

BACTERIOLOGICAL PROFILE OF CHRONIC SUPPORTIVE OTITIS MEDIA AND ITS ANTIBIOTIC SUSCEPTIBILITY PATTERN.

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Abstract

Introduction: Most commonly encountered diseases in otolaryngology is Chronic suppurative otitis media (CSOM). Even in this era of powerful antibiotics, CSOM still consumes considerable medical expenditure, especially in the poorer sections of the society. The present prospective study was conducted at the DR.S.C.G.M.C Nanded, Maharashtra India towards bacteriological evaluation of chronic suppurative otitis media. The focus was mainly on aerobic bacteria, involved in active CSOM in adults as well as children. An attempt was made, despite resource and man power constraints, to have a glimpse of the current antibiotic sensitivity pattern, with special reference to ciprofloxacin. However, **Aim:** To see the types of aerobic bacteria involved in CSOM and their antibiotic sensitivity pattern. **Material & Method:** Ear swabs were collected from 600 ears. Swabs were received to the hospitals microbiology laboratory for culture and sensitivity tests. **Result:** Out of 600 cases, 316(52.6%) were female and 284(47.3%) were male. Peak prevalence of otitis media was documented in age group 2-10 years (39.41%). 380 cases were culture positive (63.33%). Among 380 culture positive, 80 cases were polymicrobial (21.05%). The most common Gram-negative bacteria isolated were *Pseudomonas aeruginosa*, *Proteus mirabilis*, *Klebsiella pneumoniae* & *E.coli* followed by Gram-positive bacteria were *Staphylococcus aureus*. Percentage of gram negative organisms was 77.39%, higher than for gram positive (GPC) with GPC 22.60%. Gram negative bacteria shows >90% sensitivity to following antibiotics Ciprofloxacin, Imipenem, Meropenem. They are resistance to Amoxiclav, Ampicillin &. Gram positive bacteria shows sensitivity to commonly used antibiotics Clindamycin, erythromycin, Ciprofloxacin, Amikacin & Linezolid, Vancomycin, Gentamicin. **Conclusion:** Routine use of topical antibiotics for any case of CSOM as empirical therapy must be reviewed and judicious use of antibiotics is recommended to minimise antibiotic resistance

Keywords: Aerobic bacteria, CSOM, Culture and sensitivity, Ciprofloxacin, Otitis Media

INTRODUCTION:

CSOM is one the most commonly encountered diseases in the day to day practice of otorhinolaryngology. It requires remarkable and patient management, especially in the children of poorer socio-economic strata, as they do not or cannot access adequate and persistent treatment for this chronic affliction^[1]. It is a privilege for an otorhinolaryngologist to preserve, repair and take utmost care of the structure and function of this wonderful organ, in whatever condition it is presented. Suppurative otitis media with its unpleasant symptoms and complications may be a catastrophe for the marvellously structured organ, the ear, on which much of our appreciation of life and human activity depends. It is a challenge especially in children to prevent the progress of acute suppurative otitis media to a chronic disease^[2]. A WHO/CIBA Foundation workshop^[3] in 1996 defined Chronic suppurative otitis media as a stage of disease in which there is chronic infection of the middle ear cleft, i.e., eustachean tube, middle ear and mastoid, and in which a non-intact tympanic membrane (e.g., perforation or tympanostomy tube) and discharge (otorrhoea) are present for at least 2 weeks or more.

Chronic suppurative otitis media (CSOM) was earlier defined as persistent or intermittent infected ear discharge from a non-intact, perforated tympanic membrane, at least for 12 weeks. Those cases in which there is only central perforation of tympanic membrane without any discharge, they are referred to as inactive CSOM. There are two main varieties of CSOM viz. mucosal (or tubotympanic) type of CSOM and squamous (or atticofurrow) CSOM. Active tubotympanic CSOM was rechristened active mucosal chronic otitis media (COM) for sometime but the international symposium on recent advances in otitis media, in 1999 preferred the term chronic suppurative otitis media (CSOM) to COM which would mean 'a chronic perforation with chronic otitis media' [4]. Prevalence of CSOM is more in the developing and underdeveloped countries. It is also common among the poorer sections of the developed world. The incidence is highest among low hygiene populations or with overcrowding and malnutrition. In most cases the disease started in childhood when the eustachian tube was incompetent. More bouts of acute otitis media were seen in infants with many siblings in crowded day care facilities where the mother stopped breast feeding early and parents were smoking. Premature and low birth weight babies in lower socio-economic groups were more vulnerable to CSOM and its attendant handicap and complications in later life [2]. A variety of host factors, genetic disorders like Down syndrome, immune deficiencies or paresis, ciliary disorders, cleft palate have been implicated in the causation of CSOM [2]. In this study we collected aural swabs from 100 ears, in 97 patients, and subjected to culture and sensitivity test in order to detect the aerobic bacteria involved in the chronic suppurative otitis media and the drug susceptibility of selected isolated bacteria.

