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Microbiological profile of chronic suppurative otitis media and invitro antibiotic sensitivity pattern in a tertiary care hospital.

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ABSTRACT:

Background: Chronic suppurative otitis media (CSOM) is one of the most common illness which requires medical attention. Knowledge of microorganisms commonly associated with CSOM and their drug susceptibility pattern will contribute to appropriate antibiotic usage and successful treatment.

AIM: This study was aimed to determine the causative microorganisms of CSOM and the antibiotic susceptibility pattern of isolated bacterial pathogens.

Materials and Methods: Aural swabs were collected from one hundred (100) clinically diagnosed CSOM patients from Dec2011-nov2012.Samples were processed and

identified by conventional methods and drug susceptibility testing was done by Kirby-Bauer's disc diffusion method according to CLSI guidelines.

Results: The most commonly isolated bacteria was *Pseudomonas* spp (43.2%) followed by *Staphylococcus aureus* (31%). Out of 13 fungal isolates seven were identified as Candida spp followed by Aspergillus spp (5) and one Absidia spp. Amikacin and Ciprofloxacin were found to be the most effective drugs showing maximum sensitivity against all bacterial isolates.

Conclusion: The study of microorganisms and the current drug sensitivity pattern helps the clinician to choose an appropriate treatment for patients with chronic suppurative otitis media.

INTRODUCTION:

Chronic suppurative otitis media(CSOM) is defined as persistent or intermittent infection of ear for more than three months duration where the infected discharge occurs through the perforated tympanic membrane caused by bacteria ,fungi and virus resulting in inflammation of mucosal lining that results in partial or total loss of the tympanic membrane and ossicles.[1]It is a persistent disease of the middle ear commonly follows a delay in the diagnosis or cases of acute otitis media treated inadequately[2].The incidence of Chronic suppurative otitis media(CSOM) is higher in developing countries where the living standards like health and sanitation facilities are low and lack of health education. According to World health organization in developing countries each year 51,000 children aged below five years die from complications of the otitis media(3) .The

feature which is common to all the cases of CSOM is the presence of perforated tympanic membrane. It is classified into two types, tubo tympanic and attico antral basing on the affection of pars tensa or the pars flaccida of the tympanic membrane. In cases of CSOM i.e. suppuration of more than 8 weeks duration is an important cause of preventable hearing loss in the developing world.([4])The complications associated with CSOM are tympanic membrane perforation, hearing impairment ,Middle ear granulation, facial nerve palsy, neck rigidity, death and severe disability occurs due to involvement of Central nervous system .Since CSOM can cause significant morbidity a knowledge of the pathogens responsible for CSOM and their antibiotic susceptibility pattern helps in the appropriate usage of antibiotics which can minimize the complications that may require surgery.

Materials& Methods:

One hundred clinically diagnosed cases of CSOM who are attending the ENT department are taken for the study. The ear discharge from the middle ear was collected by sterile swabs under aseptic conditions and sent to the department of Microbiology for bacterial and fungal culture. Samples were collected from those patients who had not taken any treatment either locally or systemic for the last 7 days. The sample was processed microscopically for the presence of pus cells, bacteria, and budding yeast cells and for hyphae. For culture sample was plated on 5% sheep Blood agar, MacConkey agar and SDA with chloramphenicol. The organisms were identified by morphology, cultural characteristics, and pigment production followed by

conventional biochemical tests. The antibiotic susceptibility testing of the bacterial isolates was done by Kirby-Baeur's disc diffusion method on Mueller Hinton agar according to CLSI guidelines ([5]).

Results & Discussion:

Chronic suppurative otitis media has received more attention because of its higher incidence and also due to increasing bacterial resistance to both topical and systemic antibiotics.

In this present study out of 100 cases of Chronic suppurative otitis media 87 pathogenic organisms were isolated. Patients ranged in age from <1yr-80 years with majority of them belonged to 11-20 yrs of age. This is in accordance to the study of Shrestha et al ([6]) where children and young adults are more commonly involved. Male predominance (58%) was observed when compared to females (42%).The most common type of tympanic membrane perforation was central (82%) followed by attic (12%) and then posterosuperior.(6%). Seventy four out of 100(74%) CSOM cases were showed positive bacterial growth. It has seen that most common organism isolated was *Pseudomonas aeruginosa* followed by *Staphylococcus aureus* among bacterial causes. Osazuwa F et al([7])found that *Pseudomonas aeruginosa* (28.3%) was the predominant bacteria followed by *Staphylococcus aureus*(21.0%).Similarly *Pseudomonas aeruginosa* was the most prevalent organism from CSOM cases reported in several studies.([8,9,10,11,12,13,14,15]) In contrast to our study some studies ([16,17,18]) reported *Staphylococcus aureus* to be the most predominant organism which is the second common isolate in our study followed by

