Case report

Case Report of a Patient with *Burkholderia cepacia* Urinary Tract Infection with Prostatitis and Prostatic Micro abscess.

ABSTRACT

The term urinary tract infection encompasses a variety of clinical entities, including asymptomatic bacteriuria, cystitis, prostatitis, and pyelonephritis. *Burkholderia 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. In this case report we highlight a case of Urinary tract infection caused by *Burkholderia cepacia* in a patient with history of recent invasive urological procedure. Through this case report, we wish to create an awareness of the fact that urinary tract infection secondary to *Burkholderia cepacia* should be considered especially in the context of Urological procedure.

INTRODUCTION

Urinary tract infection is a common human illness that is rapidly responsive to modern antimicrobial therapy, if the correct antibiotic is chosen for the particular urinary pathogen. It may be asymptomatic (subclinical infection) or symptomatic (disease). The term urinary tract infection encompasses a variety of clinical entities, including asymptomatic bacteriuria (ASB), cystitis, prostatitis, and pyelonephritis. Except among infants and older adults, urinary tract infection tends to occur far more commonly in females than in males. After 50 years of age, obstruction from prostatic hypertrophy becomes common in men, and the incidence of urinary tract infection is almost same as among men and women. The pathogen causing urinary tract infection may vary by clinical syndrome but are usually the enteric gram-negative bacilli that have migrated to the urinary tract. In acute uncomplicated cystitis, the etiologic agents are usually predictable. *Escherichia coli* accounts for 75–90% of isolates; *Staphylococcus saprophyticus* for 5–15% (with particularly frequent isolation from younger women); and *Klebsiella*, *Proteus*, *Enterococcus* and *Citrobacter* species, along with other organisms, for 5–10%. In complicated urinary tract infection (e.g., Catheter Associated Urinary Tract Infection), *Escherichia coli* remains the predominant organism, but other aerobic gram-negative bacilli, such as *Pseudomonas aeruginosa* and *Klebsiella*, *Proteus*, *Citrobacter*, *Acinetobacter* and *Morganella* species also are frequently encountered. Gram-positive bacteria (e.g., *Enterococci* and *Staphylococcus aureus*) and yeasts also are important pathogens encountered in complicated urinary tract infection.

Burkholderia cepacia [now referred to as *Burkholderia Cepacia* Complex species] is an aerobic, gram-negative bacillus which are glucose non-fermenting. It mainly affects the immunocompromised and hospitalized patients. Besides infecting the lungs in cystic fibrosis (CF), the *Burkholderia Cepacia* Complex species appears as airway colonizers during broad-spectrum antibiotic therapy. They have been implicated in causing Ventilator Associated Pneumonia, catheter-associated infections and wound infections. Urinary Tract Infections caused by this aggressive pathogen are rarely described in the literature.

Patients who have predisposing risk factors like post organ transplant, post invasive urological procedures, neurogenic bladder, vesico-ureteral reflex, post bladder irrigation are susceptible to *Burkholderia cepacia* urinary tract infection. Here we report an unusual case of a 61 year old male, who presented with fever with chills, dysuria, increased frequency, hesitancy, poor stream of urine and incomplete voiding and with a history of recent invasive urological procedure.

CASE PRESENTATION

We report the case of a 61 year old male, with no known comorbidities, who was admitted with complaints of fever, dysuria, increased frequency, hesitancy, poor stream of urine and incomplete voiding for 2 days. Fever was associated with chills. He had a recent history of bilateral renal calculi with right upper ureteric calculus measuring 7.4 mm causing mild hydroureteronephrosis for which cystoscopy and Double J (DJ) stenting was done 2 weeks back. Subsequently, he underwent ureteroscopy and laser lithotripsy 4 days prior to current admission.

At the time of admission, he was afebrile (temperature of 97.5 degree Fahrenheit), had pulse rate of 96 beats per minute, blood pressure of 90/70 mmHg and respiratory rate of 17 breaths per minute with oxygen saturation of 97% on room air. Systemic examination did not reveal any obvious abnormality. Digital rectal examination was done and it revealed enlarged and tender prostate. Considering his symptoms, the recent history and clinical findings, we suspected urinary tract infection - acute prostatitis.

