Original Research Article

A study of bacteriological profile and susceptibility pattern in chronic suppurative otitis media at a tertiary care centre in Akola

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Abstract

Background: CSOM is one of the most commonly occurring diseases in the otolaryngology. It is very infamous for its severe complications and recurrence. Moreover, due to advent of newer antibiotics and their unnecessary use there has been a development of resistance to some of them. Thus, this study was carried out to study the microbiological flora of CSOM and study the resistance and susceptibility of the bacteria isolated. Objective was to study to which antibiotics were the bacterial flora susceptible or resistant. Secondary objectives were; to study the distribution of CSOM in various age, socio economic, sex groups, etc. Aural discharges were collected as samples, from patients reporting to ENT O.P.D. of GMC Akola, who were diagnosed with CSOM and these swabs were studied in the microbiology department of the same Institute. Bacteria were cultured, isolated and tested for resistance and susceptibility against 22 antibiotics. The results were compared with other studies. Distribution of CSOM in various sections of the society was also studied depending on sex, residential area, socio economic status, etc. Staphylococcus aureus and Pseudomonas aeruginosa species were found commonly in the bacterial isolates. Most of the bacteria were susceptible to Amikacin followed by Tetracycline, Gentamicin and Ciprofloxacin and these drugs can be used in the empirical treatment for CSOM in Akola region. Resistance was mostly seen against Penicillin and Cotrimoxazole. High risk groups were people with low socio economic status, people living in rural areas. Male dominance in this study was observed but it is not significant as there is no evidence to prove any difference between the male and female ears. Cases of CSOM were most common in first 2 decades of life and thus it was important to educate the parents and guardians about the risk factors and complications of CSOM. Health education, spreading awareness about the complications and risk factors in the at risk groups and providing better medical facilities to reach even the remote rural areas will reduce the incidence of CSOM in the general population. **Aim**-The aim of this study is to identify the bacterial pathogens in chronic suppurative otitis media and study which antibiotics are effective against them at Govt. Medical College and Hospital Akola. Thus, chalk out a basic empirical treatment for otitis media in Akola region to reduce the haphazard use of antibiotics and also the time and expenses required for the treatment. **Objectives:** 1.To isolate and detect bacteria from CSOM cases. 2. To detect extended spectrum beta lactamase, metalo beta lactamase producing organisms from relevant clinical isolates. 3. To study antimicrobial susceptibility in all isolates of CSOM. **Secondary objectives:** 1. To study the susceptibility and sensitivity pattern of the isolated bacteria and thus study the development of resistance. 2. To study the distribution of the disease on the basis of Age, sex, socio economic status, etc. 3. To compare the organisms causing CSOM in various regions in India and the world with Akola region.

Key Word: chronic suppurative otitis.

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INTRODUCTION

Chronic suppurative otitis media (CSOM) is the chronic inflammation of the middle ear and mastoid cavity which may present with recurrent ear discharges or otorrhoea through a tympanic perforation. It is one of the most commonly encountered diseases in otolaryngology practice. It is a disease with multiple aetiologies'. CSOM is infamous for its persistence and recurrence even after treatment. It is a destructive disease whose infection can spread from the middle ear cavity to vital structures like

