

## PANDRUG RESISTANT PSEUDOMONUS AERUGINOSA ISOLATED FROM URINE SAMPLE OF A PATIENT OF BITID : A CASE REPORT

Md Mamunur Rashid<sup>1\*</sup>

### Summary

*A 80 years old diabetic, hypertensive with severe sleep apnoea syndrome male patient who is on BiPAP machine having history of repeated hospitalization in ICU for stroke, LVF, sleep apnoea and chronic urinary retention with repeated urinary catheterization with intake of different parenteral antibiotic therapy presented with burning micturition along with passage of cloudy urine for five days. His urine culture report revealed growth of Pseudomonas aeruginosa which was resistant to all antibiotics like Azithromycine, Cefixime, Ceftriaxone, Cefuroxime, Cotrimoxazole, Amoxyclav, Amikacin, Cefazidime, Ciprofloxacin, Doxycyclin, Meropenem, Nitrofurantoin, Chloramphenicol, Cefipime, Tetracyclin, Cefpirome, Cefotaxime, Levofloxacin, Piperacilin+Tazobactam, Cefoperazone+Sulbatam, Tygicyclin, and Ticarcillin+Clamlanic acid except Colistin which was sensitive. Patient was given Inj. Colistin for seven days and then was stopped due to severe nephrotoxicity and microbiologically patient was cured. But two weeks after again growth of multidrug resistant pseudomonas occurred in his urine sample. Then patient was given a series of parenteral and oral antibiotics (Inj. Cefuroxime, Inj. Colistin, Inj. Ceftriaxone, Moxifloxacin, Levofloxacin, Azithromycin, Ciprofloxacin, cefixime, cotrimoxazole etc) to which the organism was resistant along with relieve of obstruction by urinary catheterization for last 12 months of study. At follow up after end of study patients well being was good though resistant organism remained in his urine sample proved by repeated urine culture where the colony count of the organism was not in pathological range.*

### Key words

Multi Drug Resistant (MDR) organism; Extended Drug Resistant (XDR) organism; Pan Drug Resistant (PDR) organism; Pseudomonas aeruginosa; Urinary catheterization; Urine culture.

1. Assistant Professor of Clinical Tropical Medicine  
Bangladesh Institute of Tropical and Infectious Diseases (BITID)  
Fouzderhat, Chittagong.

\*Correspondence: Dr. Md Mamunur Rashid  
Email : mamunurdr@ymail.com  
Cell : 01711236644

### Introduction

MDR (Multidrug Resistant) is defined as acquired non susceptibility to at least one agent in three or more antimicrobial categories and XDR (Extended Drug Resistant) is defined as non susceptibility to at least one agent in all but two or fewer antimicrobial categories (i.e Bacterial isolates) remain susceptible [1,2,3]. If resistance is seen against all commercially available antipseudomonal drugs it is called pandrug resistant pseudomonas aeruginosa [4,5]. Pseudomonas aeruginosa is a gram (-ve) opportunistic human pathogen of the family pseudomonadaceae and can switch from being an environmental isolate, found in the soil and water, to being a human pathogen. According to data from US Center for Disease Control (CDC) and prevention, it is the third most common cause of urinary tract infection and fifth most frequently isolated nosocomial pathogen. It shows inherent resistance to anti microbial agents through a variety of mechanism. i) decreased permeability of the outer membrane. ii) Efflux systems which actively pump antibiotics out the cell and iii) production of antibiotic-inactivating enzymes. Besides this by mutational change or by transfer of horizontal gene p.aeruginosa also acquires resistance against different antibiotics. Repeated and periodic urine culture is recommended in these patient to confirm its presence in urine sample and also to guide the treatment. It is very difficult to eradicate the organism from urine sample of patients with PDR-P.aeruginosa induced urinary tract infection.

Regularly updated surveillance of local microbial prevalence and resistant patterns are needed to guide the empiric therapy for Urinary Tract Infection (UTI) [6]. Treatment of these patient with evidence of obstructive uropathy with MDR Pseudomonas UTI consists catheterization and parenteral antibiotics [7,8].

### Case Report

A 80 years old diabetic hypertensive with chronic urinary retention with continuous catheterized patient having prior history of repeated ICU admission and intake of several types of antibiotics

presented with burning micturition and passage of cloudy urine. His immediate urine culture report confirmed growth of PDR pseudomonas aeruginosa (Colony count  $1 \times 10^5$ /ml) which was resistant to all antibiotics except colistin.

#### Physical examination

Patients was alert, conscious, temperature-normal, irregular pulse (82/min), with normal respiratory rate (20/min),  $SpO_2$ -98%, catheter in situ with evidence of right sided hemiparesis.



**Fig 1 :** Patient at Hospital **Fig 2 :** Patient during followup

#### Investigations

**Table I :** Investigation profile of the patient

<b>i) During symptom appearance</b>		
Date	Investigation	Result
05.02.15	Urine R/E & M/E Urine C/S	Pus Cell- Plenty, RBC- 8-10/HPF.  Growth of Pseudomonas aeruginosa having colony count= $1 \times 10^5$ /ml which is resistant to all drugs except colistin which is sensitive .
<b>ii) 1 week after Colistin therapy</b>		
14.02.15	Urine R/E & M/E Urine C/S	Pus Cell-0-4-HPF, RBC-Nil  No growth of micro organism
<b>iii) 10 days after end of Colistin therapy</b>		
24.02.15	Urine R/E & M/E Urine C/S  USG of KUB region  Uroflowmetry  PSA	Pus Cell-4-6/HPF, RBC-3-5/HPF  Growth of Pseudomonas aeruginosa having colony count= $5 \times 10^3$ /ml which is resistant to all drugs  Enlarged prostate with chronic retention of urine  Evidence of severe urinary flow obstruction  Within normal range

