MICROBIOLOGY OF CHRONIC SUPPURATIVE OTITIS MEDIA - EXPERIENCE AT BAHAWALPUR

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ABSTRACT

Objective: To determine the aerobic microorganisms involved and their antibiotic sensitivity pattern in patients with chronic suppurative otitis media (CSOM) to provide a guideline for making a protocol for empirical antibiotic therapy.

Design: Descriptive study.

Place and Duration of study: The study was conducted from Sept 2005 to April 2007 at the department of ENT and Microbiology, Combined Military hospital Bahawalpur.

Patients and Methods: A total of 178 patients with unilateral or bilateral active chronic suppurative otitis media attending the outpatient clinic were included in the study. All the patients were evaluated through detailed clinical history and clinical examination. Pus samples were collected from the discharging ear(s) and sent to microbiology section of hospital laboratory where aerobic cultures were done. Antibiotic sensitivity testing was done with standard antibiotic discs using Kirby-Bauer disk diffusion method as per National Committee for Clinical Laboratory Standards recommendations.

Results: From the clinical specimens of 178 patients enrolled in the study, microbiological culture was yielded from 130 (73%) specimens. There were 116, (89%) bacterial isolates and 14, (11%) fungi. Pseudomonas aeruginosa 58 (45%) was the most common isolate, followed by Staphylococcus aureus 52 (40%) including two isolates of Methicilliresistent Staphylococcus Aureus (MRSA). Antibiotic sensitivities of Pseudomonas aeruginosa showed that 100% isolates were sensitive to Piperacillin/Tazobactam, where as 86% isolates were sensitive to ceftazidime and 83% to ciprofloxacin. Only 45% of Pseudomonas aeruginosa isolates were sensitive to gentamicin and 48% to amikacin. For Staphylococcus aureus (other than MRSA), 100% isolates were sensitive to cloxacillin, 80% to ciprofloxacin and 68% to gentamicin. Only 60% isolates were sensitive to chloramphenicol and 32% to cotrimoxazole.

Conclusion: Pseudomonas aeruginosa was the most common isolate followed by Staphylococcus aureus. More than 80% of the two organisms were sensitive to quinolones. It is therefore concluded that the topical preparation of quinolones should be included in the formulary to cover the most common aerobic isolates involved in CSOM.

Key words: Chronic suppurative otitis media, Microbiology, Antibiotics.

INTRODUCTION

Chronic 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 [1]. It is defined as persistent or intermittent infected discharge through a non intact tympanic membrane having duration of three months or more [2].

Chronic suppurative otitis media has profound impact on society in terms of resources utilized in treatment and direct impact that chronic infection has on hearing

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Receive 26 May 2007: Accepted 2 Aug 2007

of patient [3]. It causes conductive and sensorineural hearing loss and adverse effects on child development [4]. In chronic suppurative otitis media the most frequently isolated bacteria are Pseudomonas aeruginosa, Staphylococcus aureus, Proteus spp and Klebsiella spp [1].

The goals of management are to achieve a safe, dry ear, eradicate disease and improve hearing. The first line treatment of chronic suppurative otitis media is topical therapy. Concerns about ototoxicity led to decline in use of aminoglycosides containing ear drops. Quinolone containing ear drops exhibit excellent antipseudomonal and broad spectrum antimicrobial activity and non ototoxicity [5, 6].

This study is aimed at finding the local pattern of aerobic microbes involved and their antimicrobial sensitivity pattern in cases of chronic suppurative otitis media to provide a guideline for making a protocol for empirical antibiotic therapy.

PATIENTS AND METHODS

A descriptive study was carried out at combined military hospital Bahawalpure. One hundred and seventy eight patients of chronic suppurative otitis media who presented to ear, nose and throat (ENT) department from Sept 2005 to April 2007 were prospectively studied. All patients had perforated tympanic membranes with active purulent discharge. Detailed clinical history regarding age, sex, duration of discharge and antibiotic treatment were taken. Only those patients who had not received antibiotic therapy (topical or systemic) for previous five days were included in the study. Patients with ear discharge due to cholesteotoma were excluded from the study.

Single use Mini-tip culturette swabs were used to collect pus swabs to harvest the middle ear micro flora through the tympanic membrane perforation. All care was taken to avoid surface contamination and the swabs were transported to microbiology section of pathology laboratory for further processing. The pus swabs were cultured on blood and macConkey's agar and incubated at 37°c for 24-48 hours. Any fungi that were isolated were sub cultured onto sabouraud's dextrose agar for fungal species identification.