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mastoid, facial nerve, labryinth, lateral sinus, meninges and brain leading to hearing loss, mastoid abscess, facial nerve paralysis, labrynthitis, lateral sinus thrombophlebitis, meningitis or brain abscess. Of all the complications, hearing loss which is preventable is mostly always significant and is a matter of concern especially in children because; it may have long term effects on early communication, language development, auditory processing, educational process and physiological and cognitive development. Even today CSOM consumes a big part of medical expenditure, especially in the poorer sections of the society. The morbidity and complication rates of otitis media have been increasing especially in developing countries due to unhygienic practices, lack of health education and poor medical facilities for early treatment, resulting in reduction in quality of life. Both the gram positive and gram negative bacteria are etiological factors for CSOM. The complications were very common in the pre antibiotic era. But the invention of antibiotics has given a tool to the clinicians to be used even without the precise etiological knowledge of the disease. This has resulted in the development of multi-drug resistant bacterial strains and complications as well. The antibiogram of the organisms causing CSOM has been reported to vary from time to time and from area to area probably due to indiscriminate use of antibiotics. S.pneumoneae, H.influenzae, M.catarrhalis often infect children. However the dominant species in other age groups and some types of otitis media have not been identified definitively. The emergence of antibiotic resistant bacteria like Methicillin resistant staphylococcus aureus, vancomycin resistant enterococcus, vancomycin resistant staphylococcus aureus and quinoline resistant pseudomonas has changed the dominant bacteria in otitis media. Knowledge of bacterial etiology in CSOM and their antibiotic susceptibility pattern prevalent in a community is very important for clinicians to manage the case and avoid complications and it is also important for the surgeons to make the ear dry for better results of surgeries like myringoplasty or ossiculoplasty. This requires reappraisal of the flora in CSOM and their in vitro antibiotic sensitivity pattern in cases of CSOM which do not respond to local antibiotics. Hence the periodic update of prevalence and antibiogram of the bacterial flora in CSOM is important. The frequent presence of CSOM in general practice and its poor response to routine treatment are factors that make this study significant and important.

MATERIALS AND METHOD

This hospital based prospective study was carried out in the O.P.D. of the department of ENT and in association with the microbiology laboratory of the department of microbiology at Government Medical College Akola, which is a dedicated tertiary care centre at Akola district. This study was carried out for a period of 2 months from 1st August 2017 to 30th September 2017 which included 50 subjects, who reported to Government Medical Hospital Akola with a history of chronic discharge from the ear and were diagnosed with CSOM[3]. All the patients using topical or systemic antibiotics in the past 7 days along with those who failed to give the consent were excluded from the study[4]. 50 subjects were reported over the study of 2 months. Well informed consent was taken from patients/parents explaining the procedure, its risks and benefits and the study was approved by the Institutional Ethical Committee. Detailed information about the subject's personal details, brief clinical history, previous hospital visit, use of antibiotics in the last 7 days, ear involved, type of discharge, hearing status, socio economic status was asked and noted down. Ear discharges were collected from the patients using 2 sterile cotton swab sticks under aseptic conditions. Each stick was well labelled with the patients name and registration number. The samples were transferred to the microbiology department in sterile conditions. One swab was used for gram staining and the other one was used for culture. Each sample was inoculated on blood agar and thioglycolate liquid medium and was cultured at 35 degree celsius for 24 hours. The bacteria were identified by standard microbiology tests for studying the cultural characteristics, pigment production, beta haemolysis on blood agar and biochemical tests. After identification of bacteria they were tested for susceptibility on Muller Hilton agar by Kirby Bauer disc diffusion method[5]. The bacteria were tested for susceptibility against Penicillin, Cotrimoxazole, Teicoplannin, Cefoxitin, Clindamicin, Erythromycin, Linezolid, Tetracycline, Amikacin, Piperacillin, Piperacillin tazobactum, Imipenem, Ceftazidime, Amoxiclavulonic acid, Ampicillin, Ceftriaxone, Azetronam, Vancomycin, Cefepime, Gentamicin, Ciprofloxacin, Tobramycin. The data was analysed, tabulated and compared to find out the percentage of samples which were susceptible to the above mentioned antibiotics. Variants used were- Age, sex, residential area, socio economic status. Age- The subjects were grouped in age groups with an interval of 10 years. There were total 7 groups. 0-10, 10-20, 20-30, 30-40, 40-50, 50-60, 60 and above. Subjects up to the age of 10 and of age 10 years and 0 days are included in the group 0-10 and the subjects from the age 10 years 1 day up to 20 years 0 days are included in the group 10-20. Similar rule is applied for the remaining groups as well. Sex- The subjects were grouped according to their sex as male or female. Residential area The subjects were

divided into 2 groups on the basis of residential area as living in rural areas or urban areas. Villages and small settlements were considered in rural areas whereas towns, tehsils, district headquarters and cities were considered as urban areas. Socio economic status The socio economic status of the subjects was calculated using the Prasad's scale for the rural population and was grouped as Lower class, Lower middle class, Middle class, Upper middle class and upper class [6] and the Kuppuswamy's scale for the urban population and was grouped as Lower, Upper lower, Lower Middle, Upper middle and Upper classes [6].

