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Microbiological Profile of Patients with Chronic Suppurative Otitis Media.

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ABSTRACT

Chronicsuppurative otitis media (CSOM)is an important cause of preventable hearing loss, particularly in the developing world.It causes dreaded complications like conductive and sensorineural hearing loss, adverse effects on childhood development, mastoid abscess, facial nerve paralysis etc. Early diagnosis and treatment of this condition can prevent these complications from occurring and guide in choosing appropriate therapy. Hence this study was carried out to know the aerobic microorganisms involved and their antibiotic sensitivity pattern in patients with CSOM. A total of 120 samples were collected from clinically diagnosed cases of CSOM over a period of one year. Samples were processed and organisms were identified by standard procedures. Antimicrobial susceptibility of bacterial isolates was performed as per CLSI guidelines.Of the 120 pus samples processed, 106 (88.33%) yielded growth. There were 109 (90.83%) bacterial and 5 (4.16%) fungal isolates. *Staphylococcus aureus* 45 (37.5%) was the predominant isolate of which 6 (5%) isolates were methicillin resistant *Staphylococcus aureus*(MRSA). The next most common isolate was *Pseudomonas aeruginosa*accounting for 35 (29.16%) isolates. The changing pattern of causative agents and their antibiotic susceptibility should be constantly monitored to prevent the emergence and spread of resistant pathogens.

Key words: Chronic suppurative otitis media, ear discharge, bacterial isolates, fungal isolates, antibiotic sensitivity

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INTRODUCTION

Chronic suppurative otitis media (CSOM) is a chronicinflammation of the middle ear and mastoid cavity which presents with recurrent ear discharge or otorrhoea through a tympanic perforation [1].It is one of the most common diseases of all age groups especially in childhood [2].It may occur during the first 6 years of a child's life, with a peak around 2 years [3].Infants and young children are more prone to CSOM mainly because of short, horizontal and floppy Eustachian tube [4].

The disease usually occurs after upper respiratory viral infections followed by invasion of pyogenic organisms [5]. The common organisms isolated from cases of CSOM are *Pseudomonas* species*, Staphylococcus aureus, Escherichia coli, Klebsiellapneumonia* and *Proteus* species. Amongthese bacteria, *P. aeruginosa*has been particularly known to cause deep-seated infection and progressive destruction of middle ear and mastoid structures through its toxins and enzymes [6].Fungi also play an important role in CSOM especially *Candida* and *Aspegillus species* [4].

It is an important cause of preventable hearing loss, particularly in the developing world.In the developing countries, it has continued to constitutea heavy disease burden, with the prevalence of chronic ear infections being up to 72 cases per 1000 inhabitants [7].

CSOM is known to cause dreaded complications like conductive and sensorineural hearing loss, adverse effects on childhood development, mastoid abscess, facial nerve paralysis etc [8].Prompt and early diagnosis of this condition can prevent these complications from occurring and guide in choosing appropriate therapy.Hence this study was carried out to know the aerobic microorganisms involved and their antibiotic sensitivity pattern in patients with CSOM.

MATERIALS AND METHODS

This study comprises of 120 clinically diagnosed cases of CSOM attending Ear Nose Throat (ENT)out patient department over a period of one year at a tertiary care hospital. Ear discharge were collected from them under aseptic precautions using sterile cotton swabs with the aid of an aural speculum, prior to the instillation of any topical medication and processed immediately in the microbiology laboratory.Samples were inoculated on blood agar, chacolate agar, mac conkey agarand Sabourd' dextrose agar (SDA) and incubated at 37^0c for 24-48 hrs. SDA slants are incubated upto one week before discarding as negative. Organisms were identified by standard biochemical tests [9].Antimicrobial susceptibility of bacterial isolates was performed by Kirby- Bauer disc diffusion method as recommended by CLSI [10].

RESULTS

Of the 120 pus samples processed, 106(88.33%) yielded growth. There were 109(96.61%) bacterial and 5(4.38%) fungal isolates. Pure growth was seen in 98 samples, mixed growth in 8 samples and 14 samples were culture negative. In our study, males 77(64%) were most commonly affected than females 43(36%). Most of the patients were in the age group of less than 20yr.

