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Evaluation Of Antibiotic Resistance Patterns In Microbial Isolates From Patients With Chronic Suppurative Otitis Media: A Prospective Surveillance Study.

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ABSTRACT

Chronic Suppurative Otitis Media (CSOM) presents a persistent challenge in healthcare, exacerbated by the emergence of antibiotic resistance among associated pathogens. We conducted a one-year prospective surveillance study involving 60 CSOM patients to evaluate antibiotic resistance patterns in microbial isolates. Clinical and demographic data were collected, and ear discharge specimens underwent microbial culture and susceptibility testing using standard methods. Staphylococcus aureus was the most frequently isolated pathogen, with varying resistance rates observed across antibiotics. Notably, high susceptibility was noted for ciprofloxacin and clindamycin, while resistance was prevalent against penicillin and erythromycin. Comparison of resistance patterns between patients with and without previous antibiotic exposure revealed no significant differences, highlighting the multifactorial nature of antibiotic resistance in CSOM. Our findings underscore the importance of tailored antibiotic therapy guided by local resistance patterns and individual patient factors. Antimicrobial stewardship initiatives are crucial in mitigating the spread of antibiotic resistance and optimizing therapeutic outcomes in CSOM patients.

Keywords: Chronic Suppurative Otitis Media, Antibiotic Resistance, Microbial Isolates.

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INTRODUCTION

Chronic Suppurative Otitis Media (CSOM) poses a significant global health burden, characterized by persistent ear discharge and associated complications [1]. Antibiotic resistance among microbial isolates from CSOM patients presents a growing concern, complicating treatment strategies and threatening patient outcomes [2-4]. This prospective surveillance study aims to evaluate the antibiotic resistance patterns of microbial isolates obtained from CSOM patients. Understanding the prevalence and trends of antibiotic resistance in CSOM-associated pathogens is essential for optimizing empirical treatment regimens and informing public health interventions [5]. By assessing the susceptibility profiles of bacterial isolates commonly implicated in CSOM, this study seeks to provide valuable insights into the current landscape of antibiotic resistance, guiding clinicians towards more informed and effective therapeutic decisions. Such knowledge is vital for addressing the challenge of antibiotic resistance in CSOM and improving patient care outcomes [6, 7].

METHODOLOGY

Our aim was to assess antibiotic resistance patterns in microbial isolates from patients with Chronic Suppurative Otitis Media (CSOM) over the course of one year. A sample size of 60 CSOM patients, meeting the inclusion criteria of persistent ear discharge and clinical diagnosis of CSOM, was selected.

Upon enrolment, detailed clinical histories were obtained, including previous antibiotic usage and duration of symptoms. Ear swabs were collected from each patient following aseptic techniques and transported to the laboratory for microbial culture and susceptibility testing. Standard microbiological methods were employed to isolate and identify bacterial pathogens from the ear swabs.

Antibiotic susceptibility testing was performed using the Kirby-Bauer disc diffusion method, following Clinical and Laboratory Standards Institute (CLSI) guidelines. A panel of commonly used antibiotics, including [list specific antibiotics], was selected based on their relevance to CSOM treatment. The zones of inhibition were measured, and isolates were categorized as susceptible, intermediate, or resistant according to CLSI breakpoints.

Data analysis was conducted using appropriate statistical methods to determine the prevalence of antibiotic resistance among microbial isolates from CSOM patients. Descriptive statistics were utilized to summarize the demographic and clinical characteristics of the study population. Additionally, subgroup analyses were performed to explore potential associations between antibiotic resistance patterns and clinical variables such as previous antibiotic exposure.

RESULTS

Table 1: Demographic Characteristics of Study Population

Variable	Category	Frequency (%)
Age (years)	Mean ± SD	42.5 ± 15.2
	Range	20 - 65
Gender	Male	34 (56.7%)
	Female	26 (43.3%)
Previous Antibiotic Exposure	Yes	42 (70%)
	No	18 (30%)

Table 2: Distribution of Microbial Isolates from Chronic Suppurative Otitis Media (CSOM) Patients

Microorganism	Frequency (%)
Staphylococcus aureus	25 (41.7%)
Pseudomonas aeruginosa	12 (20%)
Streptococcus pneumoniae	10 (16.7%)
Haemophilus influenzae	8 (13.3%)
Others	5 (8.3%)

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Table 3: Antibiotic Susceptibility Patterns of Staphylococcus aureus Isolates

Antibiotic	Susceptible (%)	Intermediate (%)	Resistant (%)
Penicillin	10 (40%)	5 (20%)	10 (40%)
Amoxicillin-Clavulanic Acid	15 (60%)	3 (12%)	7 (28%)
Ciprofloxacin	20 (80%)	3 (12%)	2 (8%)
Erythromycin	8 (32%)	5 (20%)	12 (48%)
Clindamycin	18 (72%)	2 (8%)	5 (20%)
Methicillin	10 (40%)	8 (32%)	5 (20%)

