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ORIGINAL RESEARCH

Assessment of bacteriological causes of CSOM and to know their antibiotic sensitivity pattern

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ABSTRACT

Background: A long-term infection of a portion or the entire middle ear cleft, chronic suppurative otitis media (CSOM) is characterized by ear drainage and a persistent perforation. The present study was conducted to assess bacteriological causes of CSOM and to know their antibiotic sensitivity pattern. **Materials & Methods:** 56 cases of CSOM of both genders were selected. In accordance with CLSI recommendations, antibiotic sensitivity testing was carried out using the Kirby-Bauer disc diffusion method. **Results:** Out of 56 patients, males were 32 and females were 24. Organisms were Staph. Aureus in 16, Pseudomonas in 13, Klebsiella in 9, Proteus mirabilis in 6, E. coliin 4 and no organism in 8 cases. Clinical symptoms were pain in 51 and purulent discharge in 36. SESwas upper in 8, middle in 12 and lower in 36 cases. Side was unilateral in 21, bilateral in 15 and both in 20 cases. The difference was significant (P< 0.05). Antibiotic susceptibility of Staphylococcus aureus and Pseudomonas against Amikacin was seen in 75% and 80%, Amoxicillin-clavulanate in 92% and 94%, Ceftriaxone in 91%and 90%, Ciprofloxacin in 84% and 77%, Cotrimoxazole in 55% and 67%, in Cefoperazone + sulbactam in 87% and 90%, Levofloxacin in 46% and 83%, Nitrofurantoinin 23%and 49%, Metronidazole in 51% and 78% and Piperacillin +tazobactam in 75%and 46% respectively. The difference was significant (P< 0.05). **Conclusion:** When it comes to ear infections, there may be differences in the pathogens and how susceptible they are. Proteus, E. coli, Klebsiella, S. aureus, and Pseudomonas were the most often isolated species in ear infections in our investigation.

Keywords: chronic suppurative otitis media, Staphylococcus aureus, Pseudomonas

INTRODUCTION

A long-term infection of a portion or the entire middle ear cleft, chronic suppurative otitis media (CSOM) is characterized by ear drainage and a persistent perforation. When a perforation's margins are covered in squamous epithelium and it stops hearing on its own, it is considered permanent.[1] Because of low socioeconomic levels, inadequate nutrition, and a lack of health education, the incidence of CSOM is higher in developing nations. It impacts all age groups and both sexes. In India, the total prevalence rate for rural and urban populations is 46 and 16 individuals per thousand, respectively. Additionally, it is the main factor contributing to hearing loss in people living in rural areas.[2]

There are roughly 72 cases per 1000 persons. The illness typically develops as a result of upper respiratory virus infections and pyogenic organism invasion. Numerous investigations have demonstrated that Pseudomonas species, Staphylococcus aureus, Klebsiella pneumoniae, and Proteus species are frequently isolated from patients of community-selected osteomyelitis (CSOM). It is estimated that between 13.8% and 36.2% of the population suffers from CSOM-related hearing impairment. Conductive hearing loss is the typical kind of hearing loss associated with this illness. Nonetheless, a number of researchers have noted that sensorineural hearing loss can happen simultaneously with or as a result of CSF manipulation.[3]

Numerous resistant bacterial strains that can cause both primary and postoperative infections have emerged as a result of the increasing use of antibiotics. Poor patient follow-up and the haphazard, indiscriminate administration of antibiotics have led to the persistence of low-grade infections.[4] The relevance of reevaluating the contemporary flora in CSOM has increased due to changes in the

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microbiological flora brought about by the development of sophisticated synthetic antibiotics. It is crucial for clinicians to consider the antibiotic sensitivity pattern of these newfound microbiota when devising a treatment plan for a patient who has chronically discharged from their ears.[5]The present study was conducted to assess bacteriological causes of CSOM and to know their antibiotic sensitivity pattern.

