

ANTIBIOTIC SENSITIVITY OF ISOLATES OF *PSEUDOMONAS AERUGINOSA* IN ENUGU, NIGERIA

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The pattern of antibiotic sensitivity of 229 clinical isolates of *Pseudomonas aeruginosa* isolated between June 1998 and May 2000 at the University of Nigeria Teaching Hospital (UNTH) Enugu was studied. The isolates were recovered from various clinical specimens by culturing on standard media viz: blood agar, macConkey agar and Cled agar and identified by routine procedures. Antibiotic sensitivity tests were performed by the disc diffusion technique employing multidisc (habdisc) and using sensitivity test agar incubated at 37°C for 24 hours. The results were read and interpreted according to the manufacturer's instructions. Majority of the isolates tested were susceptible to Ceftazidime (88.5%), Colistin (83.75%), Ciprofloxacin (62.1%) and Ofloxacin (62.5%). Non-urinary isolates were more sensitive than the urinary isolates to ofloxacin, Gentamycin, Streptomycin, Ceftriaxone and Cephtazidime. Similar incidence of resistance was observed between the two groups to other antibiotics. Efforts must be made to improve infection control practises, improve antimicrobial utilization practices and establish an antibiotic policy for the country.

INTRODUCTION

Pseudomonas aeruginosa is an ubiquitous organism and has a world wide distribution (1,2). It is a major problem as a multi resistant nosocomial pathogen(3). Before the 1940s, *Pseudomonas* infections were rare but those organisms have become among the more common opportunists that infect debilitated, burned or immuno suppressed individuals(4). *Pseudomonas aeruginosa* seldom causes infection in healthy people. In hospitals however, it's natural resistance to many antimicrobials and it's ability to grow in solutions used for treatment make it difficult to control.

The present communication reports on the invitro antibiotic sensitivity pattern of all isolates of *Pseudomonas aeruginosa* from diverse clinical specimens between June 1998 and May 2000 in our hospital. The project was divided into two parts.

1. The resistance patterns of the isolates were examined from an overall perspective,

irrespective of the site of isolation.

2. A comparison of the resistance pattern was made between urinary and non-urinary isolates.

MATERIALS AND METHODS

A total of 229 clinical isolates of *pseudomonas aeruginosa* was tested for invitro antibiotic sensitivity to 15 antimicrobial drugs between June 1989 and May 2000 at the University of Nigeria Teaching Hospital (UNTH) Enugu. The specimens were classified into two groups: non-urinary and urinary specimens. The group included wound swabs, blood body fluids, specimens from respiratory tract, ear, nose and throat, genital and conjunctival regions. The isolates were recovered from various clinical specimens by culturing on standard media viz blood agar, macConkey agar and Cled agar. Identification of the isolates was based on characteristic colonial morphology production of pigment pyocyanin, characteristic smell and production of oxidase.

Antibiotic sensitivity tests were performed by the disc diffusion technique employing multidisc (habdisc) and using sensitivity test agar incubated at 37°C for 24 hours. The results were and interpreted according to the instruction of the manufacturer. Due to the nonavailability of some antimicrobial discs at certain periods, not all antimicrobials were tested in equal numbers.

RESULTS

Out of the 229 isolates included in the study, 187 were from adults and 42 from children: 143 from males and from females. One hundred and five (105) isolates were from urine while 124 were from other sources.

1. Overall Pattern

The results of antibiotic sensitivity tests with the isolates are given in (Table I). The number of isolates tested varied depending on the availability of antimicrobial discs. As can be seen majority of the isolates tested were susceptible to Ceftazidime (88.5%), colistin (83.7%), ciprofloxacin (62.1%) and ofloxacin (62.5%). Other antibiotics were effective for a lesser number of isolates.

2. Comparison of Urinary Versus Non-Urinary Isolates

Similar incidence of resistance was observed among urinary and non-urinary isolates of *Pseudomonas aeruginosa* for most of the antibiotics except for Ofloxacin, Gentamycin, Streptomycin, Ceftriaxone and Ceftazidime where non-urinary isolates were more sensitive than the urinary isolates (Table II).

TABLE 1: IN-VITRO ANTIBIOTIC SENSITIVITY OF CLINICAL ISOLATES OF *P. aeruginosa* IN ENUGU, NIGERIA.

