Aerobic bacteriology of Chronic Suppurative Otitis Media (CSOM) in a teaching hospital

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ABSTRACT

The present study was carried out to determine the aerobic microorganisms involved and their antibiotic sensitivity pattern in patients with Chronic Suppurative Otitis Media (CSOM) and to provide a guideline for empirical antibiotic therapy. A total of 100 patients with unilateral or bilateral active chronic suppurative otitis media attending the outpatient clinic were included in the study. They had chronic ear discharge and had not received antibiotics for the previous five days. Swabs were taken, and cultured for bacteria. Antibiotic testing was done using modified Kirby Bauer disk diffusion method as per CLSI guidelines. The highest incidence (29.72%) was that of Pseudomonas aeruginosa followed by Staphylococcus aureus (21.62%) and E.coli. Of the 10 fungal isolates, 6(60%) were Candida species (Candida albicans). Aspergillus was isolated in 4(40%). According to the results of drug susceptibility test, all isolated strains were sensitive to ofloxacin. Knowledge of the pathogens, responsible for CSOM and choose suitable antibiotics according to susceptibility tests should guide the management of disease treatment and reduces intracranial and extra cranial complications with CSOM.

Key words: Chronic suppurative otitis media, aerobic bacteriology, antibiotic sensitivity.

INTRODUCTION

Chronic suppurative otitis media (CSOM) is a commonly encountered infection of the middle ear. Chronic suppurative otitis media (CSOM) is a perforated tympanic membrane with persistent drainage from the middle ear. It is defined as infection of the middle ear that lasts more than 3 months and is accompanied by tympanic membrane perforation.[1]

It is one of the most common diseases of all age groups, especially of childhood. The disease is prevalent in developing countries and is a disease of the poverty.[2] Chronic discharging ears are highly prevalent in the tropical regions including South Asia. It may often be accompanied by complications including septicaemia, meningitis, brain abscess, facial paralysis and mental retardation and it is believed to be responsible for more than two-thirds of deafness in children[3-7]. Frequent upper respiratory tract infections and poor socioeconomic conditions (overcrowded housing and poor hygiene and nutrition) may be related to the development of chronic suppurative otitis media.[8-11] In chronic suppurative otitis media the most frequently isolated bacteria are Pseudomonas aeruginosa, Staphylococcus aureus, Proteus spp, Escherichia coli and Klebsiella spp [2].

CSOM has received considerable attention, not only because of its high incidence and chronicity, but also because of issues such as bacterial resistance and ototoxicity with both topical and systemic antibiotics. [12] This study was done to find the local pattern of aerobic microbes involved and their antimicrobial sensitivity pattern in cases of chronic suppurative otitis media and to provide a guideline for making a protocol for empirical antibiotic therapy.
MATERIALS AND METHODS

Hundred patients with CSOM who presented to the Ear, Nose and Throat (ENT) department, Bhakar Medical College, R.R.Dist from June 2011 to November 2011 were prospectively studied. None of them had received topical or systemic antibiotics for earlier 7 days. Purulent discharge samples from the clinically diagnosed cases of CSOM that were sent for culture and sensitivity to the Microbiology lab were included in this study. Sterile cotton swabs were used to collect the samples. In the laboratory, the ear discharges were examined microscopically (in 10% potassium hydroxide) for the presence of epithelial cells, pus cells, budding yeast cells, fungal hyphae and spores, etc. The pus swabs were cultured on Blood and MacConkeys agar and incubated aerobically at 37°C for an overnight. All organisms isolated were identified according to standard microbiological methods.[13] Antimicrobial susceptibility test was performed using Kirby- Bauer disc diffusion method according to Clinical and Laboratory Standards Institute guidelines. [14] Antimicrobial discs (Hi Media Laboratoriers, Pvt.Ltd, Mumbai) used for Pseudomonas aeruginosa were Amikacin(30µg), gentamicin(10µg), ciprofloxacin(5µg), ofloxacin(5µg), ceftazidime (30µg), piperacillin (100µg), carbenecillin (100µg), tobramycin (10µg), and for Staph aureus were cotrimoxazole (25µg), ampicillin ,cloxacillin (10 µg), gentamicin (10µg), ciprofloxacin (5µg), ofloxacin(5µg) and vancomycin (10µg). A part of the discharge was cultured on Sabouraud’s dextrose agar slant (with chloramphenicol 0.05) and was examined for gross and the microscopic morphology of the fungi.

RESULTS

In this study, 56% of patients were males and 44% were females. Patients ranged in age from 5 to 65 years with majority of them (80%) belonged to 5 to 20 years of age. Fifty two percent of patients had no previous visit and regular treatment.

The results of the mycological and the bacteriological studies on the 100 cases showed that microbiological culture was yielded from 88 samples (88). seventy four samples (74%) had a single organism isolated from the middle ear discharge, while the remaining 14 (14%) had two or more organisms isolated. There were 12 (12%) samples who had a sterile culture with no organism isolated. (Table-I)

<table>
<thead>
<tr>
<th>Type of organism</th>
<th>Total isolates</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Pure growth</td>
<td>74</td>
<td>74%</td>
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<tr>
<td>Mixed growth</td>
<td>14</td>
<td>14%</td>
</tr>
<tr>
<td>No growth</td>
<td>12</td>
<td>12%</td>
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<tr>
<td>Total</td>
<td>100</td>
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Pseudomonas species 22 (29.72%) was the commonest microbial organism to cause ear discharge followed by Staphylococcal16(21.62%) and Escherichia coli10(13.5%).

