ORIGINAL RESEARCH PAPER

Volume-8 | Issue-8 | August - 2019 | PRINT ISSN No. 2277 - 8179

INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

DRUG SUSCEPTIBILITY PATTERN OF VARIOUS PSEUDOMONAS AERUGINOSA ISOLATES

Microbiology

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ABSTRACT

Objective: To identify the drug susceptibility pattern of various pseudomonas *aeruginosa* isolates.
Methods: Study was conducted in the department of Microbiology, GSL Medical College Rajahmundry, approved by Institutional Ethics committee. Clinical samples such as pus, swabs, blood, stool were collected from the participants. Samples were inoculated on Blood agar, MacConkey agar and Nutrient agar and identified by Gram stain, motility and various biochemical reactions. Antibiotic sensitivity testing was done on Muller Hinton agar by kibrybauer disc diffusion method.
Results: Total 32 *Pseudomonas aeruginosa* strains were isolated; the male female ratio was 1. Maximum strains were isolated from Pus followed by respiratory samples, urine and others. Maximum strains showed good sensitivity to Imipenem, Piperacillin/tazobactam.
Conclusion: *Pseudomonas aeruginosa* infection is common in > 60 years age group and drug susceptibility will improve with proper usage of antibiotics.

KEYWORDS

Antibiotics, Strains

INTRODUCTION:

Pseudomonas aeruginosa is an aerobic, motile, gram negative, non fermentative bacillus that belongs to the family, pseudomonadaceae. It has some special properties such as non fermentation, pigment production, growth in low level nutrition, propagation in hospital environment, equipment and so on. The drug resistance and capacity to cause nosocomial infection are the contributor factors for virulence of this pathogen.

Drug resistance is the current problem in the health care sector. Misuse of antibiotics is the major cause for this which is major problem in the developing as well developed countries [1]. *Pseudomonas aeruginosa* is one of the gram negative rods develop drug resistance to various commonly used antimicrobials [2].

Increased drug resistance, grow in the moist environment are the contributory factors of this pathogen, hence it is an important agent of hospital acquired infections with high mortality. With this a study was conducted to find the drug susceptibility pattern of various pseudomonas *aeruginosa* isolates.

MATERIALS AND METHODS

Study was conducted in the department of Microbiology, GSL Medical College Rajahmundry from May 1 2018 to June 10 2018. Study protocol was approved by Institutional Ethics committee. An informed verbal consent was taken from all the volunteers. Various clinical samples such as pus, swabs, blood, stool were collected from the participants.

Immediately after collection samples were inoculated on Blood agar, MacConkey agar and Nutrient agar and incubated at 37^{0}C. After overnight incubation organism was identified by Gram stain, motility and various biochemical reactions. Simultaneously antibiotic sensitivity testing was done on Muller Hinton agar by kibrybauer disc diffusion method [3].

RESULTS:

During the study period, 32 Pseudomonas strains were isolated. Among these, the male female ratio was 1 (Table 1).

Maximum strains were isolated from Pus (53%) followed by respiratory samples (25%), urine (15.6%) and others (6.25%). More strains were isolated in inpatient category; category wise, strains ratio was 5.4 (Table 2).

In IP category, maximum strains showed good sensitivity to Amikacin, Imipenem, Piperacillin/tazobactam (Table 3). Whereas in OP category, all strains were sensitive to Imipenem, Netilmicin, Piperacillin/ tazobactam (Table 3).

DISCUSSION:

In this study total 32 (47%) *Pseudomonas aeruginosa* strains were isolated from 68 samples. Gender wise, 16 (50%) isolates each were isolated respectively in male and in female; statistically the difference was not significant ($P > 0.05$). Saroj et al. also reported that the rate of isolation of *Pseudomonas aeruginosa* was 24% and infection was more common in male category [4]. Whereas Ahmad et al reported an increased (77.7%) incidence of *Pseudomonas aeruginosa* infection in male [5].

