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Microbilogy of Chronic Suppurative Otatis Media in a Teriary care setup of Bihar state, India

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Abstract
Chronic Suppurative Otitis Media (CSOM) is one of the common hearing problems which can cause many complications if not treated properly. Hence, the aim of the study is to identify the bacterial isolates causing CSOM and to study their antimicrobial susceptibility pattern. The study was carried out in a Dept of E.N.T & Dept of Paediatric J.L.N.M.C hospital in Bhagalput from August 2018 to july 2019 for a period of 12 months. 100 patients of CSOM with unilateral or bilateral discharge attending the ENT Out Patient Department were included in the study. Swabs were taken and sent immediately to the microbiology laboratory and processed. Bacterial isolates were identified using standard methods and antibiotic susceptibility testing was done. Staphylococcus aureus was the most predominant organism isolated followed by Pseudomonas sp., Escherichia coli, Klebsiella sp.. The present study helped in knowing the bacteriological profile of the cases of CSOM. Empirical treatment may not be successful in all cases because of emergence of resistant organisms. Hence it is advisable to do antibiogram before starting the treatment.

I. Introduction

Chronic suppurative otitis media is defined as chronic inflammation of middle ear and mastoid cavity that may present with recurrent ear discharge or otorrhoea through a tympanic perforation. Incidence of this disease is higher in developing countries especially among low socioeconomic society because of malnutrion overcrowding, poor hygiene, inadequate health care, and recurrent upper respiratory tract infection . The urban to rural ratio of the disease is 1:2 and the poorer rural communities have highest prevalence. CSOM is usually classified into two types, tubotympanic and attico-antral depending on whether the disease process affects the pars tensa or pars flaccida of the tympanic membrane (TM). Tubotympanic is called as a safe type or benign type as there is no serious complication whereas, attico-antral is called as the unsafe or dangerous type because of associated complication and may be life threatening at times. Infection can spread from middle-ear to vital structures such as mastoid, facial nerve, labyrinth, lateral sinus, meninges and brain leading to mastoid abscess, facial nerve, paralysis, deafness, lateral sinus thrombosis, meningitis and intracranial abscess. Of all the complications, hearing loss associated with chronic ear discharge is nearly always significant, reported in 50% of cases and tending to be more severe than those reported in other types of otitis media. Complications associated with CSOM were frequent in pre-antibiotic era, however, the introduction of antibiotics gave clinicians a tool to be used even without the precise etiological diagnosis and the irrational use of antibiotics led to the emergence of multi-drug resistant bacterial strains and disease complication in return. Changes in bacterial flora in CSOM in the last decade have been confirmed and described by various authors. The treatment of CSOM is controversial and subject to change particularly in the developing countries, the prevalence and antibiogram of these organisms has been

reported to vary with time and geographical area as well as continent to continent, probably due to indiscriminate use of the antibiotics. Hence, the periodic update of prevalence and antibiogram of the etiological agents for CSOM would be helpful in therapy and management of patients.

The objective of this cross sectional prospective study was to determine the microbial diversity and the resistogram of aerobic bacterial isolates among the patients suffering from CSOM who attended ENT Department of our hospital, a tertiary care center located in Bhagalpur. To the best of our knowledge no such data is available from this part of India.

II. Material & method

This study was carried out in Dept of E.N.T and Dept of Microbilogy J.L.N.M.C.H BHAGALPUR from August 2018 to July 2019.Hundread patient with symptom of CSOM who were not on antibiotic were included in present study. Ear discharge were collected from them under srict aseptic precaution using two sterile swab with assist of aural speculum and processed immediately in microbiology laboratory. The first swab was used for direct Gram stain and the second swab was cultured in nutrient agar, blood agar and Mac conkey agar plates and incubated at 37^0 C for 24 – 48 hrs. The isolates grown were identified by their cultural characteristics, morphology and biochemical reactions. Antibiotic susceptibility testing of the organisms diagnosed was done by Kirby Bauer method in Muller Hinton agar. The plates were read after overnight incubation at 37^0 C by measuring the zone of inhibition around the antibiotic discs as per CLSI (Clinical Laboratory Standards Institute) guidelines.

III. Result

The out of total 100 ear swab processed microbial growth was seen in 93 while 7 sampel shown no growth. In 58 samples monomicrobial growth was seen whereas 33 samles showed polymicrobial growth . The mean age of patient was25.6 and peak incidence of CSOM was observed in age group between 0 year and 20 yrs.

S. No	Age	Total No of Case	percentage
1	0-1	2	2
2	1-10	45	45
3	11-20	30	30
4	21-30	11	11
5	31-40	5	5
6	41-50	3	3
7	51-60	1	1
8	61-70	3	3

Females (56%) were more commonly affected than males (46%) and the sex ratio female: male was 1.2:1.

Sex	**Number**	**%**
Male	46	46%
Female	56	56%

Micro organism	**No.of cases**	**Percentage %**
Staphylococcus aureus	45	40.99
Coagulase negative taphylococcus	12	10.90
Escherichia coli	6	5.45
Klebsiella pneumonia	8	7.27
Proteus sp.	6	5.45
Pseudomonas sp.	33	30

Five samples were culture negative 15 % of the samples showed mixed growth. The most common organism isolated in this study was *Staphylococcus aureus* (40.99%) followed by *Pseudomonas* species (30%). *Klebsiella pneumoniae*, *Escherichia coli*, *Proteus* sp, and Coagulase Negative Staphylococcus were the other organisms isolated.

