**Original article:**

**A study of microbiological spectrum with its antibiotic susceptibility in patients of chronic suppurative otitis media at RIMS, Adilabad (AP)**

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**Abstract:**

**Introduction:** Microbiological predominance and their antibiotic sensitivity pattern change over time. Thus knowledge of the microbiological spectrum with antibiotic susceptibility of chronic suppurative otitis media, safe is imperative to deliver efficacious treatment of this disease. The appropriate antibiotic therapy is not only important to start the initial therapy for better clinical and surgical outcome but also to minimise antibiotic resistance.

**Aims and objective:** to study the microbiological profile and the antibiotic sensitivity in the patients of CSOM safe.

**Materials and methods:** this study was carried out at RIMS Adilabad which spanned over the period of 1 year from April 2011 to march 2012. A total of 100 patients of all age groups and both genders were included. The organisms isolated were identified by standard microbiological methods & antibiogram pattern was determined.

**Results:** the majority of the patients with CSOM safe were upto 30 years of age (85%), mean age being 18.96 years. The most common organism isolated was *Pseudomonas aeruginosa* [43 (43%)] sensitive to amikacin (100%) followed by *Staphylococcus aureus* [25 (25%)] sensitive to cefoxitin (100 %) and gentamycin (92%). Klebsiella pneumonae was isolated in 14 patients (14%) and was found 100% sensitive to gentamycin. These results suggest that amikacin, gentamycin and cefoxitin can be considered in the refractory cases.

**Conclusion:** The knowledge of microbiological profile with its antibiotic susceptibility in the respective region is of utmost importance for successful clinical and surgical outcome.

**Key Words:** Chronic suppurative otitis media (CSOM) Safe, Microbiological profile, Antibiotic sensitivity.

**Introduction:**

Chronic suppurative otitis media (CSOM) is characterized by persistent or recurrent and rarely refractory otorrhoea. This persistence of discharge could be attributed to the changing microbial trends and their resistance to the antimicrobial therapy. Irrational and injudicious use of antibiotics causing emergence of new strains is the cause of resistance in most of the cases. Important fallout of the chronicity of infection in middle ear is progressive conductive hearing loss apart from influencing surgical outcome.

Hence insight in changing pattern of microbes and their antibiotic susceptibility and sensitivity is of utmost importance to the treating physician for desired and best clinical outcome like...
dry disease free ear with good hearing. We believe that a scientific study in the geographical area in question to look at the microbial pattern and their antibiotic sensitivity can determine the prevalent bacterial organisms causing Chronic middle ear infection like CSOM and can go a long way in instituting plausible initial treatment of otitis media and its complications. Treatment based on antibiogram not only treats the event but helps in preventing the emergence of resistant strains also.

In this backdrop this study was planned and carried out at RIMS Abilabad with the principle aim of finding out the native pattern of microorganisms in the patients of safe CSOM and their antibiotic sensitivity.

**Materials and methods:** This observational prospective study was carried out in ENT OPD at Rajiv Gandhi Institute of Medical Sciences (RIMS) Adilabad, Andhra pradesh spanning over the period of 1 year from April 2011 to March 2012. A total of 100 patients of all age groups and both genders were included in this study.

**Inclusion criteria:**
1. Patients with CSOM safe (tubotympanic type) of all age group
2. Only those patients of CSOM who have not received any treatment either systemic or local in the form of eardrops for the last seven days

**Exclusion Criteria**
1. Those patients of CSOM who have received treatment either systemic or local in the form of eardrops for the last seven days
2. Patients with unsafe ear that is cholestatomatous CSOM

The ear discharge from each diseased ear was taken on a sterile swab in ENT OPD and sent to the Microbiology Department for their Gram staining, direct microscopy with KOH, Culture sensitivity, and Culture Sensitivity testing. Above swabs which were taken from the deeper part of External Auditory Canal under all aseptic precautions were inoculated on MacConkey’s, Blood, Chocolate and Sabouraud’s Dextrose agar and incubated aerobically at 37 degree for 24-48 hrs. Antimicrobial susceptibility testing was performed on Muller Hilton agar using the modified Kirby Bauer disc diffusion method.