The initial laboratory analysis revealed: White Blood Cell count of 16970/µL, with Neutrophils of 83% and Lymphocytes of 7%; elevated inflammatory markers: C-Reactive Protein of 286 mg/dL. Haemoglobin of 12 g/dL, Haematocrit of 35%, Mean corpuscular volume (MCV) of 87 fL, Platelet count of 1,67,000/µL. Serum electrolytes revealed, Serum sodium of 131.9 mmol/L, Serum potassium of 3.2 mmol/L. Fasting blood sugar was 107 mg/dL and HbA1C of 6.5% and coagulation studies were within normal limits. Urine routine examination revealed numerous pus cells / high power field and 2-3 RBCs / high power field. Total Prostate Specific Antigen (PSA) levels were found to be elevated (135.4 ng/ml). Urine culture obtained from mid-stream urine sample showed significant growth of *Burkholderia cepacia* (with a colony count of >100000 Colony Forming Units (CFU) per mL of urine), and the antibiogram showed sensitivity to Ceftazidime, Meropenem, Trimethoprim-Sulfamethoxazole and Chloramphenicol, intermediate results with Levofloxacin and resistance to Ticarcillin-Clavulanic acid.

Abdominal Ultrasound revealed normal sized kidneys with normal parenchyma, bilateral renal calculi and prostatomegaly (56cc). Suspecting prostate abscess, Magnetic Resonance Imaging (MRI) of pelvis with contrast was done and it showed enlarged prostate gland (40 X 50 X 45 mm, 45cc), few T2-hetero-intense Benign Prostatic Hyperplasia nodules in bilateral anterior and posterior transitional zone in the base, mid gland and apex of the prostate. Diffuse areas of diffusion restriction seen involving the right anterior, posterior, medial and posterolateral peripheral zones at the base, midline and apex of prostate, similar areas of diffusion restriction also seen involving the anterior and posterior peripheral zones from the base to the mid gland on the left half of the gland and all of these areas showing early enhancement in post contrast study which was suggestive of prostatitis and a focal tiny area in the right posterior transitional zone of the mid gland showing T2-hyperintense signal showing diffusion restriction and peripheral enhancement in post contrast study and was suggestive of micro-abscess (5 X 5 mm).

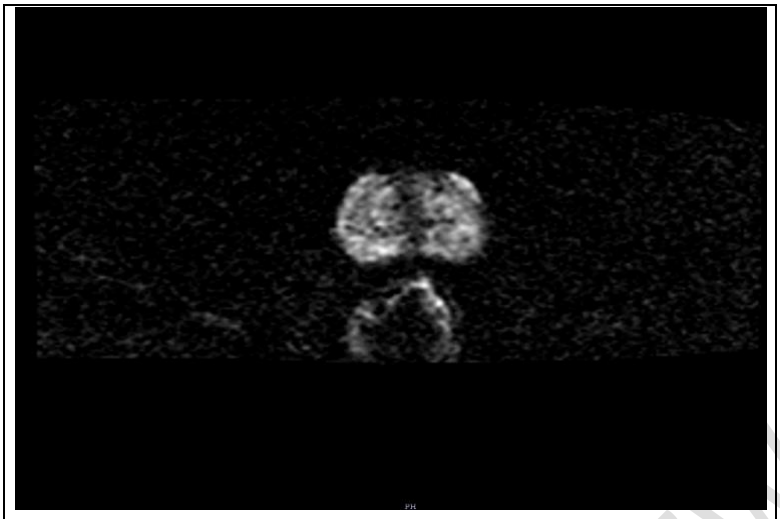

Figure 1:Magnetic Resonance Imaging (MRI) of pelvis with contrast

Diffusion weighted image showing geographical areas of diffusion restriction almost involving the entire gland and all of these areas showing relatively early enhancement - suggestive of features of prostatitis.

Figure 2: Magnetic Resonance Imaging (MRI) of pelvis with contrast

Post contrast T1-weighted images showing non-enhancing focus in the right mid transitional zone – suggestive of micro abscess.

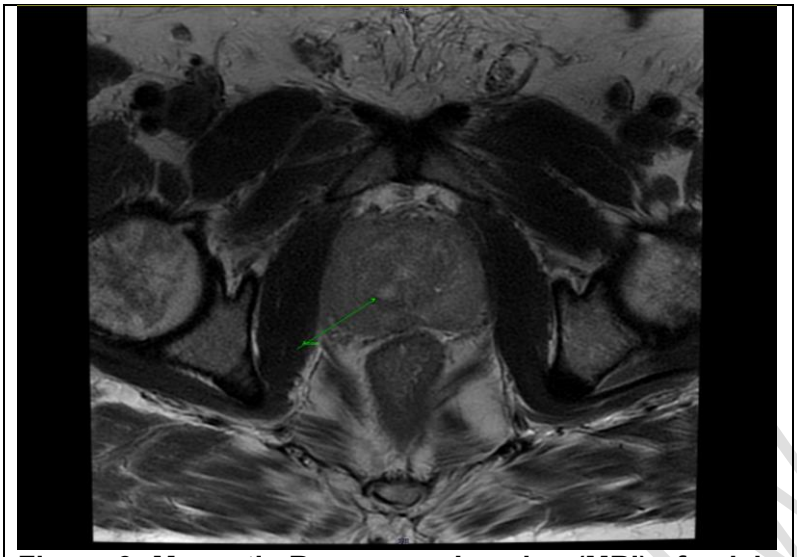

Figure 3: Magnetic Resonance Imaging (MRI) of pelvis with contrast
T2-weighted images showing bright focus in the right mid transitional zone – suggestive of micro abscess.