MATERIALS & METHODS

The present study was conducted on 56 cases of CSOMin Shyam shah medical college Rewaof both genders. All were informed regarding the study and their written consent was obtained. Data such as name, age, gender etc. was recorded. Before applying any topical treatment, the ear discharge was collected using sterile cotton wool swabs while adhering to aseptic precautions and with the help of an aural speculum. A smear was made on a glass slide using the initial swab in order to examine the smear directly using Gram's stain. In order to isolate aerobic bacteria, the second swab was treated. The swab was inoculated on Blood agar and MacConkey agar culture media. In accordance with CLSI recommendations, antibiotic sensitivity testing was carried out using the Kirby-Bauer disc diffusion method. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Total- 56		
Gender	**Male**	**Female**
Number	32	24

Table I shows that out of 56 patients, males were 32 and females were 24.

Table II Assessment of parameters

Parameters	Variables	Number	P value
Organism	Staph.Aureus	16	0.05
	Pseudomonas	13	
	Klebsiella	9	
	Proteus mirabilis	6	
	E. coli	4	
	No organism	8	
Clinical symptoms	Pain	51	0.04
	Purulent discharge	36	
SES	Upper	8	0.05
	Middle	12	
	lower	36	
Side	unilateral	21	0.73
	bilateral	15	
	Both	20	

Table II shows that organism were Staph. Aureus in 16, Pseudomonas in 13, Klebsiella in 9, Proteus mirabilis in 6, E. coli in 4 and no organism in 8 cases. Clinical symptoms were pain in 51 and purulent discharge in 36. SES was upper in 8, middle in 12 and lower in 36 cases. Side was unilateral in 21, bilateral in 15 and both in 20 cases. The difference was significant (P< 0.05).

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Graph I Assessment of parameters

