

CHRONIC SUPPURATIVE OTITIS MEDIA: FREQUENCY AND SENSITIVITY PATTERN OF PSEUDOMONAS AERUGINOSA

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ABSTRACT

Objective: To identify the frequency of *Pseudomonas aeruginosa* and its sensitivity to various antibiotics in patients of chronic suppurative otitis media.

Material and Methods: This descriptive study was conducted at the Department of ENT, DHQ Teaching Hospital, Dera Ismail Khan from January 2011 to October 2011. Patients with unilateral or bilateral active chronic suppurative otitis media attending the out patient clinic were included in the study. All the patients were evaluated through detailed history and clinical examination. Pus samples were collected from the discharging ears and sent to the Microbiology Department, Combined Military Hospital, Dera Ismail Khan for culture and sensitivity studies.

Results: From the clinical specimens of 220 patients enrolled in the study, microbiological culture was yielded from 198(90%) specimens. Out of total 198 cultured isolates, *Pseudomonas aeruginosa* was isolated in 96/198(48.49%) cases. Drug sensitivities pattern showed that tazocin (piperacillin/tazobactam) had highest sensitivity 96 (100%) while gentamicin had lowest sensitivity 48 (50%) against *Pseudomonas aeruginosa* isolates.

Conclusion: *Pseudomonas aeruginosa* was the commonest isolate from chronic discharging ears. *Pseudomonas aeruginosa* was 100% sensitive to tazobactam-piperacillin. *Pseudomonas aeruginosa* is increasingly becoming more resistant to the common drugs like quinolones.

Key Words: Suppurative otitis media, Culture and sensitivity, *Pseudomonas aeruginosa*.

INTRODUCTION

Chronic suppurative otitis media (CSOM) is one of the commonest Otolaryngological problem especially in under developed countries. It is especially common amongst children of low socio economic strata and is one of the major cause of deafness.^{1,2} The common micro-organisms found in CSOM are *Pseudomonas aeruginosa*, *Staphylococcus aureus*, *Proteus mirabilis*, *Klebsiella pneumoniae*, *Escherichia coli*, *Aspergillus* and *Candida* species.³ But these organisms vary in various geographical areas.⁴ In developing countries like Pakistan, the problem of resistance to antibiotics is rapidly increasing due to misuse of antibiotics.⁵

The study of the micro-organisms commonly associated with chronic suppurative otitis media and their in-vitro antibiotic sensitivity pattern is very pertinent for the clinician to plan a general outline of treatment for the patient with a chronically discharging ear. This study was undertaken to identify the frequency of *Pseudomonas aeruginosa* in patients of chronic suppurative otitis media and its sensitivity to various antibiotics.

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MATERIAL AND METHODS

This study was conducted at Out Patient Department of ENT, Head & Neck Surgery, District Head Quarter Teaching Hospital, and Microbiology Department of Combined Military Hospital, Dera Ismail Khan from January 2011 to October 2011. In this study, patients of all age groups and both gender having discharge from one or both ears for more than 3 months with tympanic membrane perforation were included. Patients on local or systemic antibiotics within the previous 7 days were excluded from the study.

Pus swabs were taken from the deeper part of external auditory canal of the affected ear on a sterile swab in ENT OPD. Commercially available pre-packed sterile cotton swabs were used. Samples of discharge were obtained after cleaning the external auditory canal by suction under aseptic condition. Swabs were sent to the Microbiology Department, Combined Military Hospital, Dera Ismail Khan without delay. These were inoculated on MacConkey, Blood, Chocolate and Sabouraud Dextrose agar and incubated aerobically at 37°C for 24-48 hours. *Pseudomonas* species appeared as pale coloured colonies on MacConkey agar, some strains produced a greenish blue pigment on nutrient agar. The isolates were identified using colony morphology, gram staining, catalase, coagulase, oxidase and biochemical strips. In case of fungal growth, lactophenol cotton blue was used for final identification.

The antimicrobial susceptibility testing was performed on Mueller Hinton agar using the modified Kirby-Bauer disc diffusion method. The antibiotics tested were amikacin, gentamicin, ciprofloxacin, ceftazidime, ceftriaxone, imipenem, tazocin (tazobactam-piperacillin) and vancomycin. Data was analyzed using SPSS software (Version 16, Chicago, IL, USA).

RESULTS

Out of 220 swabs, 198 showed bacterial growth giving an isolation rate of 90%. *Pseudomonas aeruginosa* was isolated in 96 (43.65%) cases. It was isolated in 61.45% (59/96) of male and 37 (38.55%) of female patients respectively. The most commonly affected age group was 11-20 years 36/96 (37.50%) while the least affected age group was 51-60 years (Table 1). Drug sensitivities pattern showed that tazocin (piperacillin/tazobactam) had highest sensitivity 96 (100%) while gentamicin had lowest sensitivity 48 (50%) against *Pseudomonas aeruginosa* isolates (Table 2).

DISCUSSION

Chronic suppurative otitis media is still a challenging problem in developing and under developed countries, owing to its high incidence (6.3%) and high mortality (36%) for economical, social and medical reasons.⁶ The mainstay of treatment for uncomplicated CSOM is two fold: meticulous aural toilet and instillation of topical antimicrobial agents. The therapeutic use of antibiotics is usually started empirically prior to results of microbiological culture. Selection of any antibiotic is influenced by its efficacy, resistance of bacteria, safety, risk of toxicity and cost.

In our study, majority of the *Pseudomonas aeruginosa* isolates were found in the teenager group as supported by other studies.^{7,8} This may be due to multiple reasons as young children and infants may have low resistance and also because of relative short and straight eustachian tube. Males were more commonly affected than females in our study. These results are in agreement with both local and international literature.^{9,10,15,17} But a study by Mansoor et al has reported a female preponderance.¹⁹ In our study, *Pseudomonas aeruginosa* was the commonest (43.65%) isolate. This finding is in tandem with the pattern of CSOM infection of the other studies.^{11,12,13} But contrary to these reports, other studies from Korea and Iran have reported that *Staphylococcus aureus* was the commonest isolate in CSOM patients.^{14,15}

This organism is difficult to be treated by standard regimens. Antimicrobial sensitivities of *P. aeruginosa* in our study revealed that 100% isolates were sensitive to tazocin (tazobactam-piperacillin). Similar results were also reported by Mirza et al.¹⁶ *P. aeruginosa* is susceptible to piperacillin alone. However, the combination is most widely available and used since it covers both piperacillin susceptible infections and those due to bacteria with beta

Table 1: Age and Gender wise distribution of *Pseudomonas aeruginosa* isolates among the patients n=96

Age years	No. of pts %age	Male %age	Female %age
<10	11 (11.45%)	07 (07.30%)	04 (04.20%)
11-20	36 (37.50%)	22 (22.90%)	14 (14.60%)
21-30	23 (23.95%)	16 (16.65%)	07 (07.30%)
31-40	12 (12.50%)	06 (06.25%)	06 (06.25%)
41-50	09 (09.40%)	06 (06.25%)	03 (03.10%)
51-60	05 (05.20%)	02 (02.10%)	03 (03.10%)
Total	96 (100%)	59 (61.45%)	37 (38.55%)

Table 2: Sensitivity pattern of *Pseudomonas aeruginosa* to various antibiotics n=96

Drugs	No. of sensitive isolates (%age)
Amikacin	72 (75.00%)
Ceftazidim	78 (81.25%)
Ceftriaxone	49 (51.00%)
Ciprofloxacin	68 (70.80%)
Gentamicin	48 (50.00%)
Imepemem	89 (92.70%)
Vancomycin	84 (87.50%)
Tazocin (Tazobactum-Piperacillin)	96 (100%)

lactamase (inhibited by tazobactam) mediated resistance to piperacillin.

Pseudomonas aeruginosa showed relatively low sensitivity to amikacin (75%) and gentamicin (50%) in our study. High aminoglycosides antibacterial activity (85%) against *Pseudomonas* isolates was reported by another study.¹⁷

The sensitivity of *P. aeruginosa* against quinolones has shown a downward trend globally in the recent past. In our study, 70% of *Pseudomonas* isolates showed sensitivity to ciprofloxacin. High fluoroquinolones antibacterial activity (92%) against *Pseudomonas* isolates was reported in a study from Turkey,¹⁷ although high resistant strains of *Pseudomonas* isolates to fluoroquinolones were detected in an other study.¹⁸ This declining sensitivity trend may be due to number of factors including injudicious use, inappropriate dosage, and easy accessibility and developing enzymatic resistance of organism especially *Pseudomonas* against quinolones.

Cephalosporins are the most frequently prescribed class of antibiotics and third-generation displays an extended gram negative spectrum. They are also used in treating pseudomonal infections. In our study, 81% of *P. aeruginosa* isolates were found to be sensitive to ceftazidime which is also comparable with another local study.¹⁹ On the other hand, only 51% of isolates showed sensitivity to ceftriaxone in our findings. These results suggested that in our local community, ceftazidime is effective but resistance against ceftriaxone increases progressively.

Imepenem belonging to carbapenem group of antibiotics is the most active drug against *P. aeruginosa* found in CSOM in various studies.^{5,20} In our study, 92.7% of isolates were found to be sensitive to imepenem. Studies performed previously have suggested the use of a combination of antibiotics for pseudomonas infection, where the discharge persisted in spite of the commonly used antibiotics.^{5,20}

CONCLUSION

Pseudomonas aeruginosa was the most common isolate from chronic discharging ears. *Pseudomonas aeruginosa* was 100% sensitive to tazobactam-piperacillin. *Pseudomonas aeruginosa* is increasingly becoming more resistant to the commonly prescribed drugs like quinolones.

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