Antibiotic	Concentration in the disc	No of isolates sensitive/No. tested	% Sensitive	% Resistance
Ciprofloxacin	5mcg	18/29	62.1	37.9
Colistin	10mcg	200/229	83.7	16.3
Gentamycin	10mcg	105/226	44.1	55.9
Azithromycin		13/29	44.8	55.2
Pefloxacin	5mcg	73/131	55.7	44.3
ceftazidime	30mcg	108/122	88.5	11.5
Ampicillin	10mcg	20/148	0	100
cotrinnoxazole	25mcg	1/150	0.7	99.3
ceftriaxone	30mcg	55/122	45.1	54.9
Tetracycline	30mcg	2/154	1.3	98.7
Nitrofurantoin	50mcg	3/45	6.7	93.3
Nalidixic acid	30mcg	2/46	4.3	95.7
Ofloxacin	5mcg	10/16	62.5	37.5
Streptomycin	10mcg	32/86	37.2	62.8

TABLE II: In-Vitro antibiotic sensitivity of Clinical Isolates of *Pseudomonas aeruginosa* in Enugu, Nigeria, Urinary versus Non-urinary Isolates.

Antibiotic	No of isolates No of tested	Sensitive/ No of tested	% Sensitive	% Resistance
Ciprofloxacin	12/19	(6/10)	63.2(60)	36.8(40)
Colistin	88/110/129	(112/129)	80(86.8)	20(13.2)
Gentamycin	37/103	(68/133)	35.9(51.1)	64.1(48.9)
Azithromycin	4/9	(9/20)	44.9(45)	55.6(55)
Pefloxacin	40/65	(33/66)	61.5(50)	38.5(50)
Ceftazidime	45/53	(63/69)	64.9(91.3)	115.1(8.7)
Ampicillin	0/58	(0/90)	-(-)	10.0(100)
cotrimoxazole	0/150	(1/150)	- (0.7)	100(99.3)
Rocephine	26/57	(29/65)	45.6(44.6)	54.4(55.4)
Tetracycline	0/154	(/154)	- (1.3)	100(96.7)
Cefuroxime	3/56	(5/75)	.4(6.7)	94.6(93.3)
Nitrofurantoin	3/5	(-)	4.3(-)	95.7(-)
Nalidixic acid	2/46	(-)	4.3(-)	95.7(-)
Streptomycin	9/35	32/86	25.7(37.2)	74.3(62.8)
Ceftriaxone	8/16	(10/12)	50(83.3)	50(16.7)
Ofloxacin	4/7	(6/9)	57.1(66.7)	42.9(33.3)

Figures in parenthesis represent non-urinary isolates.

DISCUSSION

The resistance of bacteria to antibiotics particularly those used for first-line therapy is an increasing cause for concern (1,5,6,7). In vitro susceptibility testing is crucial to assess the resistance pattern in any specific location and for each individual agent(8). The pattern of resistance may vary in different hospitals, depending on several factors such as antibiotic prescribing policy, types of patients, the level of hygiene and infection control(7). The prevalence of resistance amongst our isolates was very high probably due to very ineffective infection control procedures in the hospital coupled with reliance on a narrow spectrum of antibiotics due to absence of

antipseudomonas antibiotics like amikacin, tobramycin, imipenim, cefsulodin, netilmicine and cefoperazone. The frequency of susceptibility was highest to ceftazidime (88.5%) and colistin (83.7%). The sensitivity of the isolates to Flouroquinolones; Ofloxacin and Ciproflozacin (62.5%) and (62.1%) respectively was much lower than that of others(8). Thus from the present report, it seems that resistance of *Pseudomonas aeruginosa* to the flouroquinolones is on the rise. The antibiotic prescribing policy may be contributory to this, since many physicians in Nigeria, usually prescribe without recourse to antibiotic sensitivity patterns.

Unlike the present study where the sensitivity of isolates to cotrimoxazole, tetracycline and gentamycin was very low (0.7%, 1.3% and 44.1% respectively, others(5), had moderately higher levels of sensitivity (55.17%, 48.28% and 67.75%) respectively. In Nigeria, cotrimoxazole and tetracycline are amongst the four most commonly abused antibiotics. They are easily available in chemists' shops without prescription. Non-urinary isolates were more sensitive to Pefloxacin, Gentamycin, Streptomycin, Ceftriaxone and Ceftazidime than urinary isolates. This may be due to the facts that isolates from the urinary tract were from patients who were catheterized at one period or the other thus predisposing to recurrent infections with more antibiotic resistant organisms.

In view of the occurrence of multiple antibiotic resistant strains, coupled with the increasing resistance of *P. aeruginosa* to the flouroquinolones, considerable effort must be made to establish and improve infection control units, antimicrobial utilization practices and establish an antibiotic policy for the hospital and the country.

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