The range of antibiotics tested was: Amikacin, Gentamycin, Ciprofloxacin, Ceftazidime, Ceftriaxone, cotrimoxazole, Augmentin (Amoxycillin/Clavulanic Acid), ticarcillin, ticarcillin+clavulenic acid, pipracillin, cefoxitin.

**Statistical analysis**
The data was analyzed by using Statistical Package for Social Sciences (SPSS) version 11 and the prevalence of organisms was determined and expressed in percentage.

**Results:** A yearlong observational prospective study was carried out in ENT OPD at RIMS Adilabad (A.P). A total of 100 patients of all age groups and both genders were included in this study. Following are the observations. Age of the patients ranged from 1 yr to 50 years with the mean age of 18.96 years. Age wise distribution of patients is given in table and graph no. 1. Almost a third of patients i.e. 33 (33%) patients were observed in the age group of 0-10 years while 23 (23%) and 29 (29%) were seen in 2nd and 3rd decade respectively.

52 (52%) patients were males and 48 (48%) were females. The most common microorganism isolated was Pseudomonas auriginosa in 43 (43%) patients followed by staphylococcus aureus 25 (25%), klebsiella pneumonia 14 (14%), E.coli and proteus Mirabilis 8(8%) each and citerobacter freundi (2). This is given in graph 2.

In this study we observed that the most common organism emerged in the study i.e. Pseudomas was 100% sensitive to amikacin and
whereas 82% sensitive to ceftazidime and ticarcillin+clavulinic acid. Another important organism, Staphylococcus aureus was sensitive to cefoxitin (100%) , gentamycin (92%) and ceftriaxone (90). Klebsiella pneumoniae, E.coli, Proteus mirabilis were sensitive to gentamycin (100%). Another important observation was that Pseudomonas auriginosa was sensitive to ciprofloxacin in only 50% of cases whereas staphylococcus aureus was sensitive in 75% and Proteus mirabilis was 100% sensitive to ciprofloxacin. Proteus mirabilis was found to be sensitive to amoxicillin and clavulinic acid, ceftriaxone and cotrimoxazole. This is given in table 2 and graph no. 3.

Graph 1: Age wise distribution.

Graph 2: Number and types of microflora
Graph 3: Antibiotic susceptibility of various isolated organisms.

Table no. 1 – Age wise distribution of patients

<table>
<thead>
<tr>
<th>age</th>
<th>No. of pts</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-10</td>
<td>33</td>
</tr>
<tr>
<td>11-20</td>
<td>23</td>
</tr>
<tr>
<td>21-30</td>
<td>29</td>
</tr>
<tr>
<td>31-40</td>
<td>8</td>
</tr>
<tr>
<td>41-50</td>
<td>7</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 2: Organism susceptibility to antimicrobials in percentage

<table>
<thead>
<tr>
<th>Organisms</th>
<th>Amk</th>
<th>Gm</th>
<th>Aug</th>
<th>Ti+clav</th>
<th>Cfxt</th>
<th>Cipro</th>
<th>Ery</th>
<th>Ceftri</th>
<th>Ctz</th>
<th>Cfz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pseudomonas aeruginosa</td>
<td>100</td>
<td>85</td>
<td>resist</td>
<td>84</td>
<td>resist</td>
<td>52</td>
<td>resis</td>
<td>resis</td>
<td>Resis</td>
<td>84</td>
</tr>
<tr>
<td>Staphylococcus aureus</td>
<td>-</td>
<td>92</td>
<td>72</td>
<td>-</td>
<td>100</td>
<td>75</td>
<td>68</td>
<td>90</td>
<td>36</td>
<td>-</td>
</tr>
<tr>
<td>E.coli</td>
<td>-</td>
<td>100</td>
<td>-</td>
<td>-</td>
<td>50</td>
<td>resis</td>
<td>38</td>
<td>Resis</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Klebsiella pneumoniae</td>
<td>-</td>
<td>100</td>
<td>42</td>
<td>-</td>
<td>35</td>
<td>-</td>
<td>8</td>
<td>Resis</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Proteus mirabilis</td>
<td>-</td>
<td>100</td>
<td>88</td>
<td>-</td>
<td>-</td>
<td>100</td>
<td>-</td>
<td>88</td>
<td>75</td>
<td>-</td>
</tr>
</tbody>
</table>