All organisms isolated were identified according to standard microbiological methods. [7]. Antimicrobial susceptibility tests was performed using modified Kirby-Bauer disc diffusion method and using national committee for clinical laboratory standards (NCCLS) for breakpoints for interpretatation of results [8, 9]. The standard antimicrobial discs (Oxoid) used for Staphylococcus aureus were oxacillin (OX) 1 µg, cotrimoxazole (COT) 1.25/23.75 µg , gentamicin (GEN) 10 µg , chloramphenicol (CAP) 30µg, ciprofloxacin (CIP) 5µg and vancomycin (VAN) 30µg . The standard antimicrobial discs (Oxoid) used for Pseudomonas aeruginosa were gentamicin (GEN) 10 µg, amikacin (AMK) 30µg, ciprofloxacin (CIP) 5µg, ceftazidime (CAZ) 30 µg and Piperacillin/Tazobactam 10/1 (TZP) 110 µg. The susceptible zone diameters were interpreted according to NCCLS criteria [9].

RESULTS

The overall age range of patients was 6-65 years with mean age of 31 years. There was almost equal distribution between sexes, males 96 (54%) and females 82 (46%).

From the 178 patients enrolled in the study microbiological culture was yielded from 130 (73%). The microbiological profile of aerobic bacterial isolates from patients of CSOM (table).

The antibiotic sensitivity pattern of the two commonest isolates, Pseudomonas aeruginosa and Staphylococcus aureus (other than MRSA) is shown in (fig. 1 & 2) respectively. The two isolates of MRSA were only sensitive to vancomycin and rifampicin.

DISCUSSION

Chronic suppurative otitis media (CSOM) and its complications are among the most common conditions seen by otologists, pediatricians and general practitioners. It is a persistent disease with great risk of

Table: Microbiological profile of chronic suppurative otitis media (n = 130).

Type of organism	No. of isolates	Percentage yield
Pseudomonas aeruginosa	58	45%
Staphylococcus aureus (methicillin sensitive)	50	38%
MRSA	02	1.5%
Escherichia coli	02	1.5%
Klebsiella spp	02	1.5%
Proteus mirabilis	02	1.5%
Aspergillus spp	08	6%
Candida spp	06	5%

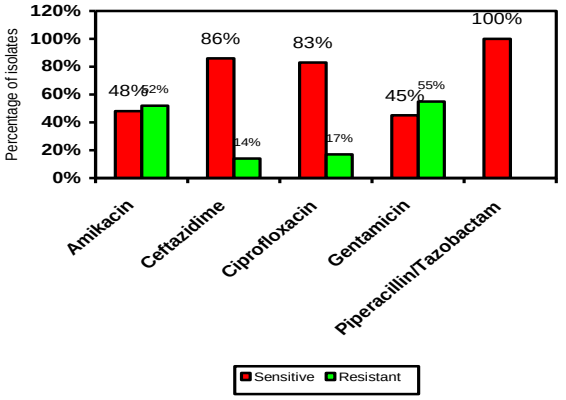

Fig. 1: Antibiogram of Pseudomonas aeruginosa (n=58).

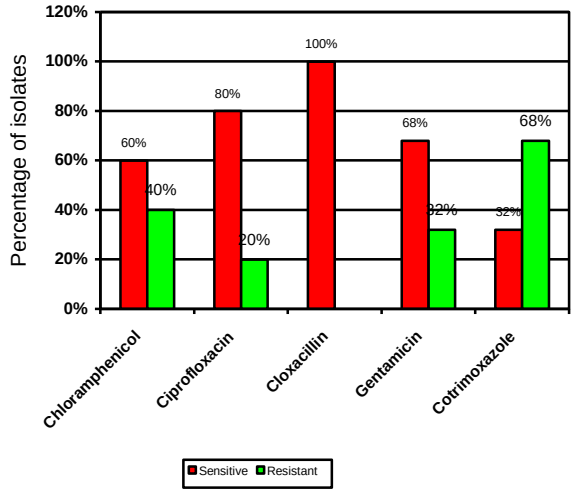

Fig. 2: Antibiogram of Staphylococcus aureus (other than (MRSA) (n = 50).

irreversible complications. Early bacteriological diagnosis of all cases will assure 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 microorganism's pattern and their antibiotic sensitivity is then essential to formulate a protocol for empirical antibiotic therapy.