RESULTS

Out of the 50 samples collected 37(74%) showed pure culture, 1(2%) showed mixed culture 12 (24%) were found to be sterile. Methicillin Susceptible Staphylococcus Aureus (MSSA) was isolated in 8(16%) samples which was followed by Methicillin Resistant Staphylococcus Aureus and Pseudomonas Aeruginosa being isolated in 7(14%) cases each. Proteus Vulgaris was isolated in 5(10%) samples and Proteus Mirabilis and E. coli in 2 (4%) cases each. Enterococcus species were isolated in 4(8%) cases and Klebsiella in 2 (4%) cases. Pseudomonas species and Proteus Vulgaris were isolated together in 1 (2%) samples. (Fig 1)

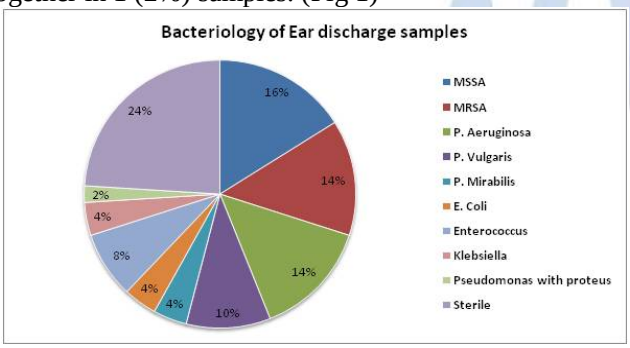

Figure 1: Bacterial susceptibility

A majority of these samples showed sensitivity to Amikacin (54%). Linezolid was effective in 30% isolates, tetracycline in 28% and Gentamicin in 26% isolates. These isolates prominently showed resistance to Penicillin (26%), Ciprofloxacin (22%) and Cotrimoxazole (20%). (Fig.2)

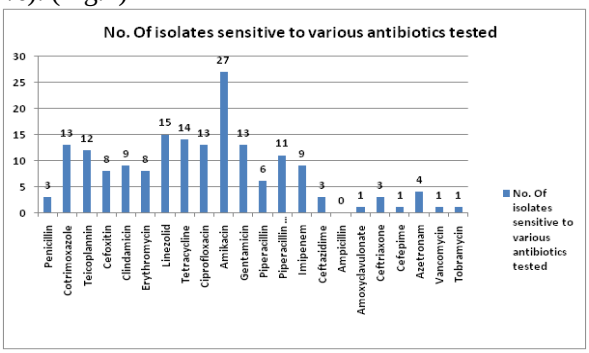

Figure 2: the above data is calculated with total samples as 50

Bacteria isolated from the samples showed different susceptibility for different antibiotics. Out of total samples of MSSA 100% samples were susceptible to Cefoxitin, Erythromycin and Linezolid. 85.7% of MRSA samples were susceptible to Teicoplannin and Linezolid. Out of 7 samples isolated of P.aeruginosa 85.7% were found to be susceptible to Amikacin and Gentamicin. Figure 3 and 4 shows detailed description of the susceptibility of percentage of samples of each bacterium isolated.