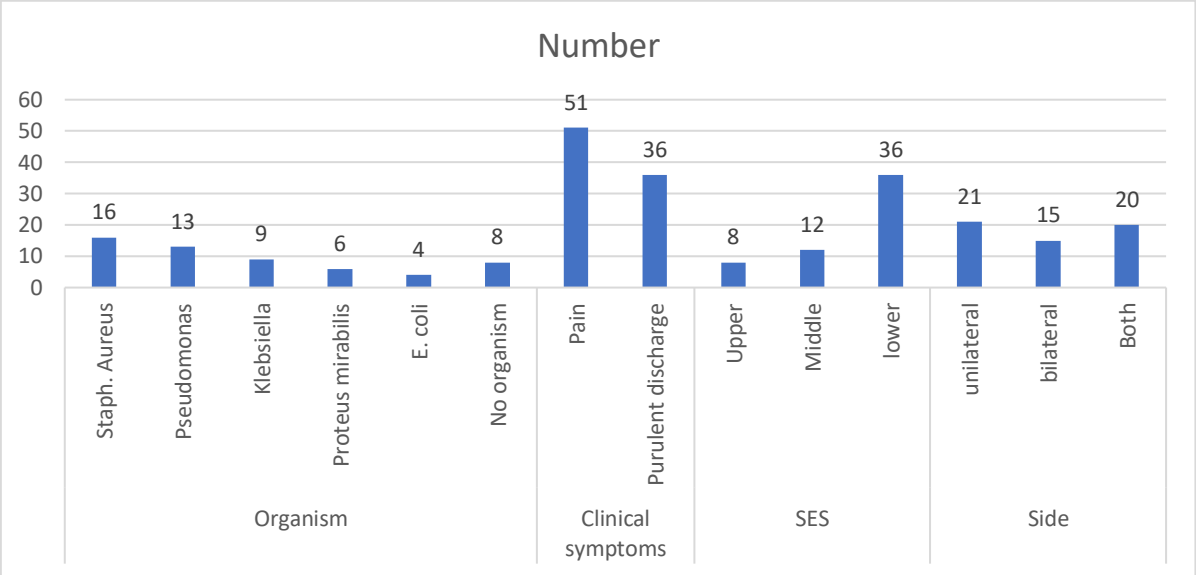
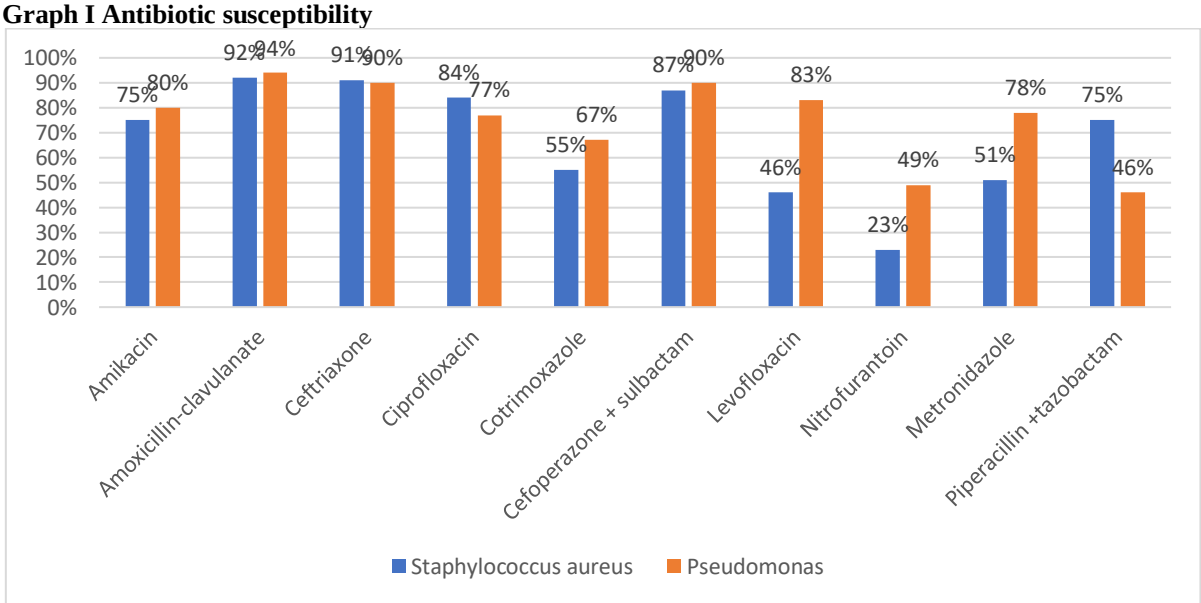


Table III Antibiotic susceptibility

Antibiotic	Staphylococcus aureus	Pseudomonas
Amikacin	75%	80%
Amoxicillin-clavulanate	92%	94%
Ceftriaxone	91%	90%
Ciprofloxacin	84%	77%
Cotrimoxazole	55%	67%
Cefoperazone + sulbactam	87%	90%
Levofloxacin	46%	83%
Nitrofurantoin	23%	49%
Metronidazole	51%	78%
Piperacillin +tazobactam	75%	46%

Table III, graph I shows that antibiotic susceptibility of Staphylococcus aureus and Pseudomonas against Amikacin was seen in 75% and 80%, Amoxicillin-clavulanate in 92% and 94%, Ceftriaxone in 91% and 90%, Ciprofloxacin in 84% and 77%, Cotrimoxazole in 55% and 67%, in Cefoperazone + sulbactam in 87% and 90%, Levofloxacin in 46% and 83%, Nitrofurantoin in 23% and 49%, Metronidazole in 51% and 78% and Piperacillin +tazobactam in 75% and 46% respectively. The difference was significant (P< 0.05).

Graph I Antibiotic susceptibility



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DISCUSSION

Patients with tympanic membrane perforations who, in spite of medical intervention, release mucoid material for six weeks to three months are classified as CSOM instances.[6] The WHO defines otorrhea as lasting only two weeks, while otolaryngologists typically use a broader time frame—more than three months of active illness, for example.[7] CSOM is a worldwide issue that impacts individuals of all ages, however it is most common in children under 7 years old because of their shorter, broader, and horizontal eustachian tubes. This is a poverty-related illness that is common in underdeveloped nations.[8] Untreated sore throat, low socioeconomic position, age, sloppy hygiene, upper respiratory tract infection, weakened immune system, environmental variables, nutritional issues, and facial abnormalities are the most likely risk factors listed. India belongs to high prevalence rategroup of CSOM.[9]The present study was conducted to assess bacteriological causes of CSOM and to know their antibiotic sensitivity pattern.