Staphylococcus aureus 45 (37.5%) was the predominant isolate of which, 39(32.5%) were methicillin sensitive *Staphylococcus aureus*(MSSA) and 6(5%) were methicillin resistant *Staphylococcus aureus* (MRSA). The next most common isolate was *Pseudomonas aeruginosa*accounting for 35 (29.16%) , followed by *Acinetobacter species, Proteus species, Enterobacter species, Escherichia coli, Klebsiellapeumoniae, Morganellamorganii* were the other organisms isolated.Culture also yielded fungal isolates like *candida* 3(2.50%), *Aspegillusniger* 1(0.83%) and *Aspegillusflavus* 1(0.83%) (Table 1).

Fig 1 and 2 depicts antibiogram of MSSA and MRSA isolates. Antibiotic susceptibility of MSSA showed that 80% were sensitive to gentamicin and chloramphenicol, 70% tociprofloxacin, 60% to clindamycin, 62% to cotrimoxazoleand 41% to erythromycin. All MRSA isolates were sensitive to vancomycin, linezolid, tetracycline, doxycycline, 33% to gentamicin, ciprofloxacin, clindamycin, cotrimoxazoleand 17% to erythromycin.

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Fig 3 depicts the antibiogram of*Pseudomonas aeruginosa* isolates. All the isolateswere sensitive to imipenem, 82% to piperacillin, 86% to piperacillin-tazobactam, 80% to ciprofloxacin, 78% to amikacin, 74% to gentamicinandceftazidime.