Bacteriological sensitivity pattern in bacterial isolates of CSOM (n=38 as 12 samples were sterile) for each antibiotic tested [The values are in %]

Bacteria	Pen	Cot	Tei	Cx	Cd	E	Lz	Tet	Cip	A	Gen
MSSA (n=8)	37.5	50	87.5	100	87.5	100	100	62.5	97.5	87.5	12.5
MRSA (n=7)	-	57.1	85.7	-	28.5	14.2	85.7	71.4	-	71.4	-
P.aeruginosa (n=7)	-	-	-	-	-	-	-	-	57.1	85.7	85.7
P. vulgaris (n=5)	-	20	-	-	-	-	-	-	40	100	20
P. mirabilis (n=2)	-	50	-	-	-	-	-	-	50	50	50
E. Coli (n=2)	-	100	-	-	-	-	-	100	-	-	100
Enterococcus (n=4)	-	25	-	-	-	-	25	50	50	25	-
Klebsiella (n=2)	-	-	-	-	-	-	-	-	-	50	50
Pseudomonas with Proteus (n=1)	-	-	-	-	-	-	-	-	100	100	100

Figure 3

n=no. of samples; Pen=penicillin; Cot=Cotrimoxazole;Tei=Teicoplannin;Cx=Cefoxitin;Cd=Clindamycin; E=Erythromycin;Lz=Linezolid;Tet=Tetracycline;Cip=Ciprofloxacin;A=Amikacin; Gen=Gentamicin.

Bacteriological sensitivity pattern in bacterial isolates of CSOM (n=38 as 12 samples were sterile) for each antibiotic tested

Bacteria	Pi	Pit	Ipm	Caz	Amp	Amc	Ctx	Cpm	At	Va	Tob
MSSA (n=8)	-	-	-	-	-	-	-	-	-	-	-
MRSA (n=7)	-	-	-	-	-	-	-	-	-	-	-
P.aeruginosa (n=7)	57.1	57.1	42.8	-	-	-	-	-	28.5	-	-
P.vulgaris (n=5)	20	100	20	20	-	-	-	-	-	-	-
P.mirabilis (n=2)	-	50	100	100	-	-	100	50	50	-	-
E.coli (n=2)	-	-	100	-	-	-	-	-	-	-	-
Enterococcus (n=4)	-	-	-	-	-	-	-	-	-	-	-
Klebsiella (n=2)	-	-	50	-	-	50	50	-	-	-	-
Pseudomonas with Proteus (n=1)	100	100	-	-	-	-	-	100	-	-	-

Figure 4

n=no. Of samples; Pi=Piperacillin;Pit=Piperacillin tazobactum; Ipm=Imipenem; Caz=Ceftazidine;Amp=Ampicillin;Amc=Amoxyclavunate;Ctx=Ceftriaxone;Cpm=Cefepime; At=Azetronam; Va=Vancomycin; Tobramycin.

Resistance in bacteria

Figure 11 and 12 show resistance of various bacteria against various test antibiotics. 100% of the MRSA isolates were resistant against Penicillin and Cefoxitin. MSSA showed high resistance against Gentamicin and none of the P.aeruginosa isolates were resistant against Penicillin or Cefoxitin. '-'indicates 0 samples of the isolates were susceptible to the corresponding antibiotic of the mentioned bacteria.

Bacteriological Resistance pattern in bacterial isolates of CSOM (n=38 as 12 samples were sterile) for each antibiotic tested

Bacteria	Pen	Cot	Tei	Cx	Cd	E	Lz	Tet	Cip	A	Gen
MSSA (n=8)	62.5	50	12.5	-	12.5	-	-	37.5	2.5	12.5	87.5
MRSA (n=7)	100	42.9	14.3	100	71.5	85.8	14.3	28.2	100	28.6	-
P.aeruginosa (n=7)	-	-	-	-	-	-	-	-	42.9	14.3	14.3
P.vulgaris (n=5)	-	80	-	-	-	-	-	100	60	-	80
P.mirabilis (n=2)	-	50	-	-	-	-	-	-	50	50	50
E.coli (n=2)	-	-	-	-	-	-	-	-	100	100	-
Enterococcus (n=4)	-	25	-	-	-	-	75	50	50	75	100
Klebsiella (n=2)	-	-	-	-	-	-	-	-	-	50	50
Pseudomonas with Proteus (n=1)	-	-	-	-	-	-	-	-	-	-	-

Figure 5

n=no. of samples; Pen=penicillin; Cot=Cotrimoxazole; Tei=Teicoplannin; Cx=Cefoxitin; Cd=Clindamycin; E=Erythromycin; Lz= Linezolid; Tet=Tetracycline; Cip=Ciprofloxacin; A=Amikacin; Gen=Gentamicin.