Antimicrobial sensitivity testing was carried out for 90 isolates as 5 isolates were identified as Diptheroids. Results of sensitivity testing are . Amikacin (AK) (95.5%), ceftriaxone (CAX) (83.4%) Ciprofloxacin, Cefoperazone, and gentamicin (GEN) (82.7%) showed maximum activity to most of the isolates.

IV. Discussion

CSOM is one of the common ear infections which is more reported from rural population and lower socio economic status group. It is a chronic infection of middle ear which can even lead to deafness. Poorly treated or untreated CSOM can lead to many complications like mastoiditis, meningitis and brain abscess. Hence, diagnosis of the causative organism is necessary for proper management of CSOM cases. Early, microbiological diagnosis ensures prompt and effective treatment to avoid such complications. High prevalence of culture positive cases of CSOM (91.18%) was seen in the present study. We found that the CSOM was more prevalent in first and second decade of life and accounted for 51% of the cases. This finding corroborates well with the observations made by other researchers. High-prevalence of CSOM in children may be attributed to the fact that they are more prone to upper respiratory tract infections (URTIs). Furthermore, cold weather pre-disposes children to URTI. Poor hygiene and unorthodox approach to treatment like use of unconventional ear drops and concoctions such as oil and honey into the middle-ear may initiate the proliferation of opportunistic pathogens leading to blockage of eustachian tube (ET).

In our study, Majority of the patients were less than 20 years of age, which is in agreement with the previous literature. In contrast, Loy *et al* showed the increased prevalence of CSOM in 30 - 40 years age in his study. In our study, 45% were males and 55% were females. Thus females were affected more in our study which is in accordance with Loy *et al*, but differ

from Ahmed *et al* who showed 57.3% male and 42.7% female affected by CSOM.

Monomicrobial growth was seen in 85% of cases, which is similar to the previous study by Agarwal *et al* . In our study, five of the samples (6.25%) showed no growth. This is in accordance with Vijaya *et al* who found 5.28% sterile samples in their study whereas Fatma *et al* (16.9%) and Chakraborty *et al*] (12.6%) found higher percentage of culture negative samples in their studies.

The predominant organism isolated in our study was *Staphylococcusaureus* (40.99%) followed by *Pseudomonas* sp. (30%). This is inaccordance with the previous studies. Taneja Mansi *et al* had isolated *S.aureus* as the most common organism in their study, but the percentage of isolation (33.3%) was lesser when compared to our study. Kuchal *et al* also showed that in his study in 75 patients, *S. aureus* was the most common isolate followed by *Pseudomonas sp.*. Shyamala *et al* also has found out that these two were the predominant organisms isolated from the otitis media cases.

Many of the previous studies showed *Pseudomonas* to be the most common bacteria isolated from CSOM cases . But *Pseudomonas* sp. was the second most common organism in our study, isolated from 37.5% cases. This is similar to a study by Sharma *et al* who reported Pseudomonas in 36% cases. In our study, *Staphylococcus aureus* and *Pseudomonas sp.* together account for about 78.75% of cases, which is in accordance with the study by Aslam *et al* .

Coagulase negative Staphylococcus was the next common organism isolated. It is usually considered as commensal organism of the skin, but rarely can become an opportunistic pathogen. Among the gram negative pathogens, next to *Pseudomonas, Klebsiella pneumoniae*
(7.27%) was the other common pathogen followed by *Escherichia coliand Proteus sp.* (6% each).This is similar to study by Loy *et al* .

All the pathogenic strains isolated in the present series were tested against various antibiotics. Amikacin was found to be the most effective drug followed by Ciprofloxacin, Cefoperazone, Gentamicin, Cefotaxime and Amoxicillin. These findings are in accordance with those of Gulati et al (1997) and Mishra et al (1997). When the results of various workers were compared, one fact became obvious that the bacteriology and antibiotic sensitivity pattern of C.S.O.M. has been changing from time to time. The strains of yesterday which were sensitive to Streptomycin, Tetracycine and Chloramphenicol no longer exhibit the old sensitivity pattern today. These drugs have been replaced by Aminoglycosides, Quinolones and Cephalosporines.

V. Conclusion

CSOM like other chronic disease can limit an individual's employability and quality of life. *Staphylococcus aureus* and *Pseudomonas* sp. were found to be the common cause of CSOM in our study. Amikacin was the most effective antibiotic followed by Ciprofloxacin, Cefoperazone, Gentamicin, Cefotaxime, Amoxicillin . Also the resistance pattern of the micro organisms usually keeps changing. Hence, Routine use of topical antibiotics for any case of CSOM as empirical therapy must be reviewed and judicial use of antibiotics is recommended. Appropriate antimicrobial drugs should be prescribed after proper diagnosis of the causative organism and its antimicrobial susceptibility pattern. The patients should also be advised to take the drugs for the complete prescribed duration without stopping in the middle. This will not only help in minimising the complications, but also help in preventing the emergence of resistant strains

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