ABSTRACT

To study the pattern of Chronic Suppurative Otitis Media caused by the aerobic bacteria and to determine the antibiotic sensitivity of the isolated organisms. The ear discharge from one hundred patients with the clinical diagnosis of chronic suppurative otitis media with or without complications was collected and investigated by direct smears and culture methods for isolation of aerobic bacteria and tested for their antibiotic sensitivity. Majority of the cases were of the age 0-20 yrs (71%). Direct smear examination and culture was positive in 93% of cases. Pseudomonas aeruginosa was the most common isolate (40%). The sensitivity pattern for the isolated aerobes was maximum for Amoxiclav and the least for Clindamycin. Microbial Culture and sensitivity helps in appropriate management of CSOM.

Key-words: Chronic suppurative otitis media, ear discharge, antibiotic sensitivity

INTRODUCTION

Otitis media is an inflammation of the middle ear that affects the tympanic membrane. Clinically, otitis media may be classified as acute, subacute, and chronic suppurative otitis media (CSOM). CSOM is a chronic suppurative inflammation of the middle ear cleft leading to dangerous complications like meningitis and subdural abscess in the absence of timely management. Since the introduction of antibiotics, complications have become less common. However their occurrence should not be underestimated due to the morbidity and mortality associated with them. Microbial culture and sensitivity helps in appropriate management of CSOM. The purpose of this study was to acquire data on the pattern of CSOM caused by aerobic bacterial flora and to determine the
antibiotic sensitivity of the isolated organisms prevalent in our hospital.

**MATERIALS AND METHODS**

100 patients suffering from CSOM were randomly selected from the department of Otorhinolaryngology, Narayana Hospital, Narayana Medical College, Nellore. The ear discharge was collected under aseptic precautions with an aid of an aural speculum, prior to the instillation of any topical medication.

The first swab was used to make a smear on a clean glass slide for direct smear examination by Gram’s stain. The second swab was processed for the isolation of aerobic bacteria.

**Direct Smear examination**: Gram’s stain was performed by Jensen’s modification and then screened under oil immersion to note the various morphological types of bacteria, their number, the presence or absence of inflammatory cells and the number of squamous epithelial cells in the sample.

**Aerobic Culture**: the swab on reaching the laboratory was inoculated on the following culture media.

- Mac conkey agar plate
- Blood agar plate
- Chocolate agar plate and
- Nutrient agar plate to isolate the organisms.

The inoculated Blood agar and Mac conkey agar plates were incubated aerobically at 37degree C for 24 hours.

After overnight incubation at 37 degrees C the blood agar and Mac conkey agar plates were examined for evidence of growth. The colony characters were studied; smears were stained by Gram’s stain and examined under the 100X objective.

After 48 hours incubation the chocolate agar plate was similarly examined and the colonies further processed.

The bacterial species then isolated were identified by morphology, cultural characteristics and bio-chemical reactions according to the standard techniques.

Staphylococci were identified as Staphylococcus aureus and Staphylococcus albus. this was done by taking in to account colony characteristics (large, circular, smooth, convex, shiny, opaque and easily emulsifiable), pigmentation (white to golden yellow), mannitol fermentation and coagulase test. The slide coagulase test was done as per Williams and Harper (1946) method and the tube coagulase test was done as per Gillespie’s method.

The Gram negative bacilli were tested for motility by hanging drop and then subjected to other biochemical and sugar fermentation tests. The tests were read after incubation at the end of 24 hours and 48 hours.

The sugars were used to study the fermentation reaction with Glucose, lactose, sucrose, maltose and Mannitol. The Bio-chemical tests done were Indole, Methylred, Voges-Proskauer, citrate (IMVIC) and Urease.
All sugar fermentation and biochemical tests were done from the subcultures made from isolated colonies picked from the primary isolation media. All subcultures were incubated before putting up the sugar and biochemical tests. After the subcultures reached Mc Farland's Grade 3 turbidity the sugars and biochemical tests were put up and incubated at 37 Degrees C for 24 hours and 48 hours.

**Antibiotic Sensitivity tests:**

Antibiotic sensitivity testing was done by Kirby Bauer disk diffusion method.

The antibiotics used were

- Amoxicillin
- Cephemide
- Ceftazidime
- Ciproflaxacin
- Chloramphenicol
- Amoxiclav
- Cefaperazone with sulbactum
- Cefotaxime
- Sporfloxacin
- Ampicillin
- Erythromycin
- Vancomycin
- Penicillin
- Oxacillin
- Cephazoline
- Azithromycin

**RESULTS AND DISCUSSION:-**

One hundred patients attending the ENT Department of Narayana Medical College Hospital, Nellore, with the clinical diagnosis of chronic suppurative otitis media with or without complications were included in the study. The ear discharge was collected and investigated by direct smears and culture methods for isolation of aerobic bacteria and tested for their antibiotic sensitivity.