Bacteriological Resistance pattern in bacterial isolates of CSOM (n=38 as 12 samples were sterile) for each antibiotic tested

Bacteria	Pi	Pit	Ipm	Caz	Amp	Amc	Ctx	Cpm	At	Va	Tob
MSSA (n=8)	-	-	-	-	-	-	-	-	-	-	-
MRSA (n=7)	-	-	-	-	-	-	-	-	-	-	-
P.aeruginosa (n=7)	42.9	42.9	57.2	-	-	-	-	100	71.5	-	-
P.vulgaris (n=5)	80	0	80	80	-	100	100	-	-	-	-
P.mirabilis (n=2)	-	50	-	-	-	-	-	50	50	-	-
E.coli (n=2)	100	-	100	100	-	100	100	-	-	-	-
Enterococcus (n=4)	-	-	-	-	-	-	100	-	-	100	-
Klebsiella (n=2)	-	-	50	-	-	50	50	-	-	-	-
Pseudomonas with Proteus (n=1)	-	-	-	-	-	-	-	-	-	-	-

Figure 6

n=no. Of samples; Pi=Piperacillin; Pit=Piperacillin tazobactum; Ipm=Imipenem; Caz=Ceftazidine; Amp=Ampicillin; Amc=Amoxyclavunate; Ctx=Ceftriaxone; Cpm=Cefepime; At=Azetronam; Va=Vancomycin; Tobramycin. '-'indicates 0

samples of the isolates were resistant to the corresponding antibiotic of the mentioned bacteria. Overall Sensitivity and Resistance pattern of Antimicrobial agents tested for bacterial isolates of CSOM. fig 13. Most of the bacterial isolates (71%) are susceptible to Amikacin whereas most resistance is offered against Cotrimoxazole (26%)

Antibiotics	Sensitive isolates	Resistant isolates
Penicillin	3 (7.89%)	13 (34.2%)
Cotrimoxazole	13 (34.2%)	10 (26.31%)
Teicoplannin	12 (31.57%)	3 (7.89%)
Cefoxitin	8 (21.05%)	7 (18.42%)
Clindamycin	9 (23.68%)	8 (21.05%)
Erythromycin	8 (21.05%)	6 (15.78%)
Linezolid	15 (39.47%)	0 (0%)
Tetracycline	14 (36.84%)	7 (18.42%)
Ciprofloxacin	13 (34.21%)	11 (28.94%)
Amikacin	27 (71.05%)	2 (5.26%)
Gentamicin	13 (34.21%)	6 (15.78%)
Piperacillin	6 (15.78%)	0 (0%)
Piperacillin tazobactum	11 (28.94%)	2 (5.26%)
Imipenem	9 (23.68%)	4 (10.52%)
Ceftazidine	3 (7.89%)	9 (23.68%)
Ampicillin	0 (0%)	2 (5.26%)
Amoxyclavunate	1 (2.63%)	6 (15.78%)
Ceftriaxone	3 (7.89%)	8 (21.05%)
Cefepime	1 (2.63%)	7 (18.42%)
Azetronam	4 (10.52%)	4 (10.52%)
Vancomycin	1 (2.63%)	1 (2.63%)
Tobramycin	1 (2.63%)	0 (0%)

Figure 7: (the above % are calculated with total samples as 38. Sterile samples are excluded)

Distribution of the disease on basis of sex-Out of the total 50 subjects in whom CSOM was detected 28 (56%)were males and 22 (44%)were females. The male: female ratio was found to be 1.2:1. (fig5)

