SHORT COMMUNICATION

Bacterial Spectrum and Their Sensitivity Pattern in Patients of Chronic Suppurative Otitis Media

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ABSTRACT

The study was conducted from March 2008 to February 2010 in Microbiology Department, Citi Lab, Rawalpindi, to determine the causative microorganisms and their antibiotic sensitivity pattern in patients with chronic suppurative otitis media. One hundred and eighty-three samples received at Citi Lab were included in the study. Pus samples were cultured aerobically. Antibiotic sensitivity testing was done with standard antibiotic discs using modified Kirby-Bauer disk diffusion method. Out of 183 patients, microbiological culture was yielded from 154 specimens (84%). There were 148 bacterial isolates (96%) and 06 fungi (4%). *Pseudomonas aeruginosa* (n=59, 38%) was the most common isolate followed by *Staphylococcus aureus* (n=34, 22%). Susceptibility pattern of *Pseudomonas aeruginosa* showed that 100% isolates were sensitive to Piperacillin/Tazobactam, whereas 98% isolates were sensitive to Imipenem and 76% to Ciprofloxacin. Continuous surveillance of susceptibility pattern is suggestive for effective therapy of chronic suppurative otitis media.

Key words: *Chronic suppurative otitis media. Pseudomonas aeruginosa. Susceptibility pattern. Ciprofloxacin.*

Chronic suppurative otitis media (CSOM) is chronic inflammation of middle ear, which affects the tympanic membrane, middle ear mucosa and other middle ear structures. Clinically, CSOM presents with ear discharge and conductive deafness.[1] Suppurative otitis media is one of the most common diseases of all age groups, especially of childhood. It is prevalent in developing countries and is a disease of poverty.[2] Etiology and pathogenesis of otitis media are multifactorial including genetic predisposition, infections, allergy, environmental, social and racial factors and eustachian tube dysfunction.[3]

Different studies from Pakistan showed that *Pseudomonas aeruginosa* is the most common cause of CSOM, followed by *Staphylococcus aureus*, *Proteus* and *Klebsiella (K.)* species.[2] Topical antibiotics are more effective at clearing aural discharge than systemic therapy, probably due to the higher local concentrations of antibiotic achieved. Empirical therapy should be chosen according to susceptibility pattern of most common organisms like *Pseudomonas aeruginosa* and *Staphylococcus aureus*. This study was planned to find the local pattern of microorganisms involved and their antibiotic susceptibility pattern in cases of CSOM to provide a guideline for empirical antibiotic therapy.

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A descriptive study was carried out in the Microbiology Department of the Citi Lab, Rawalpindi. One hundred and eighty three patients of CSOM from March 2008 to February 2010 were prospectively studied. The pus swabs were cultured on blood and MacConkey agar and incubated at 37ºC for 24-48 hours. The organisms were primarily identified by colony morphology, microscopy of Gram stain and routine biochemical tests. Confirmation of the species level was achieved by API 20 E and API 20 NE (Biomerieux), where required. Inoculated plates were incubated overnight at 37°C. Detection of MRSA was done using 30 µg disc of Cefoxitin as recommended by Clinical Laboratory Standard Institute (CLSI).[4]

Antimicrobial susceptibility tests were performed by modified Kirby-Bauer disc diffusion method. The standard antimicrobial discs (Oxoid) as recommended by CLSI were used for all bacterial isolates. The susceptible zone diameters were interpreted according to CLSI criteria. Control strain of MRSA (ATCC 33591), MSSA (ATCC 25923) were used along with test organism. *K. pneumoniae* ATCC 700603 (positive control) and *E. coli* ATCC 25922 (negative control) were used for quality control of ESBL tests. Control strain of *Pseudomonas aeruginosa* (ATCC 27853) was used along with test organisms.

The overall age range of patients was 4 months to 85 years. Male to female ratio was 1.4:1. Out of 183 patients in the study, microbiological culture was yielded from 154 samples (84%). Most of our patients were children and young adults.

