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A STUDY ON BACTERIOLOGICAL PROFILE AND THEIR ANTIBIOTIC SENSITIVITY PATTERN IN CHRONIC SUPPURATIVE OTITIS MEDIA

Microbiology

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ABSTRACT

Introduction: CSOM is a chronic inflammatory condition of mucoperiosteal lining of middle ear cavity. It is characterized by its persistence nature and post infectious life threatening complications .This study is conducted to identify the common bacterial pathogens associated with CSOM.
Material & Methods : ear discharge samples of about 112 patients were collected and the bacterial pathogens were isolated ,identified and their antimicrobial susceptibility pattern were analyze according to SOP.
Results: of the 112 samples processed, 80.36 % were culture positive of which 30%were Gram positives, 35.56% were Gram negatives coliforms and 34.44% were Non fermentors. Among Gram positives 14.81% were MRSA and 25% of Gram negatives were ESBL. Amikacin was the most sensitive antibiotic among all the clinical isolates.
Conclusion: Prompt and effective antibiotic therapy will help in the treatment and in preventing the development of treatment failures and complications.

KEYWORDS

CSOM, bacterial profile, antibiotic sensitivity.

INTRODUCTION:

Chronic suppurative otitis media (C.S.O.M.) is a chronic inflammation of the mucoperiosteal lining of the middle ear cavity, presenting with ear pain, persistent ear discharge of more than 2 weeks duration, hearing loss, vertigo with serious intracranial and extra cranial complications and is known for its persistence and recurrence even with proper management[1]. It is one of the major challenges encountered by pediatrician, otologist and general physician especially in developing countries where risk factors like overcrowding, malnutrition, recurrent upper respiratory infections and acute otitis media are common.

The prevalence of CSOM in South East Asia is about 5.2% in general population, affecting predominantly lower socioeconomic group [2].As per WHO ,a prevalence rate of 1-2%is considered as low and 3-6% as high prevalence rate for CSOM .The average prevalence rate of CSOM in India being 5.2% , it poses a major cause of preventable ,conductive deafness and especially if it occurs within 2 yrs of age, can have severe impact on speech ,education and behavioural development of the child [3],[4],[5].

A proper diagnosis with judicious use of antibiotics along with regular aural toileting can prove effective in preventing the chronicity and hence complications of this illness [6].Also improper and inadvertent usage of antibiotics can lead to the emergence of multi drug resistant organisms, identification of the pathogen with its antibiotic sensitivity pattern becomes absolutely necessary for curbing this chronic infection .This study is aimed at identifying the bacterial causes of CSOM and its antibiogram in our tertiary care hospital, thereby it may help in proper and effective management of the affected patients.

MATERIALS AND METHODS:

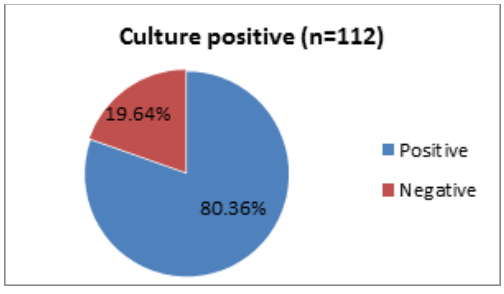
The study was conducted over a period of 6 months after getting Institutional Ethical Committee approval .All patients presented to our tertiary care hospital, with chronic ear discharge for more than 2 weeks duration with or without ear pain were included during the study period. Those patients who were on topical antibiotics for more than 5 days were excluded from the study .A total of 90 patients were included in the study after getting informed consent and assent .Two aural swabs were collected from the ear discharge using sterile cotton swabs and sent to the Microbiology laboratory as early as possible.

With one swab direct Gram stain was performed .The other swab was inoculated onto the surface of MacConkey agar and Blood agar .The culture plates were incubated overnight at 37^{0}C and the isolated organisms were identified by colony morphology and appropriate biochemical reactions according to Standard Operating Procedures (SOP).The Antibiotic susceptibility testing of the isolated pathogens were done by Modified Kirby Bauer disc diffusion method .The antibiotic sensitivity and the resistance pattern were then identified according to CLSI guidelines 2018 .The collected data were recorded and then analyzed statistically .

RESULTS:

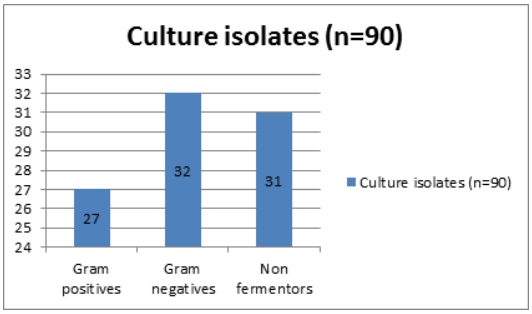
During the 6 months study period about 112 ear discharge samples from patients were collected and processed. Out of the total 112 patients, 63 (56.25 %) were males and 49 (43.75 %) were females .The age group of the study population ranges from 5yrs to 54 yrs.

Figure 1: Culture positivity among the study population (n=112)



Out of the total 112 samples processed, 90 (80.36 %) were culture positive and 22 (19.64 %) were culture negative (Figure 1).

Figure2: Isolates among the culture positives (n=90)



Out of the 90 culture positive samples, 27(30%) were Gram positives, 32 (35.56%) were Gram negatives-coliforms and 31 (34.44%) were Non fermentors (Figure 2).