[ Amk-Amikacin, Gm-Gentamycin, Aug-Augmentin, Ti+clav-Ticarcillin+Clavulunic acid, Cfxt-Cefoxitin, Cipro-Ciprofloxacan, Ery-Erythromycin, Ceftri-Ceftriaxone, Ctz-Cotrimaxazole, Cfz-Ceftazidime.]
Discussion:
Chronic suppurrative otitis media (CSOM) tubotympanic type is one of the commonest diseases encountered by an otolaryngologist in his day to day practice. Chronicity of the disease can be attributed to low socio economic status with poor affordability, neglecting the discharging ear, inadequate and improper treatment. By itself CSOM safe is not a fatal disease and has a good prognosis with respect to control of infection. Much of the morbidity of CSOM comes from the associated conductive hearing loss and the social stigma of an often fetid fluid draining from the affected ear. Complications can rarely be seen in immunocomprrmised host or highly virulent organism

Microbiological predominance and their antibiotic sensitivity pattern change over time. Thus knowledge of the microbiological spectrum is imperative to deliver efficacious treatment of this disease. This also additionally helps in cutting down the potential risks of complications. Moreover, the wide spread use of antibiotics at times injudicious and indiscriminate, has changed the microbiological flora. Hence the scientific exercise to study of microbiological profile in the one’s native area is immensely important for the better management of CSOM.

In our study, majority of the patients i.e 85% , belonged to the age group of 1-30 years out of which almost one third were below 10 years. Predominating presence of CSOM in younger decades is established fact .Our findings are in accordance with study done by Wariso et al7. The high incidence of the CSOM in this age group is due to short & wider eustachian tube, mothers’ breast feeding the child in supine position. This is in consistent with studies done by different workers8,9

Out of 100 micro organisms isolated from our study, the predominant bacterium was Pseudomonas aeruginosa 43 (43%) followed by Staphylococcus aureus 25(25%).Band of investigators 2,3,4,5,6 have echoed similar observations and thus in consonance with our study. Contrary to this some workers 7,8,9,10 have reported Staphylococcus aureus is a predominant isolate followed by Pseudomonas aeruginosa.. The findings emerging out from different studies indicate the variations in micro organisms. This can be ascribed to climate, environmental influence geographical factors and antibiotic usage 12 .

In our study; based on the antiibiogram pattern, 90% of the isolates which includes Pseudomonas, Staphylococci and members of Enterobacteriaceae family were sensitive to Amikacin and gentamicin. Pseudomonal infections commonly resist macrolides, extended-spectrum penicillins, and first- and second-generation cephalosporins. Our observations are consistent with other studies which also have reported .Amikacin is the most potent and effective drug 13. In stark contrast. Moorthy et al 11 reported Ciprofloxacin as the most effective drug..

Conclusion
Continuous and periodic evaluation of microbiological pattern and antibiotic sensitivity of tubotympanic type of CSOM is desirable to eliminate the potential risks of complications due to chronic and lingering infection. This can be achieved by early institution of appropriate systemic and topical antibiotic coupled with surgical management in form of tympanoplasty and ossiculoplasty.

Since the most common organisms in our clinical set up being P. aeruginosa S. aureus, K.pneumonae , P. mirabilis showing a percentage susceptibility of 100% to amikacin .prompts us to make it an initial antibiotic combination therapy of
choice in the recent times. This is all the more important as cases resistant to routine antibiotics like amoxicillin-clavulanic acid, ceftriaxone, quinolones and macrolides are so commonly encountered. So better/best clinical outcome can be achieved by combining beta-lactam (amoxicillin–clavulanic acid) with aminoglycosides (amikacin/gentamycin). We believe strongly that our data may contribute to an effective medical management of safe chronic suppurative otitis media.

References:
