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ORIGINAL ARTICLE

ANTIBIOTIC PROFILE OF PSEUDOMONAS AERUGINOSA STRAINS ISOLATED FROM VARIOUS CLINICAL SPECIMENS IN DM WIMS HOSPITAL WAYANAD, KERALA

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ABSTRACT: OBJECTIVES: Pseudomonas aeruginosa is one of the important bacterial pathogens isolated from various clinical samples. Several different epidemiological studies indicate that antibiotic resistance is increasing in clinical isolates. The present study was undertaken to assess the antibiotic susceptibility patterns of Pseudomonas aeruginosa isolated from various clinical samples. **MATERIALS AND METHODS:** A total of 290 Pseudomonas aeruginosa isolates from various clinical samples like exudates, urine, sputum, and blood, were tested for antibiotic sensitivity pattern using disk diffusion method as per Clinical and Laboratory Standards Institute guidelines [CLSI]. **RESULTS:** The highest number of Pseudomonas infections was found in exudates, followed by urine and sputum. Maximum resistance was seen to third generation cephalosporins cefaperazone (42.6%) and ceftazamide (39.3%). Low level of resistance was seen in amikacin (14.5%). Minimal resistance was seen to Imipenem (6.5%). **CONCLUSION:** Over all we have observed that there is increased antibiotic resistance which may be due to the selective pressure from the use of anti-microbial agents is a major determinant for the emergence of resistance strains. Antimicrobial surveillance should be done periodically to monitor the current susceptibility patterns in local hospitals.

KEYWORDS: Clinical isolates of Pseudomonas aeruginosa, Antibiotic sensitivity pattern.

INTRODUCTION: Pseudomonas aeruginosa is a gram-negative bacterium that continues to be a major cause of opportunistic nosocomial infections, causing around 9–10% of hospital infections.[1] It has the unique ability to infect all body systems. It almost exclusively infects hospitalized patients and is the most frequent opportunistic pathogen isolated from nosocomial infection in intensive care units (ICU).[2] It continues to be the major pathogen in immunosuppression, cystic fibrosis and malignancy.[3]

Despite advances in medical and surgical care and introduction of wide variety of antimicrobial agents against having anti-pseudomonal activities, life threatening infections caused by Ps.aeruginosa continues to cause complications in hospital acquired infections.[4] Unfortunately, P. aeruginosa demonstrates resistance to multiple antibiotics, thereby jeopardizing the selection of appropriate treatment.[1] Therefore a study was conducted to determine the antibiotic sensitivity patterns of Ps.aeruginosa isolated from various clinical samples obtained from hospitalized patients.

MATERIALS AND METHODS: The present study was conducted over a period of 6 months from October 2013-March 2014 at DM WIMS Hospital, Meppadi, Kerala. Out of total 500 samples obtained from patients from various sources, exudates, sputum, urine and blood, 182 isolates were ps. aeruginosa. All the specimens were inoculated onto Mac Conckey's agar and 5% blood agar. The

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culture plates were incubated overnight at 37°c for 48 hours and examined for growth. P. aeruginosa was identified according to the procedure described in the manual of clinical microbiology.[5]

The antibiotic susceptibility of the organisms identified as P. aeruginosa were determined using Kirby-Bauer method (disk diffusion technique)[6] and the results were interpreted as per Clinical and Laboratory Standards Institute (CLSI) guidelines P. aeruginosa ATCC 27853 was used as the control strain.

The antibiotics tested were amikacin, gentamycin, ciprofloxacin, ceftriaxone, cefoperazone, Tobramycin, and imipenem of standard strengths.

Source of the specimen	Total number	Percentage (%)
Exudates	67	54.91
Urine	40	32.78
Sputum	15	12.29
Blood	4	3.27

Table 1: Isolation of Pseudomonas aeruginosa from different clinical specimens

Antibiotic	Resistant number	Percentage (%)
Amikacin	18	14.5
Gentamycin	30	24.5
Tobramycin	26	21.3
Ciprofloxacin	30	24.5
Ceftazamide	48	39.3
Cefoperazone	52	42.6
Piperacilin-Tozabactam	18	14.7
Imipenem	08	6.5

Table 2: Antimicrobial sensitivity pattern of Pseudomonas aeruginosa

RESULTS: A total of 122 isolates of P. aeruginosa were obtained from various sources [Table 1]. The rate of isolation of P. aeruginosa was 25.6%. Exudates (54.9%) followed by urine (32.7%) accounted for the maximum isolates. Antibiotic sensitivity testing revealed that Ps. aeruginosa was highly resistant to third generation cephalosporins, cefoperazone (42.6%) to ceftazamide (39.3%) followed by ciprofloxacin and gentamycin (24.5%). Low levels of resistance were seen to amikacin (14.5%) and piperacillin-tazobactam (14.7%). Minimum resistance was seen to imipenem (6.5%).

DISCUSSION: Pseudomonas aeruginosa emerged as an important pathogen and responsible for the healthcare associated infections and is one of the important causes of morbidity and mortality among hospital patients[1]. In the present study, maximum isolates of Ps. aeruginosa were isolated from exudates (54.9%), followed by urine (32.7%). The findings of our study correlates well with studies of Jamshaid A K et al.[7] This study shows that the clinical isolates of Ps. aeruginosa are becoming increasingly resistant to commonly used antibiotics and gaining more and more resistance to newer

antibiotics. Maximum resistance was seen to 3rd generation cephalosporins (48-52%), similar to the study done by Holloway et al.[8]

Among the aminoglycosides, amikacin has the highest sensitivity against P. aeruginosa, which is in corroboration with an earlier report published from India.[9] Amikacin seems to be a promising therapy for Pseudomonal infection. Hence, its use should be restricted to severe nosocomial infections, in order to avoid rapid emergence of resistant strains[1]. Minimal resistance was seen to imipenem (6.5%). The resistance to carbapenems results from reduced levels of drug accumulation or increased expression of pump efflux.[10] Over all we have observed that there is increased antibiotic resistance which may be due to the selective pressure from the use of anti-microbial agents and is a major determinant for the emergence of resistance strains.[3]

CONCLUSION: Irrational and inappropriate use of antibiotics has made Ps. aeruginosa one of the leading causes of health care associate infections. Hence, there is a need to emphasize the rational use of antimicrobials and strictly adhere to the concept of "reserve drugs" to minimize the misuse of available antimicrobials. The emergence of resistance in microbes can be prevented by implication of strict guidelines for antibiotic prescribing and appropriate infection control measures.

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