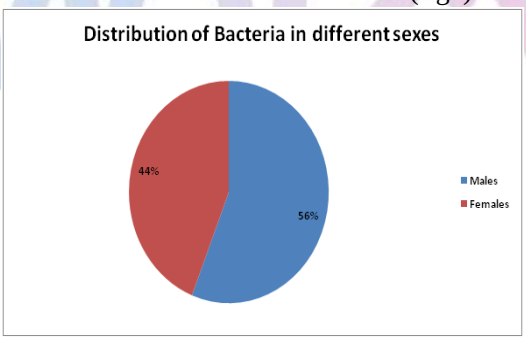

Figure 8: the sterile 12 samples were not considered

Distribution of different strains of bacteria The gram positive and gram negative strains were found equally distributed in the 38 samples from which bacteria were isolated.

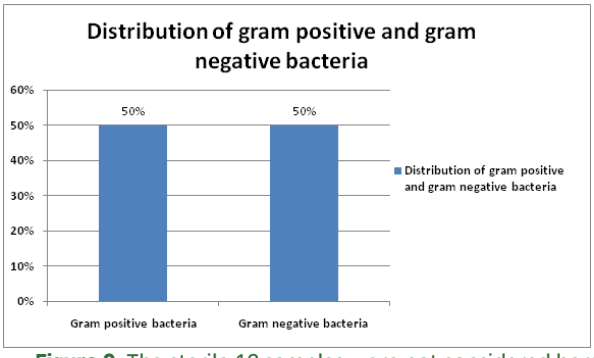

Figure 9: The sterile 12 samples were not considered here

Distribution of the disease according to the residential area -24 samples isolated were from the subjects living in the rural areas whereas 14 samples were isolated from people living in urban areas.(Fig.7)

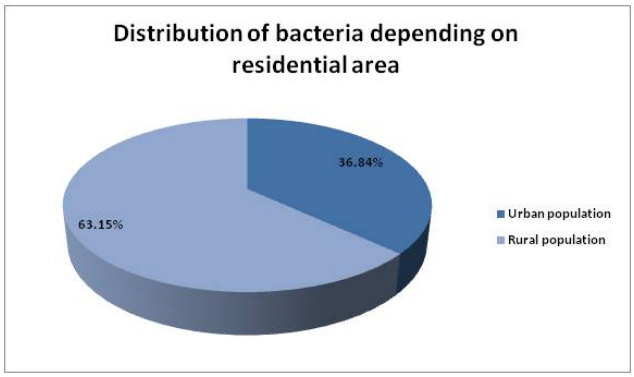

Figure 10: the 12 sterile samples are excluded

Distribution of bacteria in various socio economic sub groups Rural population It is grouped into 5 subgroups[6] and 10 (41.66%) isolates were obtained from the people in the lower middle class group. (figure. 8)

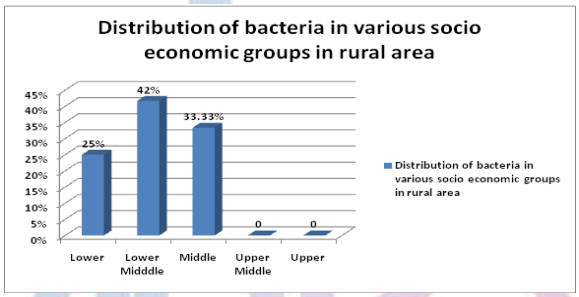

Figure 11: 24 total Rural isolates are considered; urban and sterile samples are excluded

Urban population- it is divided in 5 subgroups[6] and 7 (70%) isolates from urban area were obtained from the Upper lower class. Fig 9

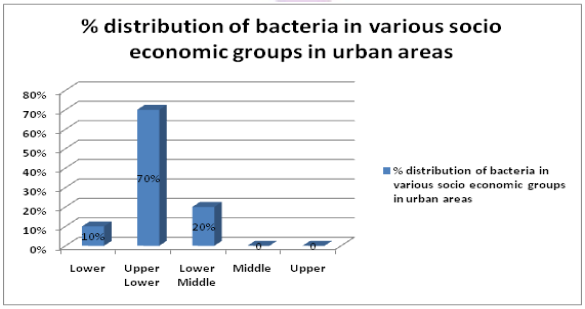

Figure 12: the one above] (14 total urban isolates are considered; rural and sterile isolates are excluded)