Age wise, in this study, maximum (31.2%) strains were isolated in > 61 years age group, followed by 41 – 50 (22%) and 51 – 60 (18.8%) year's group. Ahmed et al. also reported that Pseudomonas infection is commonly seen in > 61 years age group (43.92%) [5]. According to Saroj et al. [4] study, 41 – 60 years group was the prevalent (33.3) for *Pseudomonas aeruginosa* infection, followed by > 60 years of age (29.16%). In another Indian study [6], 31 – 45 years group was reported to be the prevalent for *Pseudomonas aeruginosa*.

In this study, sample wise, pus showed maximum isolates, followed urine and respiratory specimen (Table 2). Similar results were reported in different Indian studies [7,8,9]. According to Saroja et al. [4] report, pus showed maximum strains followed by sputum and tracheal aspirates.

Increase in drug resistance to different hospital strains has been reported worldwide and this is a serious therapeutic problem in the management of infectious diseases caused by drug resistant strains. In this study, maximum pseudomonas strains were sensitive to Imipenem (72%) followed by Amikacin, Piperacillin/tazobactam (69%). Among beta lactms, less sensitivity was reported to Ceftazidime (30%). Maximum sensitivity to Imipenem is the striking feature in this study. As policy matter, institutional antibiotic policy is being discussed with Microbiology culture and sensitivity reports for every three months in this organization and all entire faculty follow the protocol. These may be the reasons for more Imipenem sensitivity in this study. This is consistent with a report published in 2002 in [10].

In this study, MDR rate (resistance to three or more of anti Pseudomonal antimicrobials (piperacillin + tazobactam, ofloxacin, cephotaxime and gentamicin) was 31% (10/32). Unan et al. [11] reported high (60%) MDR cases and Sabir et al. reported lower rates of MDR (22.08%) [12].

With these we conclude that *Pseudomonas aeruginosa* infection is common in > 60 years age group and drug susceptibility will improve with proper usage of antibiotics.

Table 1: Age wise distribution of Pseudomonas isolates in gender; n (%)

Age	Male	Female	Total
< 10	0	1 (3.1)	1 (3.1)
11 – 20	0	1 (3.1)	1 (3.1)
21 – 30	1 (3.1)	1 (3.1)	2 (6.2)
31 – 40	2 (6.2)	3 (9.4)	5 (15.6)

41 – 50	3 (9.4)	4 (12.5)	7 (22)
51 – 60	4 (12.5)	2 (6.2)	6 (18.8)
>61	6 (18.8)	4 (12.5)	10 (31.2)
Total	16 (50)	16 (50)	32 (100)

Table 2: Sample wise Pseudomonas growth in gender; n (%)

Sample	OP			IP		
	Male	Female	Total	Male	Female	Total
Pus	2 (6.3)	1 (3.1)	3 (9.4)	7 (22)	7 (22)	14 (43.7)
Urine	0	2 (6.3)	2 (6.3)	2 (6.3)	1 (3.1)	3 (9.4)
RP	0	0	0	5 (15.7)	3 (9.4)	8 (25)
Others	0	0	0	0	2 (6.3)	2 (6.3)
Total	2 (6.3)	3 (9.4)	5 (15.7)	14 (43.7)	13 (40.6)	27 (84)

OP: Out Patient; IP: In Patient

Table 3: Antibiotic susceptibility results for all Pseudomonas isolates; n (%).

Antibiotic	IP	OP	Total
Amikacin	19 (59.4)	4 (12.5)	23 (72)
Aztreonam	4 (12.5)	3 (9.4)	7 (22)
Cefepime	9 (28.1)	2 (6.2)	11 (34.3)
Ceftazidime	10 (31.2)	0	10 (31.2)
Ciprofloxacin	16 (50)	3 (9.4)	19 (59.3)
Gentamicin	17 (53.1)	4 (12.5)	21 (65.6)
Imipenem	19 (59.4)	5 (15.6)	24 (75)
Levofloxacin	15 (46.8)	1 (3.1)	16 (50)
Netilmicin	17 (53.1)	5 (15.6)	22 (68.7)
Piperacillin/tazobactam	19 59.4)	4 (12.5)	23 (72)
Tobramycin	17 (53.1)	5 (15.6)	22 (69)

OP: Out Patient; IP: In Patient

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