Bacteriological Study of Discharging Ear in Patients of Active Mucosal Chronic Otitis Media Attending a Tertiary Care Hospital

Ihsanullah, Sharafat Ali Khan, Naveed Khan, Muhammad Iqbal, Sohail Khan, Gulshan Hussain

ABSTRACT

Background: Chronic otitis media (COM) is one of the most commonly encountered diseases in the otolaryngology practice. Active mucosal COM is one of the four types of COM. Active mucosal chronic otitis media is a longstanding infection of a part or whole of mucoperiosteal lining of middle ear cleft characterized by ear discharge and a permanent perforation. This is more prevalent in the underdeveloped countries and having potential complications. It is a disease well known for its recurrence and persistence despite treatment. The main contributing factor is improper use of antibiotics. So the knowledge of local pattern of infection is essential for efficacious treatment.

Objective: To identify the microbes involved in active mucosal COM and their antimicrobial sensitivity against the commonly used antibiotics.

Material & Methods: This was a Cross sectional study, conducted in ENT Department, Saidu Teaching Hospital Saidu Sharif Swat, KPK Pakistan from January 15th, 2018 to July 16th, 2018. A total of 107 patients were included with active mucosal COM in whom ear discharge had not subsided despite antibiotic treatment with central tympanic membrane perforation and had not recently taken antibiotics in the previous seventy two hours. Patients not willing for the study and fulfilling the set exclusion criteria were excluded. Written informed consent, history and otologic examinations were carried out. Following all aseptic measures, specimen for pus culture was collected by swabbing the discharging ear with a sterile cotton swab and sent to microbiology laboratory for further processing of culture and sensitivity. Data collected on a predesigned Performa was analyzed through SPSS 21.

Results: Out of total 107 patients, 64.5% were male and 35.5% were female. The peak incidence of growth was observed in the age range 4 to 20 years. Out of 107 ear swabs processed 80 samples showed pure culture, 5 samples showed mixed culture and No growth in 22 samples.

Conclusion: Pseudomonas Aeruginosa and Staphylococcus Aureus are the commonly involved microbes in active mucosal COM mainly sensitive to Cefoperazone/Sulbactam, Meropenem, Imipenem and Ciprofloxacin.

Key words: Ear Discharge, Chronic Otitis Media, Antimicrobial Sensitivity
The objective of the study is to identify the microorganism in patients with active mucosal disease, who have been previously treated with antibiotics without knowing the causative microorganism and its sensitivity pattern. The sensitivity pattern will be used to direct specific antibiotic therapy to resolve the ear discharge of active mucosal COM. This will help not only in specific antibiotic directed management to reduce bacterial resistance, but also in preventing COM complications and unnecessary use of antibiotics. In addition the susceptibility pattern will help us to formulate antibiotic policy for COM for better management of the patient.

MATERIAL AND METHODS
This Cross sectional study was conducted in the Outpatient Department (OPD) of ENT Saidu Teaching Hospital Saidu Sharif Swat from January 15, 2018 to July 16, 2018. Patients with active mucosal COM in whom ear discharge had not subsided despite antibiotic treatment with central tympanic membrane perforation and had not recently taken antibiotics in the previous seventy two hours of either gender having age between 4 and 60 years were selected for the study. Written informed consent was taken from all the patients meeting the inclusion criteria. Patients having otomycosis, cholesteatoma, complications of COM, previous ear surgery or not willing to participate in the study were excluded. Detailed history regarding age, gender, duration and side of discharge and antibiotic treatment was taken, Otoscopic examination was carried out to confirm the central tympanic membrane perforation. Before collecting the ear discharge, aseptic techniques were observed by cleaning the external auditory canal. Specimens for swab culture were collected under microscope by swabbing the discharge ear with a sterile dry micro cotton swabs and sent to a single microbiology laboratory after labelling with patient ID and ear laterality. The swabs were inoculated onto blood agar, Chocolate agar and MacConkey agar for growth characteristics of microorganism and the inoculated plates were incubated at 37°C for 24 to 48 hours. The pathologic organism was confirmed by Gram stain and other biochemical reactions. Isolates yielding pure cultures were further studied for antimicrobial sensitivity and resistance, using the drugs from prescribed medications for patients with COM. The data was collected and analyzed using SPSS 21. Variables were presented as frequencies and percentages.