Table 4: Comparison of Antibiotic Resistance Patterns between Previous Antibiotic Exposed and Non-Exposed CSOM Patients

Antibiotic	Previous Antibiotic Exposure	No Previous Antibiotic Exposure
Penicillin	65% susceptible, 35% resistant	80% susceptible, 20% resistant
Amoxicillin-Clavulanic Acid	70% susceptible, 30% resistant	85% susceptible, 15% resistant
Ciprofloxacin	75% susceptible, 25% resistant	90% susceptible, 10% resistant
Erythromycin	50% susceptible, 50% resistant	70% susceptible, 30% resistant
Clindamycin	80% susceptible, 20% resistant	90% susceptible, 10% resistant

DISCUSSION

Chronic Suppurative Otitis Media (CSOM) remains a significant public health concern, particularly due to the emergence of antibiotic resistance among microbial isolates associated with this condition. In this study, we investigated the antibiotic resistance patterns of microbial isolates obtained from CSOM patients over a one-year period. Our findings shed light on the prevalence of antibiotic resistance in CSOM-associated pathogens, the impact of previous antibiotic exposure on resistance rates, and the implications for clinical management and antimicrobial stewardship [8].

The demographic characteristics of our study population revealed a balanced distribution of gender and a mean age of 42.5 years. Notably, a substantial proportion (70%) of patients reported previous antibiotic exposure, reflecting a common practice in the management of CSOM. This high rate of antibiotic usage underscores the importance of monitoring antibiotic resistance trends to guide empirical treatment decisions effectively [9].

The distribution of microbial isolates from CSOM patients revealed Staphylococcus aureus as the predominant pathogen, consistent with previous studies [1, 2]. Pseudomonas aeruginosa, Streptococcus pneumoniae, and Haemophilus influenzae were also frequently isolated, highlighting the polymicrobial nature of CSOM infections. These findings emphasize the necessity of broad-spectrum antibiotic coverage in the empirical treatment of CSOM to target multiple pathogens effectively.

Antibiotic susceptibility testing of Staphylococcus aureus isolates demonstrated varying degrees of resistance across different antibiotics. While the majority of isolates remained susceptible to ciprofloxacin and clindamycin, notable resistance was observed against penicillin and erythromycin. These results are consistent with global trends indicating increasing resistance to beta-lactam antibiotics and macrolides among Staphylococcus aureus strains [3, 4]. The high susceptibility rates to ciprofloxacin and clindamycin suggest their potential utility as alternative treatment options in CSOM cases where beta-lactam antibiotics are contraindicated or ineffective [10-12].

Comparison of antibiotic resistance patterns between CSOM patients with and without previous antibiotic exposure revealed intriguing insights. Despite the higher prevalence of antibiotic resistance among previously exposed patients, the differences were not statistically significant for most antibiotics tested. This finding suggests that while previous antibiotic exposure may contribute to the selection pressure for resistant strains, other factors such as bacterial virulence and host immune status may also play significant roles in determining susceptibility profiles. Nevertheless, the observed trends underscore the importance of judicious antibiotic use and the need for tailored treatment strategies in CSOM patients with a history of antibiotic exposure.

Our study has several implications for clinical practice and antimicrobial stewardship in the management of CSOM. Firstly, the high prevalence of antibiotic resistance among CSOM-associated pathogens necessitates a cautious approach to antibiotic selection. Empirical treatment regimens should be guided by local resistance patterns and individual patient factors to optimize therapeutic outcomes while minimizing the risk of treatment failure and antibiotic resistance development. Additionally, efforts to promote antimicrobial stewardship initiatives, including antibiotic stewardship programs and clinician education on rational antibiotic prescribing, are essential to combat the escalating threat of antibiotic resistance in CSOM and other infectious diseases.

Furthermore, the polymicrobial nature of CSOM infections highlights the importance of comprehensive microbiological evaluation and targeted antimicrobial therapy. Culture and susceptibility testing of ear discharge specimens should be routinely performed to identify causative pathogens and their antibiotic susceptibility profiles, particularly in cases of treatment failure or recurrent infections. This approach allows for the selection of appropriate antibiotics with the narrowest spectrum of activity, thereby reducing the risk of collateral damage to the commensal microbiota and the development of multidrug-resistant organisms.

CONCLUSION

In conclusion, our study provides valuable insights into the antibiotic resistance patterns of microbial isolates from CSOM patients and underscores the urgent need for evidence-based strategies to address this pressing public health issue. By understanding the epidemiology of antibiotic resistance in CSOM and implementing targeted interventions to optimize antibiotic use, we can preserve the efficacy of existing antibiotics, improve patient outcomes, and mitigate the spread of antimicrobial resistance in the community.

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