The microbiological profile of aerobic isolates from patients of CSOM is shown in Table I. Gram negative

Table I: Microbiological profile of aerobic isolates.

Microorganisms	No. of isolates	Percentage of isolates
Pseudomonas aeruginosa	59	38
Staphylococcus aureus	34	22
Staphylococcus epidermidis	27	17
Gram negative rods	15	10
Streptococcus pneumonia	07	04.5
Aspergillus niger	06	04
Miscellaneous	05	03

rods include *Escherichia (E.) coli*, *Proteus mirabilis, Klebsiella pneumoniae, Haemophillus influenzae, Providencia* Spps. and *Serratia marscescens*. Only one *Escherichia coli* was detected as ESBL producer. Miscellaneous organisms include *Streptococcus pyogenes, Enterococcus faecalis* and *Candida* Spps. The antibiotic sensitivity pattern of the two commonest isolates, *Pseudomonas aeruginosa* showed > 80% sensitivity to Gentamicin, Amikacin, Ceftazidime, Cefoperazone and Aztreonam but only 76% sensitivity to Ciprofloxacin. While, 98 and 100% sensitivity to Imipenem and Piperacillin / Tazbactam was present respectively. *Staphylococcus aureus* showed > 80% sensitivity to Gentamicin, Amikacin, Ciprofloxacin, Amoxi-Clav, Doxycycline, Clindamycin and Erythromycin. It was found that > 90% sensitivity was present to Moxifloxacin and Fusidic acid while, being 100% sensitive to Vancomycin and Linezolid.

Early bacteriological diagnosis of CSOM cases assures accurate and appropriate effective therapy. Selection of antibiotics is influenced by its efficacy, resistance of bacteria, safety, risk of toxicity and cost. Knowledge of the local susceptibility pattern of microorganisms is then essential to formulate a protocol for empirical antibiotic therapy. In this study, CSOM was found mostly among children and young adults. Similar results were obtained in Karachi (Pakistan).[5] Studies from different cities of Pakistan revealed that *Pseudomonas aeruginosa* was the most common causative organism followed by *Staphylococcus aureus*.[1] Fastidious organisms like *Streptococcus pneumoniae, Streptococcus pyogenes* and *Haemophilus influenzae* were isolated in this study, which were not reported in other local studies.[1,5]

By comparing susceptibility pattern with other local studies it is noted that *Pseudomonas aeruginosa* isolates were 100% sensitive to Piperacillin/ Tazobactam, similar to a study done at Bahawalpur by Mirza *et al.*[2] Ninety eight percent isolates were sensitive to Meropenem contrary to study done by Mansoor *et al*. in Karachi.[5] The presently reported isolates were less sensitive to fluoroquinolones (76%) as compared to other studies in Karachi (85%), Bahawalpur (83%) and Rawalpindi (96%).[2,5] The declining sensitivity trend may be due to number of factors including injudicious use, inappropriate dosage, easy accessibility and developing enzymatic resistance of organism against fluoroquinolones. Sensitivity of aminoglycosides was comparable with the results of Mansoor *et al*. but they were more active as compared to the results of Mirza *et al*.[2,5]

The antimicrobial susceptibility pattern of *Staphylococcus aureus* revealed greater sensitivity to Moxifloxacin (92%) than to Ciprofloxacin (85%). Gentamicin was more active (88%) in our study as compared to previous studies.[2,5] No *Staphylococcus aureus* isolate was found resistant to Vancomycin and Linezolid. *Pseudomonas aeruginosa* is the most common pathogen involved in chronic suppurative otitis media in our setup followed by *Staphylococcus aureus*. The isolates are becoming gradually resistant to most commonly prescribed antibiotics, fluoroquinolones. Judicial use of antibiotics and continuous surveillance of susceptibility pattern is suggested for effective therapy of CSOM.

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