Distribution of CSOM depending upon the age group The subjects were broadly classified into 7 age groups with an interval of 10 years each. It shows the highest incidence of 12 cases (24%) CSOM in the age group of 10-20 years and the mean age is found to be 30.6 years (fig10)

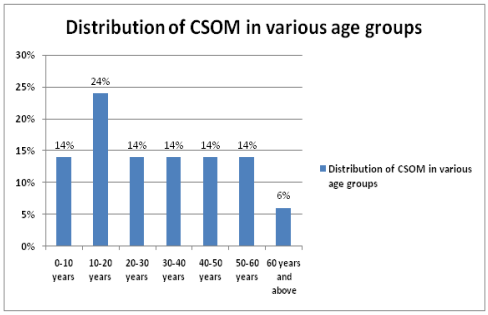

Figure 10: all 50 samples are considered as total here

DISCUSSION

CSOM is a major public-health problem, and India is one of the countries with high-prevalence where urgent attention is needed[7]. It's a persistent disease with great risk of irreversible complications. CSOM is an important cause of preventable hearing loss particularly in the developing world[8] and a reason of serious concern, particularly in children, because it may have long-term effects on early communication, language development, auditory processing, educational process, and physiological and cognitive development[7].It also takes up a lot of time in hospital outdoors as well as Operation Theatres[9]. Early diagnosis helps to avoid such complications. Culture positives and sterile Culture positive cases were dominant (76%) in this study whereas 24% were negative cultures. These culture results found are co related to Gulati *et al*1969 (78% and 22%); Asiri Saad *et al*1999 (80.5% and 19.5%). The negative cultures in this study can be attributed to Non bacterial growth or anaerobic growth. Prior antibiotic administration can't be the cause as the patients who used topical or systemic antibiotics in the last 7 days were excluded from the study. Age of occurrence of CSOM It was found that CSOM cases were more commonly found in first 2 decades of life contributing to 48% of the total cases taken. This finding goes hand in hand with other researchers as well [10, 11, 12, 13, 14]. High prevalence of CSOM in children may be attributed to their low immunity, high frequency of upper respiratory tract infections, use of unconventional substances like honey as a cure to URTI. This initiates the proliferation of bacteria blocking Eustachian tube[15]. Distribution of CSOM depending on sex The male is to female sex ratio was found out to be 1.2:1. There was a dominance of male cases over female cases of CSOM. This finding was in contrast with some studies[14, 16] but was similar to results in the studies of some other researchers[12, 17]. This dominance of occurrence of CSOM in males more than females can be purely co incidental because the sample selected is a random sample and moreover there has not been any notified difference between the anatomies of the ear of males and females. Rural-urban and socio economic distribution In this study it was found that bacterial isolates were more commonly found in rural areas (63.15% isolates) than in urban areas. This may be attributed to low standard of living, lack of proper medical facilities, lack of health education and lack of awareness in the rural areas about CSOM. There was more incidence of bacterial isolates in lower socio economic groups in both urban and rural population. These findings corroborate with other papers as well[4, 18]. This might be because of the low standard of living and poor hygienic facilities and lack of awareness. Mono and poly microbial growth Out of the total 50 samples collected monomicrobial growth was observed in 37 (74%) samples, 1(2%) showed polymicrobial growth and 12 (24%) showed no growth at all. This trend is similar to the results obtained by researchers in Pakistan who showed 76% monomicrobial growth [19] and some other researches[12,13,14,16] , but these results are in a contrast with the results obtained in Uttarakhand which showed a dominance of mixed cultures (66%)[4].Some other studies also showed dominance of mixed cultures[13, 17]. The difference in the results of different researchers might be because of a difference in sample size and different geographical conditions. Dominant species In our study Staphylococcus aureus was the most commonly isolated organism (30%) which was followed by P.aeruginosa (14%) (These proportions were calculated with the sample size of 50). The S.aureus dominance in the samples is similar to the results obtained by Singh A.H.[20] (36%). But it was in contrast to other study carried out in India where Pseudomonas species were found to be dominant[13, 17.] This difference might be due to different bacterial flora in regions with different climate. E.coli was found in 4% samples, Klebsiella in 4% and Pseudomonas species in 16% samples. These altogether showed a presence in 24% cases. Such frequent occurrence of these faecal bacteria indicates that there is a high risk of CSOM infections due to poor hygienic conditions. Few studies show more occurrences of gram negative organisms than gram positive organisms [14, 17 and 21] but it was found in our study that gram positive and gram negative organisms were equally distributed in all