Table 1: Distribution of isolated pathogens (n=90)

S.No.	Name of the organism	No	%
1.	Pseudomonas aeruginosa	28	31.11
2.	Staphylococcus aureus	24	26.67
3.	Klebsiella species	14	15.56
4.	Citrobacter koseri	10	11.11
5.	Proteus mirabilis	8	8.89
6.	Acinetobacter species	3	3.33
7.	Coagulase Negative Staphylococcus (CONS)	3	3.33
	Total	90	100

Among the 90 isolates, Pseudomonas was the most commonest isolate (28, 31.11 %) followed by Staphylococcus aureus (24, 26.67 %).Other common isolates were Klebsiella species (14, 15.56 %) and Citrobacter koseri (10, 11.11 %) (Table 1)

Table 2: Antibiotic sensitivity pattern of the isolated pathogen

Antibiotics	Gram positives (n=27)	Gram negatives (coliforms) (n=32)	Non fermentors (n=31)
Ampicillin	55.55 %	43.75%	35.48%
Cefoxitin	85.19%	-	-
Erythromycin	66.67%	-	-
Cefotaxime	77.77%	75%	-
Ceftazidime	-	75%	70.97%
Amikacin	85.19%	84.36%	74.19%
Gentamicin	51.85%	59.38%	48.38%
Ofloxacin	62.96%	53.12%	61.29%
Pipercillin Tazobactam	-	100%	96.77%
Vancomycin	100%	-	-
Imipenem	-	100%	96.77%
MRSA isolates	14.81%	-	-
ESBL isolates	-	25%	-

Amikacin was the most sensitive antibiotic among all the clinical isolates. All the Gram positive isolates showed 100% sensitivity to Vancomycin and all Gram negatives coliforms to Imipenem (100%). Non fermentors showed 96.77% sensitivity to Imipenem.14.81% of Gram positives were MRSA and 25% of coliform isolates were ESBL producers (**Table2)**

DISCUSSION:

CSOM is the most common cause of preventable conductive deafness and if treated promptly with appropriate antibiotics will prevent the occurrence of associated intracranial complications like mastoiditis, brain abscess and meningitis .This study is conducted to identify the bacterial pathogens associated with CSOM and to study its antimicrobial sensitivity pattern.

Among the 112 samples collected during the study period of 6 months, 90 (80.36 %) were culture positive and 22 (19.64 %) were culture negative .Varied studies conducted in India showed a culture positivity rate in CSOM ranging from 75.26% to 92.1%, which correlates well with our study [7], [8], [9] .Of the culture positives, 35.56% were Gram negatives (coliforms), 34.44% were Non fermentors and 30% were Gram positives. Similar study conducted by Arun Gopal Yewale *et al* [7] showed 37.81% of their isolates as Gram negatives, 41.46% as non fermentors and 20.73% of their isolates as Gram positives. Also study conducted by G.Jyothi lakshmi *et al* [9] revealed that 34.61% as Gram positives, 41.02% non fermentors and 19.23% as Gram negatives which correlates well with our study.

Among the isolates in our present study, Pseudomonas was the most commonly isolated organism (31.11%) followed by S.aureus (26.67%).Our results well correlated with other studies were Pseudomonas is the most common agent isolated from cases of CSOM (41%-31.4 %),followed by Staphylococcus aureus (28.2%- 26.6%) [7], [8],[9] .However study conducted by Dharmendra kumar *et al* [10] revealed Staphylococcus aureus(30.55%) as the most common organism followed by Pseudomonas aeruginosa(29.16%). The reason Pseudomonas being the most common isolate, is that they are resistant to majority of the disinfectant agents and can grow even in an environment with minimal growth requirements.

Among the Gram positive isolates, Vancomycin was the most sensitive drug (100%) followed by Amikacin (85.19%) and cefotaxime (77.77%). In Gram negative coliform isolates Imipenem was the most sensitive drug (100%) followed by Amikacin (84.36%). Among pseudomonas isolates Piperacillin-Tazobactam and Imipenem were the most sensitive drugs (96.77%) followed by Amikacin (74.19%). Our study results correlate well with other studies conducted by Bansal *et al* [11] and Chakraborty B *et al* [12].

About 14.81% of Staphylococcus isolates were Methicillin resistant strains (MRSA) and 25% of Gram negative coliform isolates were Extended spectrum beta lactamase producers (ESBL). Studies conducted by Upasana Bhumbla *et al* [8] and Chakraborty *et al* [12]has documented 35.7% and 34.4% of their isolates as MRSA, respectively which is high when compared to our study .Also they had documented that 27.7% and 28.6% of their Gram negative coliform isolates as ESBL which correlates well with our study . However due to the inadvertent use and over the counter issue of antibiotics ,these drug resistant strains can emerge ,spread and become a major challenge to the clinicians leading to treatment failure

CONCLUSION:

The present study has given knowledge about the common bacterial pathogens in CSOM and their antibiotic sensitivity pattern in our hospital setup .As prompt and proper use of antibiotics plays a key role in the treatment and in preventing the complications of CSOM, identification of pathogen with their antibiotic sensitivity pattern is of utmost important .This inturn will prevent the emergence of Multi Drug Resistant strains (MDRs),super infection ,complications and reduces the length of hospital stay and socioeconomic burden .

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