



## Microbiological Study of Chronic Suppurative Otitis Media in Indian Population

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### Abstract

A total 201 discharge from ear (pus) were collected from different patients. The study was carried out in patients and out patients in the hospital.

The specific objective of this study was to do microbiological study of Chronic suppurative otitis media.

The results of this study showed, the commonest clinical isolate was *P.aeruginosa* (52%) followed *Staphylococcus aureus* (40%), *E.coli* (6%), *Proteus*(2%) and *Aspergillus Niger* (4%) in which male were (56%) and females were (44%). Widespread use of antibiotics has precipitated emergence of multiple resistance strains of bacteria. Changes in the microbiological flora following the advent of sophisticated synthetic antibiotics increase the relevance of reappraisal of modern day flora of CSOM and their invitro antibiotic sensitivity pattern is very important for clinicians to plan a general outline of treatment for a patient with discharging ear. Among the bacteria responsible for CSOM, *Pseudomonas aeruginosa* has been particularly blamed for deep-seated and progressive destruction of middle ear and mastoid structures.

**Keywords:** CSOM, otitis media, *pseudomonas aeruginosa*, ear discharge.

### Introduction

Chronic suppurative otitis media (CSOM) is defined as chronic inflammation of middle ear and mastoid cavity which presents recurrent ear discharges or otorrhea through tympanic perforation.<sup>(1)</sup>

Investigation of bacteriology of CSOM regarding management of both medical and surgical therapies have same goal that is achieve a safe ear otitis media in patients attending hospital with special emphasis on seasonal variation(Maji Pk,

Chattarjer TK, 2007)<sup>(2)</sup>. A bacteriological study of CSOM with *Pseudomonas aeruginosa* as the prime pathogen (Chandrashekhar MR, 2004).<sup>(3)</sup>

Risk factors of otitis media include young age, overcrowding, inadequate housing, poor hygiene, lack of breast feeding, poor nutrition, exposure to cigarette, high rates of nasopharyngeal colonization with potentially pathogenic bacteria and poverty. Suppurative otitis media often starts in infancy and is among top five common illness in childhood. Infection generally results from

fungal and bacterial causes and viral infection like upper respiratory tract infections and tuberculosis. The predominant aerobes are gram negative rods *Pseudomonas* and gram positive cocci *Staphylococcus aureus*.<sup>(3)</sup>

It affects 84% of children by the age of 3 years. It begins in childhood as spontaneous tympanic perforation due to an acute infection of middle ear known as Acute Otitis media. In acute otitis media, the bacteria found in middle ear is *Staphylococcus aureus* or *Streptococcus pneumoniae*. Otitis media presents with nearly acute phase, with essentially reversible mucosal and bony ossicles. This is followed by ossicular destruction which together with the tympanic perforation contribute to hearing loss. Because of its longer duration and severity in inhibit cognitive development in children. Generally patients with tympanic perforations continue to discharge mucoid material of period from 6 weeks to 3 months, despite medical treatment. Therefore, the present study is undertaken to study microbiological effects and antibiotic susceptibility of CSOM by various microorganisms in NIMS hospital. Using Erythromycin (15mcg), Vancomycin (30mcg), Linezolid (30mcg), Clindamycin (02mcg), Ofloxacin (05mcg) for GPC. Tobramycin (10mcg), Amikacin (30mcg), Ticarcillin (75mcg), Meropenem (10mcg), Ceftazidime (30mcg), Gentamycin (10mcg), Ciprofloxacin (5mcg), Himedia, Mumbai, India and Cefoperazone/Salbactam (75mcg) Pfizer, India for GNB.

### Material and Methods

This study is carried out in department of Microbiology in NIMS Medical college & Hospital, Jaipur. A total of 201 discharge from ear (pus) are collected consecutively. The study is carried out by using (Kirby-Bauer Method) to determine the antimicrobial susceptibility of various isolates from in-patients and out-patients in hospital.

Clinical specimen used for the study are ear (pus) swabs. Information including age, sex and type of isolates are recorded. All the isolates are identified using colony morphology on Blood agar,

MacConkey agar, Nutrient agar, Sabarouse dextrose agar, KOH mount, Gram staining characteristics, motility detection and all biochemical reactions including oxidase, indole, citrate, urease and Triple sugar iron test done.

### Results

A total of 201 discharge from ear (pus) swabs were collected consecutively from male and female patients. One hundred and twelve patients (56%) were Males and Eighty nine patients (44%) were Females. This study was conducted to find out the microbiological etiology of CSOM. In this study, the commonest clinical isolate was *P. aeruginosa* (52%), *Staphylococcus aureus* (40%), *E.coli*(6%), *Proteus*(2%) and *Aspergillus Niger* (4%).