CSOM cases. S.aureus was found to be most common species occurring followed by P.aeruginosa and other gram negative rods. It was similar to the results found out by Singh, Chang and Prakash R[2, 20, 22]. Antibiotic susceptibility Antibiotic susceptibility test (AST) was carried out for all the isolates. It was found that most of the isolates were sensitive against Amikacin (71.05%) followed by Linezolid (39.47%) and then Tetracycline (36.84%). For the antibiotics commonly available as topical ear drops, Gentamicin and Ciprofloxacin showed good activity against most of the commonly isolated organisms and can be used as effective first line topical antibiotic in the treatment of CSOM. Studies reveal that quinolones like Ciprofloxacin are safe and particularly effective against S.aureus and P.aeruginosa[23, 24 ,25]. Similar results were found in the Uttarakhand area of India[2]. Various gram positive and negative organisms were isolated in our study and were susceptible to different antibiotics. Thus for the better management of CSOM drug sensitivity testing against all the organisms isolated is absolutely essential for making appropriate decision of selection of antibiotics which will help to effectively remove the organism. When the results found in our study were compared with other studies it was found that the microbiological profile and the AST pattern of CSOM varied with due course of time. Geographical variation and difference in patient population studied could be the possible factor for variability. Antimicrobial resistance Emergence of antimicrobial resistance is becoming more common. The bacterial isolates in this study showed maximum resistance to Penicillin (34.2%) followed by Cotrimoxazole (26.31%). It is in contrast with the results found in Latur, Maharashtra; where maximum resistance was seen against Tetracycline (65%)[26.] Indiscriminate and haphazard antibiotic uses as well as negligence on patient's part are the factors responsible. As the symptoms subside many patients stop taking antibiotics before the completion of therapy and allow the partly resistant microbes to flourish. Patients should be instructed to avoid such practice. Changes in the microbial flora following the advent of sophisticated synthetic antibiotics increase the relevance of and reappraisal of the modern day flora in CSOM and there *in vitro* AST pattern is very important for the clinician to plan the treatment of a chronically discharging ear.

CONCLUSION

Chronic Suppurative Otitis Media like other chronic disease can limit an individual's employability and quality of life. Experts declare that when prevalence of CSOM is > 3% it must be targeted as a high-priority disease [7]. S.aureus and Pseudomonas continue to be the dominant bacterial flora in CSOM patients. With the development and administration of newer antibiotics, these bacteria are becoming increasingly resistant to commonly administered antibiotics like Penicillin and Cotrimoxazole. Thus, continuous and periodic evaluation of microbiological pattern and antibiotic sensitivity of isolates is necessary to decrease the potential risk of complications by early institution of appropriate treatment. Antibiotics like Amikacin, Linezolid, Gentamicin and Ciprofloxacin showed good activity against the CSOM bacterial flora isolated in this study and can be used in the empirical treatment of CSOM in Akola region. Higher incidence of CSOM was seen in younger age group thus education of parents and guardians about the complications and risk factors associated with CSOM may reduce the disease occurrences. CSOM was more commonly seen in rural populations and low socio economic groups. This disease will continue to persist unless and until emphasis is laid on measures like health education about the risk factors of CSOM, provision of better medical facilities and spreading of awareness about the complications of CSOM are not targeted to these risk groups.

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