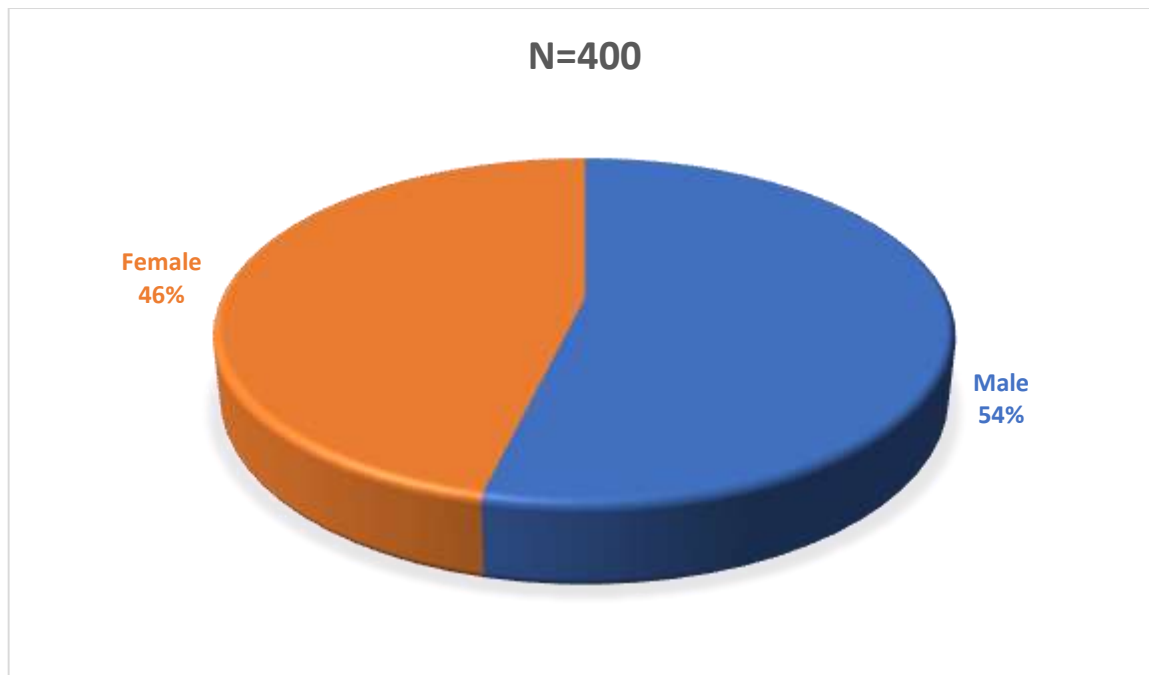
These days, it is rare for an otolaryngologist to encounter bacterial flora of a chronic discharging ear that has not already been modified by previous antibiotic therapy with some of them returning sterile cultures. [5] Knowledge of the local microbiological flora in CSOM is essential for initiating empirical therapy pending culture results, making it mandatory for periodic surveillance of microbiological profile and sensitivity pattern in CSOM. Moreover, there is a need to ascertain whether the microbial floras between both ears in bilaterally discharging ears are similar. The objective of our study was to examine our current bacteriological profile and antibiotic sensitivity pattern to locally available antibiotics in tubotympanic CSOM.

MATERIAL AND METHOD:

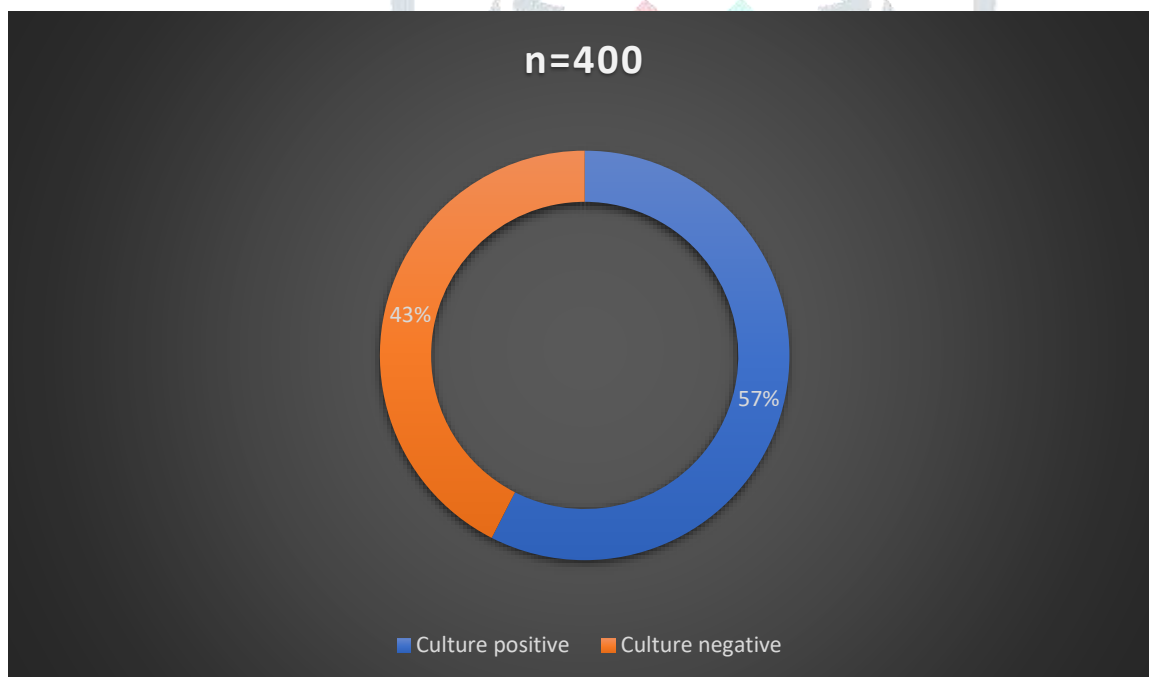
Six hundred patients, who presented to the ENT department from July 2016 – June 2017, with a history of chronic discharging ear, were prospectively studied. Two sterile cotton swabs were used to collect ear discharge from CSOM patients. One swab was used for performing Grams' stain and second one for culture. Culture was done on blood agar and MacConkey agar. The organisms were identified by culture characters, morphology, and pigment production, beta hemolysis on blood agar, motility and conventional biochemical tests. Antimicrobial susceptibility test for all isolates was performed on Mueller Hinton agar plate using Kirby Bauer disc diffusion method. Results were interpreted using Clinical Laboratory Standards Institute (CLSI) guidelines 2016-17.

RESULT AND DISCUSSION:

Out of 400 cases, 215 (53.75%) were males and 185(46.25%) were females.

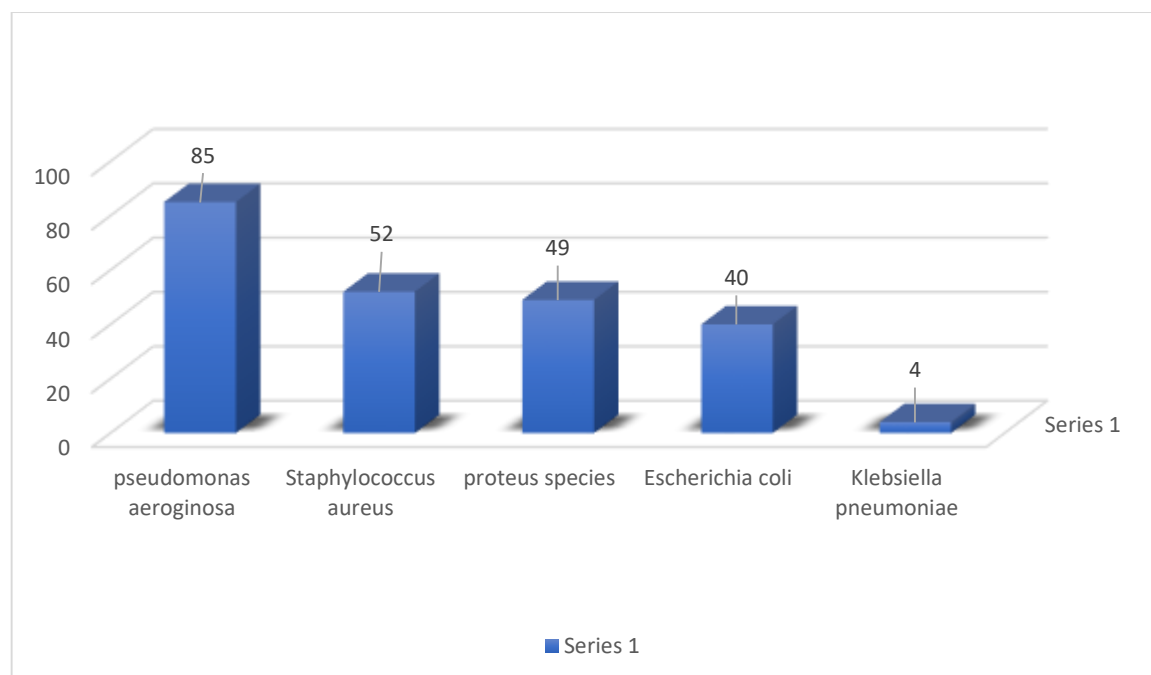
Figure 1: Gender distribution

Out of 400, 230 (57.5%) were culture positive and 170 (42.5%) were culture negative.

Figure 2: Culture positivity rate

The most common Gram-negative bacteria isolated were *Pseudomonas aeruginosa*, *Proteus mirabilis*, *E.coli* & *Klebsiella pneumoniae* followed by Gram-positive bacteria were *Staphylococcus aureus*.

Figure 3: Isolated organism



Gram negative bacteria shows >90% sensitivity to following antibiotics Ciprofloxacin, Gentamicin Amikacin, Imipenem, Meropenem. They are resistant to Amoxiclav & Ampicillin. Gram positive bacteria shows sensitivity to commonly used antibiotics Clindamycin, erythromycin, Ciprofloxacin, Amikacin & Linezolid, Vancomycin, Gentamicin.

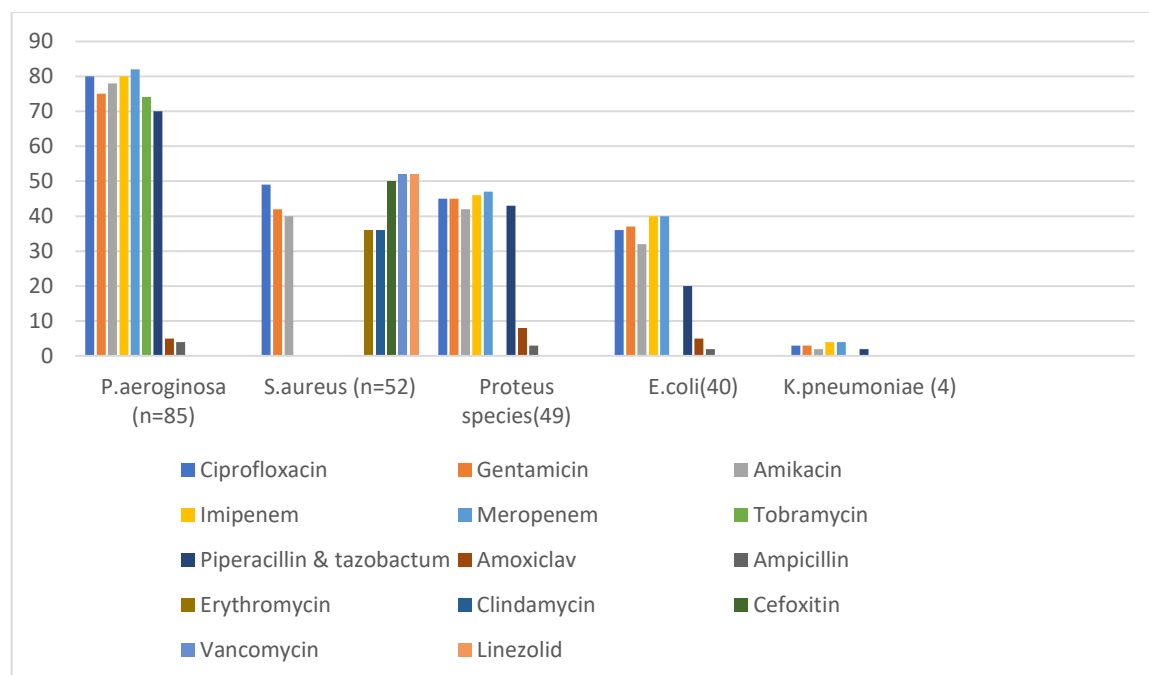
Table 2: Sensitivity pattern of Gram negative isolates

Organism	Ciprofloxacin	Gentamicin	Amikacin	Imipenem	Meropenem	Tobramycin	Piperacillin & tazobactam	Amoxiclav	Ampicillin
P.aeruginosa (n=85)	80 (94.11%)	75(88.23%)	78(91.76%)	80(94.11%)	82(96.47%)	74(87.05%)	70(82.35%)	5(5.88%)	4(4.70%)
Proteus species(49)	45 (91.83%)	45(91.83%)	42(85.71%)	46(93.87%)	47(95.91%)	-	43(87.75%)	8(16.32%)	3(6.12%)
E.coli(40)	36(90%)	37(92.5%)	32(80%)	40(100%)	40(100%)	-	20(50%)	5(12.5%)	2(5%)
K.pneumoniae (4)	3(75%)	3(75%)	2(50%)	4(100%)	4(100%)	-	2(50%)	0	0

Table 3: Sensitivity pattern of Gram positive isolates

Organism	Ciprofloxacin	Gentamicin	Amikacin	Erythromycin	Clindamycin	Cefoxitin	Vancomycin	Linezolid
S.aureus N=52	49(94.23%)	42(40.76%)	40(76.92%)	36(69.23%)	36(69.23%)	50(96.15%)	52(100%)	52(100%)

Figure 4: Sensitivity pattern of isolated organism



DISCUSSION

CSOM is a condition of the middle ear that is characterized by persistent or recurrent discharge through a chronic perforation of the tympanic membrane. Untreated cases of CSOM can result in a broad range of complications. Out of the 400 swabs 230(57.5%) yielded positive cultures, on Blood agar and Mackonkey medium, for different aerobic bacteria and 170 (47.5%) was culture negative. There were no fungal isolates on these media. The commonest bacteria isolated were *Pseudomonas aeruginosa* followed by *S. aureus*, proteus and *E. coli*. This is not different from Tanmoy Deb et al⁶. The present study revealed that 77.39% isolates were gram negative aerobic bacteria, as was found in other studies.^{6,7}

Quinolones, especially ciprofloxacin was found to be effective in eradicating majority of the gram negative bacteria, in which it was tested. In fact in this study it is seen that a cheaper drug like ciprofloxacin is almost 90-96% successful as far as *P. aeruginosa* is concerned. A randomised controlled trial of 0.3% ciprofloxacin drops found a significantly higher rate of elimination of ear discharge^[6,8]. A significant 47% swabs did not grow any aerobic bacteria and they were culture negative.^[6] However, with all the drawbacks and resource crunch in our civil hospital we were successful in having a glimpse of the aerobic bacteria involved in CSOM, in our part of the country and efficacy of ciprofloxacin in the management of CSOM could also be tested to a significant extent. Otolologists trained in allergic diagnostics tests have realized that allergic otitis media superimposed on CSOM is a definite and not uncommon clinical entity, the permanent central perforation of tympanic membrane allowing dusts, moulds and pollens to easily enter and sensitize the middle ear mucosa.^[9] Similarly in some studies anaerobes and fungus were isolated in small to significant number of patients.^[10]

CONCLUSION

- It is concluded that gram negative aerobic bacteria especially pseudomonas is significantly associated with CSOM and ciprofloxacin is a preferable tool in the treatment of CSOM because of its lower cost, lack of ototoxicity and ubiquitous availability as topical and oral preparations.
- Knowledge of the pathogens and antibiotic sensitivity pattern responsible for CSOM and choosing suitable antibiotics according to susceptibility tests should guide the management of disease treatment and reduces intracranial and extra cranial complications with CSOM.
- In this era of increasing resistance to antimicrobial agents by bacteria, a periodic surveillance of bacteriological profile is essential for effective management of CSOM.

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