Among the fungal agents, Candida spps 06(8.10%) had been the commonest organism to be detected in ear discharge. 12% of the cultures did not reveal any microbiological agent.(Table II)

Pseudomonas species was isolated in 6(42.85%) of the total samples that yielded multi- organisms, Staph aureus in 02 (14.28%), Escherichia coli 02 (14.28%), Klebsiella spps in 01 (7.14%), Proteus species 01 (7.14%), and Candida in 02(14.28). (Table-III)

<table>
<thead>
<tr>
<th>Type of organism</th>
<th>Total isolates</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pseudomonas aeruginosa</td>
<td>22</td>
<td>29.72%</td>
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<tr>
<td>Staphylococci aureus</td>
<td>16</td>
<td>21.62%</td>
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<td>CONS</td>
<td>05</td>
<td>6.7%</td>
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<tr>
<td>Escherichia coli</td>
<td>10</td>
<td>13.5%</td>
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<tr>
<td>Proteus spps</td>
<td>06</td>
<td>8.1%</td>
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<tr>
<td>Klebsiella species</td>
<td>05</td>
<td>6.7%</td>
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<tr>
<td>Candida spps</td>
<td>06</td>
<td>8.1%</td>
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<tr>
<td>Aspergillus spps</td>
<td>04</td>
<td>5.40%</td>
</tr>
<tr>
<td>Total</td>
<td>74</td>
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The antimicrobial sensitivities of the bacteria were tested and the results for most common bacteria include Pseudomonas aeruginosa was shown to be sensitive to ofloxacin, amikacin, tobramycin, ciprofloxacin, piperacillin and ceftazadime while Staphylococcus aureus was sensitive to ofloxacin, cloxacillin, vancomycin and amikacin.

DISCUSSION

Chronic suppurative otitis media (CSOM) is a condition of the middle ear that is characterized by persistent or recurrent discharge through a chronic perforation of the tympanic membrane. Due to the perforated tympanic membrane, bacteria can gain entry into the middle ear via the external ear canal. Infection of the middle ear mucosa subsequently results in ear discharge. Untreated cases of CSOM can result in a broad range of complications. These may be related to the spread of bacteria to structures adjacent to the ear or to local damage in the middle ear itself. Such complications range from persistent otorrhea, mastoiditis, labyrinthitis, facial nerve paralysis to more serious intracranial abscesses or thromboses. While the incidence of such complications is low, they need to be borne in mind while treating a patient with active CSOM. Early bacteriological diagnosis of all cases will assure accurate and appropriate effective therapy. Treatment hence needs to be instituted early and effectively to avoid such complications. Knowledge of the local microorganism pattern and their antibiotic sensitivity is essential for effective and cost-saving treatment. The disease is considered to be a major problem in the developing world with a relatively high morbidity and mortality. The overall prevalence of CSOM in these countries ranges from 5-10%. Based on results from present study, the most common aerobic organisms of CSOM were P. aeruginosa, S. aureus, Escherichia coli, P. mirabilis and Klebsiella. These findings correlate with earlier studies. Similarly, P. aeruginosa was the most prevalent organism followed by S. aureus, isolated from CSOM cases reported in several studies. With the development and widespread use of antibiotics, the types of pathogenic microorganisms and their resistance to antibiotics have changed. Knowledge of the species and resistance rates of current pathogens is important for determining the appropriate antibiotics for patients with chronic suppurative otitis media.

Ofloxacin was found to be the most sensitive antibiotic from the antimicrobial profile of tested microorganisms which is also comparable with the study by S. Nikakhlagh et al. Almost all isolates were sensitive to ofloxacin. P. aeruginosa, Escherichia coli and Klebsiella sp. showed 98% sensitivity to amikacin. Pseudomonas aeruginosa were sensitive to aminoglycosides, i.e., amikacin and gentamicin and it is also supported by previous studies in Nepal, India and Mansoor T et al (2009). It is indicated that Ceftazidime is very effective to treat nosocomial infections and pediatric patients but not active against Pseudomonas aeruginosa that causing CSOM and other otogenic complications. In accordance to this our study shows 58% of isolates were found to be sensitive to Ceftazidime. The antibiotic sensitivity pattern of Staphylococcus aureus in our study revealed that 90% to amikacin, 83.3% to gentamicin 78.5% to cloxacillin, 86% to ofloxacin and 28% to ciprofloxacin.

CONCLUSION

The study suggests that the common etiological agents for Chronic Suppurative Otitis Media were Pseudomonas aeruginosa followed by Staphylococcus aureus.
The antimicrobial susceptibility studies showed amikacin and ofloxacin as the most effective antibiotics.

REFERENCES