<b>iv) Subsequent follow up investigations</b>		
Date	Investigation	Result
12.03.15	Urine R/E & M/E Urine C/S	Pus Cell-Plenty, RBC=4-5/HPF  Growth of Pseudomonas aeruginosa having colony count= $1 \times 10^3$ /ml which is resistant to all drugs
12.04.15	Urine R/E & M/E Urine C/S	Pus Cell-40-50,RBC-2-3/HPF  Growth of Pseudomonas aeruginosa having colony count= $1 \times 10^4$ /ml which is resistant to all drugs
26.06.15	Urine R/E & M/E Urine C/S	Pus Cell-2-4,RBC-Plenty  Growth of Pseudomonas aeruginosa having colony count= $1 \times 10^2$ /ml which is resistant to all drugs
26.08.15	Urine R/E & M/E Urine C/S	Pus Cell-4-6/HPF,RBC-6-8/HPF  Growth of Pseudomonas aeruginosa having colony count= $1 \times 10^3$ /ml which is resistant to all drugs
26.10.15	Urine R/E & M/E Urine C/S	Pus Cell-2-4/HPF,RBC-4-6HPF  Growth of Pseudomonas aeruginosa having colony count= $1 \times 10^4$ /ml which is resistant to all drugs
05.02.16	Urine R/E & M/E Urine C/S	Pus Cell-1-2/HPF,RBC-0-1/HPF  Growth of Pseudomonas aeruginosa having colony count= $1 \times 10^2$ /ml which is resistant to all drugs

**Table II :** Characteristics of the reported patient and outcome of infection

Points	Events
Isolated organism	Pseudomonas aeruginosa
Site of isolation	Urine
Date of isolation	05.02.2015
Days in the ICU stay until the isolation of the multidrug resistant pseudomonas strain	35 days
Antibiotic combination used after isolation	Colistin + Ceftazidime
Dosage/Duration of colistin use	2 million IV 8 hourly for 7 days & then stopped due to severe nephrotoxicity
Outcome of the infection	Cured clinically & microbiologically for 2 weeks. After 2 weeks again pseudomonas grows but colony count was below the pathological range and patient remains clinically well till the end time of the study (05.02.2016)

### Management

Just after diagnosis patient was given inj. colistin 2 million unit 8 hourly for 7 days following which it was stopped due to severe nephrotoxicity (When serum creatinine became 3.2mgm/dl). On 9<sup>th</sup> day of urine culture confirmed no growth of organism and patients condition also improved. Within 10 days patient again developed burning micturition with passage of cloudy urine and again *P.aeruginosa* grew in his urine with colony count  $5 \times 10^3$ /ml which was also resistant to all above mentioned antibiotics including colistin. Gentamycin could not be given due to renal impairment of the patient. For this reason, patient was given several parental and oral antibiotics (Though all of them were resistant to *P.aeruginosa*) like Ceftazidime, Azithromycine, Cefixime, Ciprofloxacin, Doxycyclin etc. for definitive time period with continuous catheterization but the organism remained persistent in urine sample for last 10 month. The catheter was changed every monthly with all aseptic precaution. The last culture report showed growth of pandrug resistant *P.aeruginosa* with colony count  $1 \times 10^2$ /ml. Now, patients well being is good but drug resistant *P.aeruginosa* remains in his urine sample still.

### Prevention

For prevention of PDR : *P.aeruginosa* spread to other household members or hospitalized patients from a infected person the following measures are needed to adopt like i) periodic urine culture in catheterized patients and periodic change of catheters with all aseptic procedures ii) Use of hand gloves and repeated hand washing before and after handling patients iii) Fitting up automatic flushing toilet system iv) Stoppage of use of common shelves for personnel antiseptic solution or catheter-preserving liquids.

### Discussion

This study focuses on clinical information and outcome of infection due to pandrug resistant *pseudomonas aeruginosa*. This study shows that the isolation of pandrug resistant *pseudomonas aeruginosa* from urine sample does not necessarily mean a bad outcome. It may be explained by several reasons. First, the achieved concentration of several antimicrobials in many body fluids including urine may exceed the minimal inhibitory concentration of *pseudomonas* species,

even if the in vitro susceptibility result would place it in the resistant category [9]. Second, infections even severe, sometimes are self limited without the use antimicrobial agents, as the pre-antibiotic era taught us. Third, pandrug resistant *pseudomonas* may be colonizers of the urinary tract in patients receiving several classes of antimicrobials for a long period of time, while the real pathogen may not be isolated. Fourth, it has been shown that occasionally PDR *pseudomonas* may exhibit decreased virulence compared to other more sensitive organisms of the same species. Administration of antibiotics as a prophylactic measure against UTI should always be analysed critically and the benefits seen to be well above the side effects of which resistance is one of them. Prolonged or permanent urethral catheterizations are notable scenarios often encountered and their benefits need be periodically reviewed. Also, health personnel should be aware of the prevailing antimicrobial activity pattern of at least, the locally available antibiotics against *pseudomonas aeruginosa* so as to make correct or near correct prescriptions [10].

### Conclusion

Eradication of PDR-*pseudomonas aeruginosa* from urine sample of a patient with PDR-*pseudomonas* induced UTI is difficult. Periodic use of parenteral antibiotic though resistant to the organism and also catheterization in needed case helps to irradicate or even to reduce the concentration of the organism from urine sample.

### Disclosure

The author declared no competing interest.

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