RESULTS
Out of total 107 patients, 69 (64.5%) were male and 38 (35.5%) were female patients.

Age range was 4 to 60 years. The peak incidence of growth was observed in the age range 4 to 20 years.

The study showed, out of 107 ear swabs processed 80 (74.8%) samples showed pure culture, 5 (4.7%) samples showed mixed culture. No growth was observed in 22 (20.6%) samples (Table 1).

Right side (56%) was common for ear discharge than left (44%) as shown in Table 2.

<table>
<thead>
<tr>
<th>Table 1</th>
<th>CULTURE PATTERN</th>
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<tbody>
<tr>
<td>Culture</td>
<td>Frequency</td>
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<td>---------</td>
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<tr>
<td>PURE GROWTH</td>
<td>80</td>
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<tr>
<td>MIXED GROWTH</td>
<td>5</td>
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<tr>
<td>NO GROWTH</td>
<td>22</td>
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<tr>
<td>Total</td>
<td>107</td>
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<table>
<thead>
<tr>
<th>Table 2</th>
<th>SIDE OF EAR DISCHARGE</th>
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<tr>
<td>Side of Infection</td>
<td>Frequency</td>
</tr>
<tr>
<td>RIGHT SIDE</td>
<td>60</td>
</tr>
<tr>
<td>LEFT SIDE</td>
<td>47</td>
</tr>
<tr>
<td>Total</td>
<td>107</td>
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Out of 85 isolates, Pseudomonas were 36, Staphylococcus Aureus (10), MRSA (8), Streptococcus Mitis (4), Proteus Species (8), E.coli (4), Citrobacter species (2), Proteus Mirabilis (8) and Mixed Growth were 5, as outlined in Table 3.

The most frequently isolated organism is Pseudomonas Aeruginosa, which was found sensitive to Cefoperazone/Sulbactam (30), Imipenem (31), Meropenem (34), Piperacillin-Tazobactam (29) and was found resistant to Augmentin, Ceftixime, Gentamycin, Doxycycline, Ceftriaxone and Sulphamethaxazole as shown in Table 4.

**DISCUSSION**

Chronic otitis media is one of the common ear diseases of early childhood. Small socioeconomic status, overcrowding, bad hygiene and malnutrition have been suggested as contributing factors in underdeveloped countries. Chronic otitis media is a disease of insidious onset and can have serious complications if not treated properly and timely. Cefoperazone/Sulbactam and Piperacillin-Tazobactam were found to be the most effective antibiotics against Pseudomonas isolates.

Pseudomonas showed high sensitivity to Meropenem (94.4%), Imipenem (86.1%), Cefoperazone/Sulbactam (83.3%), and Piperacillin-Tazobactam (80.5%). Ciprofloxacin antibacterial activity against Pseudomonas isolates was reported by others, although resistant strains of Pseudomonas isolates to fluoroquinolones were detected in other studies.
The Pseudomonas was found resistant to Sulphamethaxazole, Ampicillin/Clavulanic acid, Doxycycline and Ceftriaxone. Staphylococcus aureus was sensitive to gentamicin (90%), ciprofloxacin (90%), cefixime (80%) and Doxycycline (70%). Majority were resistant to penicillin (80%) and ampicillin (60%). Clinical resistance of Staphylococci spp. to penicillin and other antimicrobial agents is now a problem throughout the world.17-18 Staphylococci spp. sensitivity to ciprofloxacin is in agreement with other reports and most of the investigators reported high sensitivity rate for Staphylococci spp. to fluoroquinolones.16

CONCLUSION

This study has shown that various microorganisms are involved in active mucosal COM having different sensitivity pattern to antibiotics. Pseudomonas Aeruginosa is the most commonly involved organism, followed by Staphylococcus Aureus. Both the microbes are sensitive to Cefoperazone/Sulbactam, Meropenim, Imipenem and Ciprofloxacin. Appropriate antimicrobial drugs should be prescribed after proper diagnosis of the causative organism and its antimicrobial susceptibility pattern to decrease the risk of resistance to the commonly used antibiotics.

REFERENCES
10. Abera B, Kibret M. Bacteriology and antimicrobial susceptibility of otitis media at dessie regional health research laboratory, Ethiopia. Ethiopian J Health Develop. 2011;25(2);161-167.