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Case Study

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URINARY TRACT INFECTION BY BURKHOLDERIA CEPACIA

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ABSTRACT

Burkholderia cepacia is an opportunistic pathogen. The awareness of this emerging bacterium is important, as it is known to cause nosocomial infection in hospitals. Urinary tract infections with *Burkholderia cepacia* have been associated after bladder irrigation or urinary catheterisation. We report 2 such cases of urinary tract infection with *Burkholderia cepacia* in immune-compromised patients with Foley's catheter in situ.

KEYWORDS: Urinary tract infection, catheterization, Burkholderia cepacian, mortality.

INTRODUCTION

Burkholderia cepacia complex (BCC) is not part of human flora but its organisms are distributed ubiquitously and found mostly on plant roots, the rhizosphere, soil and moist environments. Originally described by William Burkholder in 1950 as the causative agent of bacterial rot of onion bulbs. Initially it was classified as *Pseudomonas cepacia*. Later in 1992, P. cepacia and six other species belonging to rRNA group II of the genus Pseudomonas were transferred to the new genus *Burkholderia*, in honour of its discoverer.[1,2] *Burkholderia cepacia* is an aerobic, glucose–non-fermenting, gram-negative bacillus that mainly affects immunocompromised and hospitalized patients and is well known for causing superadded infection in those suffering from cystic fibrosis (CF) and chronic granulomatous disease.[3-5]

It has also been reported to cause bacteraemia, particularly in patients with indwelling catheters, urinary tract infection, septic arthritis, peritonitis. The natural environment could act as a reservoir of BCC infection, though in CF, patient-to-patient transmission plays predominant role.[6] BCC has emerged as an important cause of morbidity and mortality in hospitalised patients largely because of its high intrinsic antibiotic resistance and its ubiquitous nature.[2] It has always been a difficult task for a routine microbiological laboratory to identify the non-fermenting gram negative bacteria (NFGNBs) worldwide, including our own country. It needs to be differentiated from *Pseudomonas* due to its close resemblance. Because of this, there is under-reporting of UTI by BCC in India.[7-11]

Burkholderia cepacia is not a common genito-urinary tract infection causing pathogen and is usually introduced after some urological procedures or catheterization.[12]

We at our tertiary care centre, identified 2 cases of urinary tract infections due to *B. cepacia* in patients hospitalised with underlying disease and history not suggestive of UTI at the time of admission. Both were catheterised with Foley's catheter which perhaps acted as a predisposing factor for UTI leading to sepsis and hence mortality.

CASE 1

A 65year old diabetic male was hospitalised for congestive heart failure. At the time of admission, IV cannula and Foley's catheter were inserted. 4 days later, patient started having high grade fever with chills. Preliminary investigations revealed raised counts (TLC 11000/cu mm with predominant polymorphs 88%), raised procalcitonin(>10ng/ml), deranged LFT and KFTs. Samples were received in microbiology laboratory for blood and urine cultures simultaneously. Samples were processed as per standard guidelines. Urine microscopy revealed full field pus cells and micro-organisms. Semiquantitative culture of urine sample on Blood and MacConkey agar was done which showed significant growth. The growth was processed for identification. The bacteria grown were non-lactose fermenting, gram negative rods, motile, catalase positive and delayed oxidase positive. The organism utilized sugars oxidatively. On the basis of colony morphology and biochemical reactions, the organism was suspected to be *Burkholderia* species. Identification was confirmed by the Vitek 2 (BioMerieux, France) automated systems which identified it as *Burkholderia cepacia* with identification percentage >90%. Antibiotic susceptibility test was performed using Kirby–Bauer disk diffusion

methods as per the Clinical Laboratory Standards Institute (CLSI) guidelines 2019 as well as by Vitek-2. The isolate was found to be sensitive to ciprofloxacin, co-trimoxazole, minocycline and meropenam but resistant to ceftazidime and gentamicin. Simultaneous blood culture of the patient showed no growth till 5 days of incubation.

Another urine sample was received after 2 days which showed similar findings. We tried to trace the patient to get more samples for blood culture but unfortunately the patient expired.

CASE 2

A 63-year-old diabetic female presented in emergency with acute abdomen since morning. Based on physical examination and preliminary investigations, a diagnosis of acute biliary pancreatitis with ascites was made. Patient was kept nil per orally and I/V lines were inserted. Patient's general condition deteriorated so she was shifted to ICU where foley's catheter was inserted per urethra. During her stay in ICU, her ascites kept on increasing. After a week in ICU she started having high grade fever with chills. Investigations revealed rising TLC (from baseline of 6400/cu mm at the time of admission to 12000/cu mm) with predominant polymorphs, raised PCT(>10ng/ml) and deranged LFTs. Blood and urine samples were sent for culture. All these samples were processed in the microbiology laboratory as per standard protocol and confirmed by Vitek 2. Both samples grew non-lactose fermenting, gram negative rods which was motile, catalase positive and delayed oxidase positive. The organism utilized sugars oxidatively. The organism was identified as *Burkholderia cepacia* sensitive to ciprofloxacin, co-trimoxazole, minocycline and meropenam but resistant to ceftazidime and gentamicin. Ascitic fluid sample was also received from the same patient which showed similar growth and sensitivity as other two samples.

It was very interesting to note that BCC in these two cases showed same antibiogram. It was unfortunate that we lost both the patients.

DISCUSSION

Samples from both cases were received in the laboratory at the same time. So we traced back these patients but both were found to be admitted in different ICUs. We observed catheterised patients for any growth of *Burkholderia cepacia* in samples for more than a month in order to label it as a cluster or to implicate non adherence to infection control practices. But no other cases turned up, so we considered these as isolated cases.

Gram-negative rods could be opportunistic pathogens responsible for nosocomial infections. Nonfermenting gram-negative bacteria challenge the microbiologists, because they are difficult to diagnose and are difficult to treat due to the problem of multidrug resistance. Important MDR organisms in healthcare settings include *Pseudomonas aeruginosa, Acinetobacter baumannii, Burkholderia cepacia* and *Stenotrophomonas maltophilia.* A number of strains exhibit resistance to essentially all the commonly used antibiotics, including anti-pseudomonal penicillins, cephalosporins, aminoglycosides, tetracyclines, fluoroquinolones, trimethoprim-sulfamethoxazole, and carbapenems.[13]

B. cepacia is an emerging bacterium causing nosocomial infections. It is associated with a wide variety of infections, including pneumonia, bacteraemia, skin and soft tissue infection, genitourinary tract infection, secondary to instrumentation/devices. Various outbreaks have also been traced back to use of contaminated solutions such as antiseptics, disinfectants, nebulizer solution, and dextrose solution in hospitalized patients.[14-16]

In case of UTI, the predisposing factors such as renal transplantation, prolonged bladder catheterization, or urethrocystoscopy add to the menace. In our study, suggested predisposing factors are diabetes, old age and urinary catheterization. Breach in infection control practices cannot be ruled out. So, one should be vigilant in identifying such not so common organisms so that inadvertent outbreaks can be contained. All non-fermenter bacteria which are motile and delayed oxidase positive should be looked for *Burkholderia* as these might be misreported as *Pseudomonas*. Also, all strict infection control measures should be practiced to prevent any device associated infection.

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