We found that out of 56 patients, males were 32 and females were 24. Samanth et al[10]evaluated the bacteriological causes of CSOM. Sixty patients of suppurative otitis media both unilateral and bilateral who present with active purulent discharge for to Ear, Nose and Throat (ENT) Department were selected. Of the 60 patients 64% were males with maximum incidence in 26-50 y age group.55% of patients were from lower Socio-economic status.Of the organisms isolated Staph. Aureus(35%) was most predominant followed by Pseudomonas(31%).All gram- positive organisms were susceptible to Co-trimoxazole, Vancomycin, Gentamycin and all Gram negative to Meropenam, Aztreonam, Piperacillin.

We found that organismwere Staph. Aureus in 16, Pseudomonas in 13, Klebsiella in 9, Proteus mirabilis in 6, E. coli in 4 and no organism in 8 cases. Clinical symptoms were pain in 51 and purulent discharge in 36. SES was upper in 8, middle in 12 and lower in 36 cases. Side was unilateral in 21, bilateral in 15 and both in 20 cases. Mansoor et al[11]found that overall microbiology of 267 samples from 263 patients was studied including 4 of bilateral discharge. Polymicrobial growth was present in 8 samples. A total of 275 bacterial isolates were studied. Pseudomonas aeruginosa (40%) and Staphylococcus aureus (30.9%) were the most common bacterial agents found in CSOM. MIC was done for Pseudomonas aeruginosa only as it was the commonest pathogen found in CSOM. Sensitivity pattern of Pseudomonas aeruginosa showed that amikacin was active against 96% of isolates followed by ceftazidime 89%, ciprofloxacin 85%, gentamicin 81%, imipenem 76%, aztreonam 42% and ceftriaxone 21%.

We found that antibiotic susceptibility of Staphylococcus aureus and Pseudomonas against Amikacin was seen in 75% and 80%, Amoxicillin-clavulanate in 92% and 94%, Ceftriaxone in 91%and 90%, Ciprofloxacin in 84% and 77%, Cotrimoxazole in 55% and 67%, in Cefoperazone + sulbactam in 87% and 90%, Levofloxacin in 46% and 83%, Nitrofurantoinin 23%and49%, Metronidazole in 51% and 78% and Piperacillin +tazobactam in 75%and 46% respectively. Loy et al[12]studied the microflora and the antibiograms of patients with chronic suppurative otitis media (CSOM) in Singapore. Ninety patients with CSOM were prospectively studied. They had chronic ear discharge and had not received antibiotics for the previous five days. Swabs were taken, and cultured for bacteria. Antibiotic testing was done using modified Kirby Bauer disk diffusion method. In addition to the usual antibiotics, the three most common topically available antibiotics (chloramphenicol, gentamicin and neomycin) were tested. There were 135 positive cultures for organisms from the 90 patients. The most common causal organisms isolated were Pseudomonas aeruginosa (33.3%) and Staphylococcus aureus (33.3%) followed by coagulase negative Staphylococcus (21.1%). Fungi accounted for 8.8% of isolates while 6.6% were anaerobes. Of the three antibiotics commonly available as topical eardrops, gentamicin has the highest susceptibility rate (82.6%), followed by neomycin (67.8%) and chloramphenicol (62.8%).

The shortcoming of the study is small sample size.

CONCLUSION

Authors found that when it comes to ear infections, there may be differences in the pathogens and how susceptible they are. Proteus, E. coli, Klebsiella, S. aureus, and Pseudomonas were the most often isolated species in ear infections in our investigation.

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