**Demographic Data:-**

Of the hundred patients studied, 73 belonged to urban area and 27 belonged to the rural area (Table 1). Out of one hundred patients studied, 57 patients were male and 43 patients female. (Table 2). A total of 74 cases (74%) were uncomplicated and 26 cases (26%) were associated with complications. Out of these 26 cases, conductive deafness was present in 8 cases (8%). Granulations with polyp was seen in 8 cases (8%) . 4 had facial palsy (4%).4 cases had mastoiditis (4%) and 2 cases (2%) had vertigo with vomiting.

Out of the 100 specimens, 93 (93%) were direct smear positive and culture positive. 7 specimens (7%) were sterile by culture and also did not show any organism on direct smear examination.

Out of a total 93 strains

59 strains were sensitive to Amoxiclov,

55 strains were sensitive to Amikacin,

40 strains were sensitive to Gentamycin

38 strains were sensitive to Erythromycin
36 strains were sensitive to Azithromycin
33 strains were sensitive to Netilmicin
13 strains were sensitive to cefaperazone with sulbactum (Magnex)
13 strains were sensitive to Chloramphenicol
12 strains were sensitive to Clindamycin

**DISCUSSION**

According to Senturia the acute phase of otitis media is considered to be the initial three weeks of inflammation, chronic phase three months following the onset of inflammation and subacute phase is said to be between three weeks and three months of inflammation. In this particular study of one hundred cases, all the patients had symptoms lasting more than three months, mainly the symptoms being, ear discharge, pain in the ear, and other signs of inflammation like fever. Hence all the cases belong to the group of chronic suppurative otitis media. Out of the 100 cases of CSOM studied the highest incidence 71% was observed in the 0-20 age group. This finding corresponds with the work published by other authors Gulati et al, Baruah et al, Nandan singh and Radha bhasker, Changani and Goyal, A.Nandy, PS Mallayaand K.Sivaranjan.

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Nelson’s Textbook of Pediatrics and NM Moshi et al report a high incidence in the first decade of life, where as Laxmi naidu and Arya and Mahepatra reported the highest among the 11-20 yr age group.

**CONCLUSION**

One hundred patients with the clinical diagnosis of chronic suppurative otitis media attending the outpatient department of Narayana Hospital, attached to Narayana Medical College, Nellore formed the study group. They were investigated by direct smears and culture methods for the isolation of aerobic bacteria.

1. Majority of the cases were of the age 0-20 yrs (71%). The overall incidence was found to be higher in males (57%) as compared to females (43%).
2. Direct examination revealed the presence of bacteria in 93% of cases. The overall rate of culture positives was 93% and 7% of cases were culture negative.
3. Majority of cases were unilateral in nature.
4. Monomicrobial aetiology was found to be the common among the study group.
5. Among the aerobes, Pseudomonas aeruginosa was the most common isolate (40%), the other organisms in the order of decreasing frequency were,
Staphylococcus aureus – 31%
Escherichia coli – 12%
Proteus vulgaris -5%
Klebsiella -5%

Monomicrobial infection was found to be common in this study.

6. Complications in the neglected cases of suppurative otitis media noted are conductive deafness (8%), Granulomatous polyp formation (8%), Mastoiditis (4%), facial palsy (4%) and Vertigo (2%).

7. The sensitivity pattern for the isolated aerobes in the decreasing order of frequency is Amoxiclav, Amikacin, Gentamycin, Erythromycin, Azithromycin, Netilmycin, Cephaperazone with Sulbactum, Chloramphenicol and Clindamycin.

REFERENCES :


TABLE 1: Place of residence and Prevalence of CSOM

<table>
<thead>
<tr>
<th>Situation</th>
<th>No of cases</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Urban</td>
<td>73</td>
<td>73%</td>
</tr>
<tr>
<td>Rural</td>
<td>27</td>
<td>27%</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100%</td>
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TABLE 2: Gender and prevalence of CSOM

<table>
<thead>
<tr>
<th>GENDER</th>
<th>NO OF CASES</th>
<th>PERCENTAGE</th>
</tr>
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<tbody>
<tr>
<td>Male</td>
<td>57</td>
<td>57%</td>
</tr>
<tr>
<td>Female</td>
<td>43</td>
<td>43%</td>
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TABLE 3: Predominant side of otitis media

<table>
<thead>
<tr>
<th>Ear Discharge</th>
<th>Number</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Right Ear</td>
<td>62</td>
<td>62%</td>
</tr>
<tr>
<td>Left Ear</td>
<td>33</td>
<td>33%</td>
</tr>
<tr>
<td>Both Ears</td>
<td>5</td>
<td>5%</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100%</td>
</tr>
</tbody>
</table>

FIGURE 1: Age and gender-wise prevalence of CSOM
FIGURE 2: Culture results

FIGURE 3: Aerobic bacterial flora isolates

FIGURE 4: Antibiotic sensitivity pattern of aerobic organisms isolated