Out of the total 201 samples, highest rate of infection (54%) was observed in age group 0-20 yrs,(40%) in 21-40 yrs and (6%) in 40-60 yrs age group. The highest sensitivity rate for *Pseudomonas aeruginosa* was found for Amikacin (88%), Aztreonam (84%), Tobramycin (76%), Ciprofloxacin (69%), Meropenam (69%), Cefoperazone/Salbactam(53%), Ticarcillin/Clavulanic acid((42%), Ceftazidime(38%). The highest resistance rate was observed against Ceftazidime(61%). The problem of increasing resistance to *P. aeruginosa* has limited the use of other classes of antibiotics like fluoroquinolones, tetracycline, macrolides and chloramphenicol.

The highest sensitive rate for *Staphylococcus aureus* was found (100%) for Vancomycin and Linezolid, Cefoperazone/Salbactam (85%), Amikacin (75%), Clindamycin (70%), Piperacillin/Ticarcillin (60%), Erythromycin(45%) and Ofloxacin(30%). The highest resistance rate was observed against Erythromycin(55%). Similarly for other GNB isolates, 100% sensitivity was found with Cefoperazone, Cefepime, Amikacin, Piperacillin/Tazobactam, Ticarcillin/Clavulanic acid, Gentamycin(66%) and Ampicillin (33%). Highest resistance rate observed was with Ampicillin (66%).

## Discussion

This study was conducted to find out the microbiological etiology of CSOM. In this study, the commonest clinical isolate was *P. aeruginosa* (52%), *Staphylococcus aureus* (40%), *E.coli*(6%), *Proteus* (2%) and *Aspergillus Niger*(4%). Similar findings were reported by Shamin Rahman et. al. and Favour Osazuswa et. al. Oyeleke S. B. also reported higher prevalence of *Pseudomonas* sp. in their study. In other study by Bello et. al. *Staphylococcus aureus* was reported to be the commonest isolate.<sup>(4)</sup> However the incidence of Aspergillosis was reported by P.Talwar et. al.<sup>(5)</sup>

In this study the prevalence of CSOM was more common in males (56%) as compared to females(44%). This is in comparison with findings of Rao and Reddy et. al., Oguntibeju et. al. and Gulati et.al.<sup>(6)</sup> while, in other findings by Shreshtha et. al. higher incidence (55.2%) of infection was found in females.<sup>(7)</sup> The study revealed the highest infection rate of CSOM in age group 0-20yrs (54%) while it was found to be highest on the age group 20-30yrs by Erkan Mustafa Induharan R and Vijaya D, and iso Gulati and Taneja MK in separate studies.<sup>(8)</sup>

In present study Amikacin showed highest sensitivity (88.46%) and (11.54%) resistance against *Pseudomonas aeruginosa*. In another study done in Malaysia by Siva Gowri et. al. Amikacin showed the (80.6%) sensitivity against *Pseudomonas* and resistance rate was (19.4%) which is in concordance with the present study. Tobramycin showed 76.92% sensitivity against *Pseudomonas aeruginosa* and resistance rate observed was 23.07%. In a study done in J.J. Medical College, Bangalore, Tobramycin showed 72.15% sensitivity against *Pseudomonas aeruginosa* and 17.85% resistant rate while, in another study done in SKIMS in Kashmir Tobramycin showed 54.2% sensitivity and 45.8% resistance rate against *Pseudomonas aeruginosa*.<sup>(12)</sup> Similarly, 100% sensitivity with Vancomycin and Linezolid was observed in case of *Staphylococcus aureus* followed by their sensitivity against Cefoperazone/Sulbactam 85%, Amikacin 75%, Clindamycin 70%,

Piperacillin/Tazobactam 60%, Erythromycin 45% and Ofloxacin 30%. Similar high susceptibility against Clindamycin and Aminoglycoside was reported by Alo et. al. and Taneja et. al. in separate study.<sup>(9)</sup> Highest resistant of 55% was observed with Erythromycin in the present study, while 100 % sensitivity was reported by Alo et. al. and 53% sensitivity was reported by V.K. Poorey et. al which is not in agreement with our study.<sup>(10)</sup> However high resistant to Erythromycin reported by Bello et. al. is in agreement with our study.<sup>(11)</sup> In the present study in case of *E.coli*, 100% sensitivity was observed with Cefoperazone/Sulbactam, Cefepime, Amikacin, Piperacillin/Tazobactam and Ticarcillin/Clavulanic acid followed by 66.66% sensitivity with Meropenam and Gentamycin. Similarly highest sensitivity of 100% with Amikacin was reported by V.K. Poorey et. al. Lee also reported high sensitivity with Cefoperazone/Sulbactam and Ofloxacin. Thus, the present study indicates Amikacin to be the most effective drug for the treatment of CSOM. The bacterial pathogens responsible for otitis media are pathogenic, hence attempt should be made to reduce the factors militating the incidence of these pathogens in the community. Despite the effectiveness of the antibiotics which are sensitive against the bacterial pathogens, prudent use of the antibiotics is strongly recommended.

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