Pseudomonas aeruginosa. Fungus was isolated in 13 number of cases, of which *Candida albicans* was the most common .Similar to our study Kumar&Seth et al ([19]) studied on100 cases showed that the positive fungal cultures were seen in 15 % of the cases. All the bacterial isolates were tested against various antibiotics to see the susceptibility pattern. Amikacin and ciprofloxacin were found to be the most effective drugs followed by ,piperacillin tazobactum .Mansoor T et al ([20]) showed that amikacin was the most effective against 96% 0f the isolates of *Pseudomonas*, followed by ceftazidime(89%).Kumar &Seth in their study found that the organisms showed maximum sensitivity to Ciprofloxacin & cefotaxime .

Most of the patients came with symptoms of aural discharge, decreased hearing and pain in the ear. Increased incidence of middle ear diseases in lower social status might be due to unhygienic surroundings, overcrowding, under nourishment, lack of resistance to upper respiratory tract infection. A study conducted by Waqar-uddin et al ([21]) concluded that higher prevalence of CSOM cases in low socioeconomic status due to their poor living condition. These patients are habituated to swim in the nearby ponds and rivers, causing entry of infected water in the ear. Other significant predisposing factors in our study include frequent upper respiratory tract infection, DNS with nasal obstruction, enlarged adenoid and history of trauma. Another study also showed that bathing in open ponds and overcrowding were some of the important predisposing factors causing ear diseases like CSOM & serous otitis media ([22]).

Conservative medical treatment was the first option for uncomplicated cases which include topical antibiotics and aural toilet.

To conclude Knowledge of the causative organisms and their resistance pattern is crucial for appropriate treatment to prevent morbidity and mortality. As CSOM cases are more common in the day to day practice the general practitioners should aware of the changing patterns of microbial etiology and their susceptibility pattern to antibiotics.

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Table-1

Distribution of CSOM cases according to age

Age(yrs)	Total no of cases (n=100)	Cases with positive result (n=87)
<1yr	4	1
1-10	17	16
11-20	32	29
21-30	22	19
31-40	8	6
41-50	6	7
51-60	4	2
61-70	5	5
71-80	2	2

Table -2

Bacteria isolated from CSOM cases

Bacreria isolated	Number(n=74)
Pseudomonas aeroginosa	32(43.2%)
Staphylococcus aureus	23(31%)
Klebsiella spp	6(8.1%)
Proteus spp	4(5.4%)
Escherichia coli	3(4%)
Streptococcus pyogenes	2(2.7%)
Citrobacter spp	2(2.7%)
Serratia spp	1(1.3%)
Acinetobacter spp	1(1.3%)

Table-3

Fungi isolated from CSOM cases

Fungi isolated	No(n=13)
Candida albicans	7(53.8%)
Aspergillus niger	3(23%)
Aspergillus flavus	1(7%)
Aspergillus fumigatus	1(7%)
Absidia	1(7%)

Table-4

Antibiotic sensitivity pattern of bacterial isolates

Bacteria tested	PT	AK	CIP	CAZ	CTR	CFS	LZ	V	I	AMC
Pseudomonas aeroginosa (n=32)	81%	93%	84%	62%	46%	75%	-	-	68%	-
Staphylococcus aureus(n=23)	69%	86%	78%	43%	43%	52%	95%	95%	78%	30%
Klebsiella spp(n=6)	66%	83.3%	66%	R	R	50%	-	-	66%	R
Proteus spp(n=4)	50%	75%	75%	R	R	25%	-	-	50%	-
Escherichia coli(n=3)	66%	100%	66%	R	R	R	-	-	66%	R
Citrobacter spp(n=2)	50%	100%	100%		50%	50%	-	-	50%	50%
Serratia spp(n=1)	100%	100%	100%	R	R	R	-	-	100%	R
Acinetobacter spp(n=1)	100%	100%	S	R	R	R	-	-	100%	R

PT=Piperacillin Tazobactum,AK=Amikacin

CIP=Ciprofloxacin,CAZ=Ceftazidime,CTR=Ceftriaxazone,CFS=Ceftriaxazone Sulbactum,LZ=Linezolid,V=Vancomycin,Amoxyclav

Table-5

Predisposing factors in CSOM

Predisposing factors	No of patients
History of pond bathing	55(55%)
Upper respiratory tract infection	25(25%)
Allergic rhinitis	8(8%)
DNS with nasal obstruction	5(5%)
Enlarged Adenoid	4(4%)
History of trauma	2(2%)
Cleftpalate	1(1%)

Table-6

Distribution of CSOM patients according to socio economic status

Socio economic status	No of patients
Upper high	1
High	3
Upper middle	10
Lower middle	28
Poor	58
Total	100