Figure 1: Antibiogram of Methicillin sensitive Staphylococcus aureus

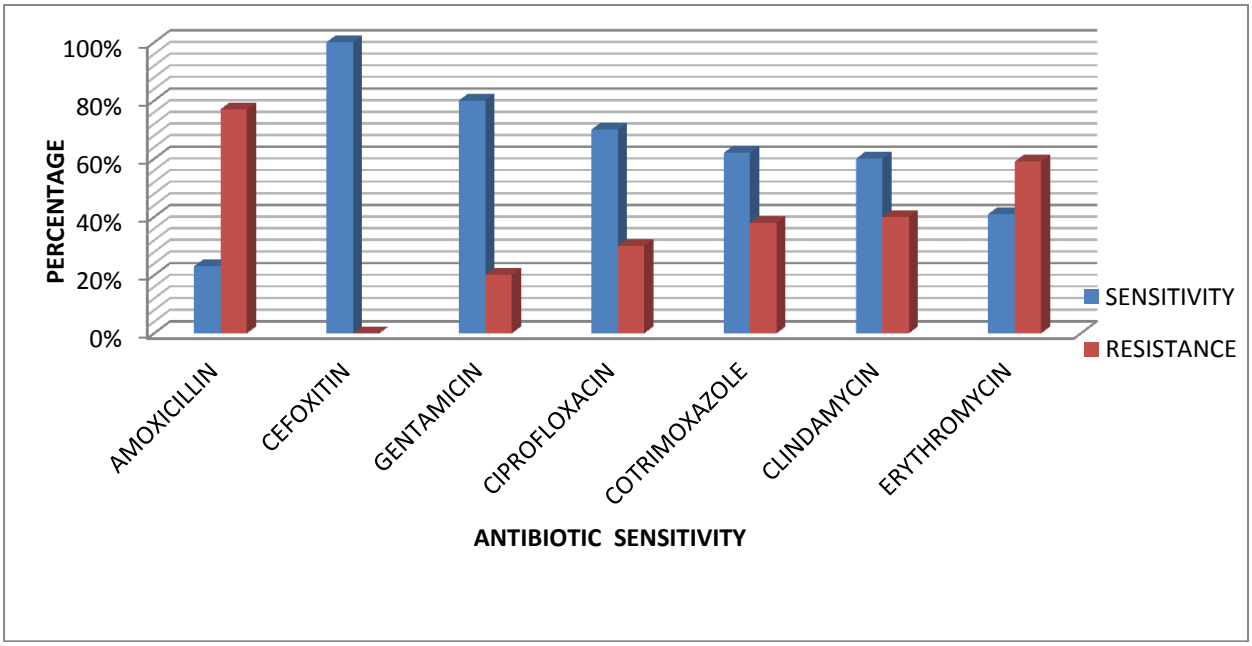

Figure 2: Antibiogram of Methicillin resistant Staphylococcus aureus

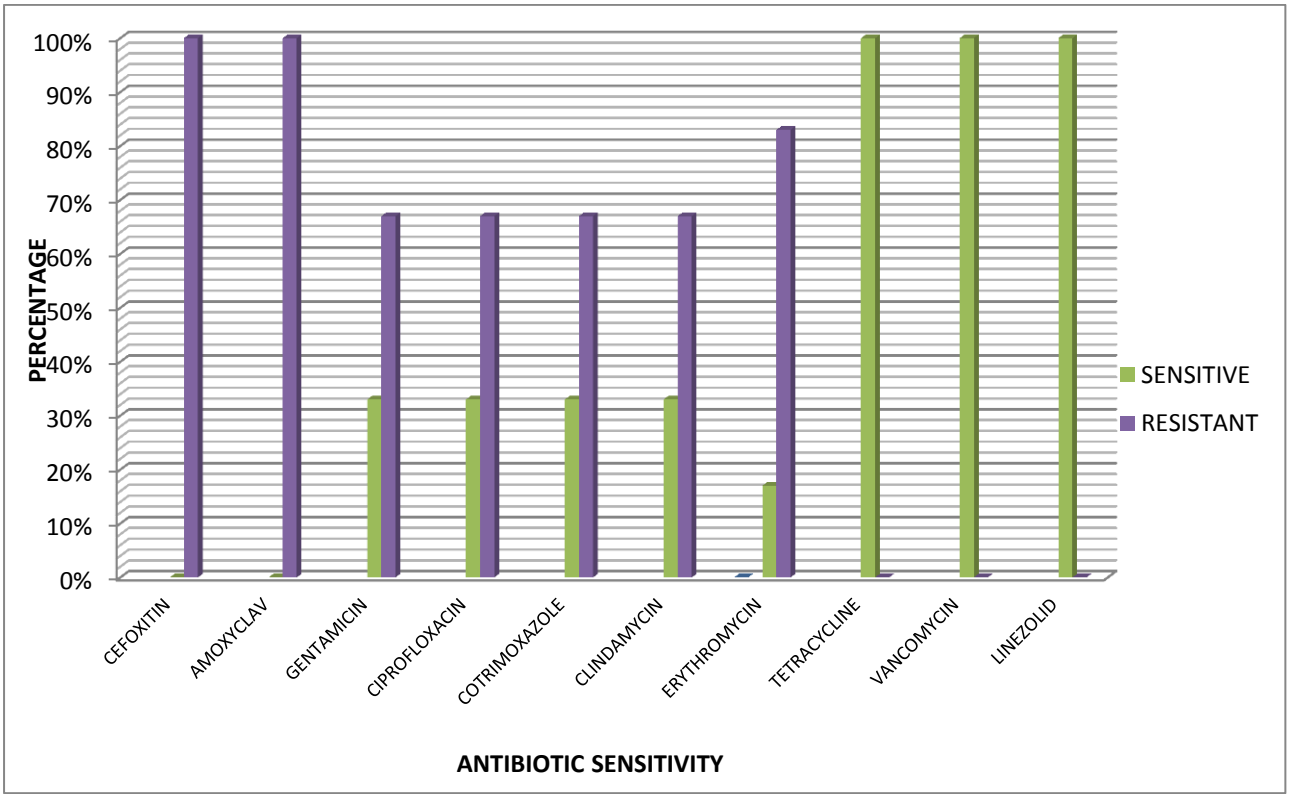

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Figure 3: Antibiogram of Pseudomonasaeruginosa isolates