In view of the diagnosis of *Burkholderia cepacia* urinary tract infection, antibiotic treatment was initiated with intravenous Ceftazidime and Oral Cotrimoxazole (Trimethoprim-Sulfamethoxazole) according to antibiogram and sensitivity testing reports along with other supportive measures. Urology consultation was sought and right DJ stent removal was done under aseptic precautions. Post procedure period was uneventful. Patient improved symptomatically during the hospital stay. After 10 days of hospital stay and antibiotic treatment, he was discharged in a hemodynamically stable state with Oral Cotrimoxazole (Trimethoprim-Sulfamethoxazole) and other supportive medications.

The patient was followed up in OPD after 2 weeks. He improved clinically and his inflammatory markers were down-trending, C-Reactive Protein of 1.82 mg/dL, total Prostate Specific Antigen (PSA) levels were decreasing (Total PSA of 6.90 ng/mL) and urine routine examination was normal. He was continued on other supportive treatment.

DISCUSSION

Urinary tract infection is a common human illness that is rapidly responsive to modern antimicrobial therapy, if the correct and proper antibiotic is chosen for the particular urinary pathogen. It is crucial to properly evaluate a patient with urinary tract infection to help in deciding type of urinary tract infection, cause, appropriate therapy including duration and in prevention of further infection. During the neonatal period, the incidence of urinary tract infection is slightly higher among males than among females because male infants more commonly have congenital urinary tract anomalies. After 50 years of age, obstruction from prostatic hypertrophy becomes common in men, and the incidence of urinary tract infection is almost as high among men as among women.

Burkholderia cepacia complex is not part of human flora but its organisms are distributed ubiquitously and found mostly on plant roots, the rhizosphere, soil and moist environments. It 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. It has also been reported to cause bacteraemia, particularly in patients with indwelling catheters, urinary tract infection, septic arthritis, peritonitis. *Burkholderia cepacia* is not a common Genito-urinary tract infection causing pathogen and is usually introduced after some urological procedures or catheterization. In

our above-mentioned case, the patient had a recent history of urological procedure (Cystoscopy and Double J (DJ) stenting, Ureteroscopy and laser lithotripsy).

Burkholderia cepacia complex organisms are intrinsically resistant to many antibiotics, making empirical treatment difficult. Therefore, treatment must be focused according to culture and sensitivities. Trimethoprim-Sulfamethoxazole, Meropenem, and Minocycline are the most active agents in vitro and may be started as first-line agents. Some strains are susceptible to third-generation Ureidopenicillins, advanced Cephalosporins and Fluoroquinolones, and these agents may be used against isolates known to be susceptible. Newer antibiotics such as Ceftolozane / Tazobactam and Ceftazidime-Avibactam show good activity against Multi Drug Resistant (MDR) strains in vitro. In our patient, the antibiogram showed sensitivity to Ceftazidime, Meropenem, Trimethoprim-Sulfamethoxazole and Chloramphenicol. The patient was started on Ceftazidime and Trimethoprim-Sulfamethoxazole.

CONCLUSION

Burkholderia cepacia is not commonly encountered as a genito-urinary tract infection (including prostatitis) causing pathogen and is usually introduced after some invasive urological procedures or catheterization. Diagnosis is made via urine culture report and treatment with antibiotics is based on antibiogram and sensitivity patterns as *Burkholderia cepacia* are intrinsically resistant to many antibiotics. Urinary tract infection secondary to *Burkholderia cepacia* should be considered especially in the context of Urological procedure. Paying attention to patient's medical and surgical history and clinical symptoms, led to further workup and arriving at the correct diagnosis followed by prompt treatment and follow up in this case. The aim of this case report is to highlight a case of urinary tract infection, prostatitis with prostatic micro abscess caused by *Burkholderia cepacia* and to create an awareness among physicians to consider this as a differential diagnosis in a patient presenting with urinary tract infection with a history of recent invasive urological procedure.

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3. **Urinary tract infection by *Burkholderia cepacia*.** Nirmaljit Kaur1 , Saloni Garg*2 , Shalini Malhotra3 and Nandini Duggal4 1 Senior Consultant, 2 Senior Resident, 3Consultant, 4 Senior Consultant & Head, Department of Microbiology, PGIMER & Dr. R.M.L. Hospital, New Delhi-110001. (Case Study Published in EUROPEAN JOURNAL OF PHARMACEUTICAL AND MEDICAL RESEARCH ejpmr, 2019,6(10), 674-676)

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