications for the whole term indicated without discontinuing.

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