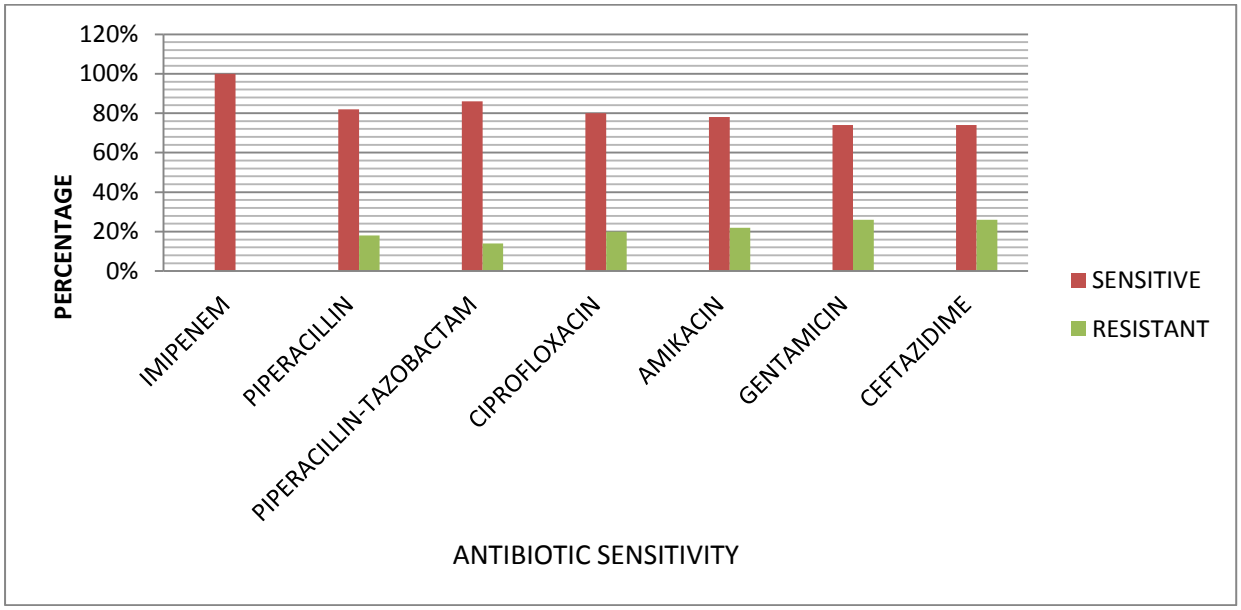

Table 1: Microorganisms isolated from culture

ISOLATES	NUMBER OF ISOLATES	PERCENTAGE
MSSA	39	32.50%
MRSA	6	5%
PSEUDOMONAS	35	29.16%
ACINETOBACTER	9	7.50%
P MIRABILIS	6	5%
ENTEROBACTER	4	3.33%
E COLI	3	2.50%
K PNEUMONIAE	3	2.50%
P VULGARIS	1	0.83%
P RETTGERI	2	1.66%
M MORGANII	1	0.83%
CANDIDA	3	2.50%
A NIGER	1	0.83%
A FLAVUS	1	0.83%
NOGROWTH	14	11.66%

DISCUSSION

CSOM is a persistent disease of ear with great risk of irreversible complications. Etiology of CSOM is multifactorial in nature.Inadequate antibiotic treatment, frequent upper respiratory tract infections and poor living conditions with poor access to medical care are related to the development of CSOM. In our study, majority of the patients were less than 20 years of age which is in agreement with other previous studies [11,12,13]. In contrast, Loyal et al showed higher incidence between 30 -40 yrs of age [14]. Gender analysis showed the incidence of CSOM was more common in males 64% than in females 36%. Which is in accordance with Gulati et al, Moshi et al, Ahmad et al who reported male predominance [13,15,16]. In contrast Prakash M et al, Loyal et al reported female predominance [11,14].

Out of 120 samples processed 106(88.33%) yielded growth. There were 109(96.61%) bacterial and 5(4.38%) fungal isolates. Pure growth was seen in 98(81.67%) samples, similar finding was also reported by Prakash et al, Agarwal et al [11,17]. No growth was seen in 14(11.67%) samples. This is in accordance Chakraborty et al(12.6%), in contrast Vijaya et al(5.28%), Prakash et al(6.25%) found lower percentage of culture negatives [11,18,19].

Staphylococcus aureus was the predominant organism isolated in our study followed by *pseudomonas aeruginosa, Acinetobacter species, Proteus species, Enterobacte species, Escherichia coli*, etc. Similarly Prakash et al, Shyamala et al,TanejaMansi et alalso reported *Staphylococcus* as the most common organism in their study [11,12,20]. In contrast Indudharan et al, Kumar et al, Goyal et al, Malkappa et al had reported *Pseudomonas* as most common organism isolated in their studies [21,22,23,24].

Amoxicillin showed 80% resistance in our study which was earlier used to treat acute and chronic ear infections, this is in accordance to Prakash et al, Chakraborthy et al, Malkappa et al [11,18,24].Ciprofloxacin which is used for empirical therapy in CSOM shows 67% resistance to MRSA, 30% to MSSA, 20% to *Pseudomonas* and 30 % to other bacterial isolates. This shows that, theknowledge of the local microorganisms and their antibiotic susceptibilityshould be constantly monitored to formulate a protocol for empirical antibiotic therapy and to prevent theemergence and spread of resistant pathogens.

CONCLUSION

Early bacteriological diagnosis of all cases will ensure accurate and appropriate effective therapy.The changing pattern of causative agents and their antibiotic susceptibility should be constantly monitored to guide the clinicians in the management of CSOM thereby preventing the emergence of multidrug resistant pathogens and occurrence of complications.

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