Previous studies on the microbiology of CSOM have revealed that the most frequently isolated bacteria were Pseudomonas aeruginosa, Staphylococcus aureus, coagulase negative Staphylococcus, Proteus spp, Klebsiella spp and fungi [5, 10, 11]. Pseudomonas spp were by far the most common, although some studies have shown that Staphylococcus aureus was more common especially when cholesteotoma was present [12]. It has also been reported that there were no significant differences in bacteriology between children and adults with CSOM [13].

Our study has revealed that Pseudomonas aeruginosa (45%) was the most common isolate in CSOM followed by Staphylococcus aureus (40%). There was also significantly high number of fungal isolates (11%) in our cases. There were very few isolates of other gram negative rods in our study. These results commensurate with a study carried out in Rawalpindi [14]. In contrast, studies carried out in Karachi and Quetta revealed that Staphylococcus aureus outnumbered Pseudomonas aeruginosa as their major bacterial isolate in ear discharges [15,16]. Pseudomonas aeruginosa was incidentally also the most common isolate in a similar study carried out in Bahawalpur in the same institution as ours in 1999 [17]. Not withstanding the minor differences in isolation percentages of the two organisms from different areas it is quite evident that Pseudomonas aeruginosa and Staphylococcus aureus together account for almost 75-85% of the total bacterial isolates in cases of chronic suppurative otitis media [14-17].

Interestingly review of literature about studies done to find out bacterial flora in cases of CSOM in neighboring state of India reveals that whereas Pseudomonas aeruginosa remained as the premier isolate in two studies, the isolation rate of Staphylococcus aureus in one of the study

was quite low where as other gram negative rods (i.e) Klebsiella pneumonae, Proteus mirabilis and Escherichia coli was relatively high [18, 19].

Antimicrobial sensitivities of Pseudomonas aeruginosa in our study revealed that 100% isolates were sensitive to tazobactam/piperacillin while 86% of isolates were sensitive to ceftazidime and 83% to ciprofloxacin. On the other hand only 45% of isolates were sensitive to gentamicin and 48% to amikacin. The sensitivity of Pseudomonas aeruginosa against quinolones has shown a downward trend globally in recent past. A study carried out in Turkey in 1996 revealed only 6 % of Pseudomonas aeruginosa isolates to be resistant to ciprofloxacin [20], where as in South Korea in a study carried out in 2004 ciprofloxacin resistance was noted in 100% of isolates [21]. In Pakistan the previous studies carried out in Rawalpindi, Quetta, Karachi and Bahawalpur revealed that more than 90% isolates were sensitive to ciprofloxacin [14-17]. In contrast our study has shown 83% of isolates to be sensitive to ciprofloxacin. The declining sensitivity trend may be due to number of factors including injudicious use, inappropriate dosage, and easy accessibility and developing enzymatic resistance of organism against quinolones. Similar differences have been noted as far as in vitro activity of aminoglycosides against Pseudomonas aeruginosa is concerned. The recent studies done in Singapore and India [10, 19] have shown significantly higher percentage of Pseudomonas aeruginosa isolates sensitive to gentamicin compared to ours and the one carried out in Quetta [15]. As far as topical preparations for treatment of CSOM are concerned the otolaryngologists have either quinolones or aminoglycosides in their armory. The topical quinolones have shown better results compared to topical aminoglycosides clinically as medical management of CSOM as published in one of the recent studies done in Pakistan [22].

The antimicrobial susceptibility pattern of Staphylococcus aureus (other than MRSA) revealed that Ciprofloxacin was sensitive in 80%, gentamicin in 68% and chloramphenicol in 60% of isolates. Only 32% of isolates were sensitive to cotrimoxazole. The susceptibility pattern of Staphylococcus aureus found in our study against most of the antibiotics is almost consistent with the one reported from studies done in Rawalpindi, Quetta and Bahawalpur in the past (14-16). However our findings have revealed lower sensitivity to ciprofloxacin 80% and gentamicin 68% as compared to 98% and 95% respectively reported from Quetta [15]

CONCLUSION

Pseudomonas aeruginosa was the most common isolate followed by Staphylococcus aureus. Majority of Pseudomonas aeruginosa isolates 83%, were sensitive to ciprofloxacin and only 45% to gentamicin. For Staphylococcus aureus isolates (other than MRSA) 80% isolates were sensitive to ciprofloxacin and 68% to gentamicin. Since more than 80% of Pseudomonas aeruginosa and Staphylococcus isolates are sensitive to quinolones, so the topical preparation of quinolones should be included in the formulary to cover the most common isolates involved in CSOM.

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