



CATHETER ASSOCIATED BLOODSTREAM INFECTION CAUSED BY RHIZOBIUM RADIOBACTER

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ABSTRACT

Rhizobium radiobacter is a Gram negative bacillus that is infrequently recognised in clinical specimens but is emerging as an opportunistic human pathogen that has a propensity to cause infections in patients with indwelling foreign devices. We report a case of R.radiobacter blood stream infection associated with central venous dialysis catheter.

KEYWORDS: Rhizobium radiobacter, Intravascular devices, Blood stream infection.

INTRODUCTION

Strains of Rhizobium species [formely Agrobacterium, which was reclassified based on 16S RNA gene analysis] are aerobic, motile, oxidase positive and non-spore forming Gram-negative bacilli.^[1-4] Among the species of Rhizobium [i.e R. radiobacter, R.rhizogenes, R.rubi, R.undicola and R.vitis] R.radiobacter is the species that most commonly causes disease in humans.^[3,4] Since the first case of human infection with R.radiobacter, in a patient with prosthetic aortic valve endocarditis, was reported in 1980^[5], R.radiobacter has been recognised as an opportunistic human pathogen.^[1,6,7] Most of the patients with R.radiobacter infection have debilitating underlying disease.^[1,6-16] Bacteraemia caused by this organism is usually secondary to the use of intravenous catheters.^[5,8,14] The majority of patients with R.radiobacter infection have appeared to respond well to antibiotic therapy. In addition, a significant aspect of therapy is the removal of foreign material, because patients who have persistant infection or who initially respond to therapy risk experiencing relapse until the foreign body is removed. The outcome of infection with R.radiobacter is favorable.^[1,7]

The current case report describes a case of central venous dialysis catheter associated blood stream infection caused by R.radiobacter.

CASE REPORT

A 36 years old male was admitted to the surgery department of a tertiary care hospital with complaints of left sided pain abdomen and abdominal distension for

two days, burning micturition, absence of passage of stools for 4 days and decreased intake of feeds. He was not a diabetic or hypertensive but chronic alcoholic and a smoker. On examination, patient was conscious and coherent, abdominal distension +, liver and spleen not palpable, no free fluid, tenderness+, no palpable mass and sluggish bowel sounds. His pulse rate was 115/min, BP 130/90 mm Hg, GRBS 110 mg/dl.

Laboratory investigations revealed the following. Blood picture showed a WBC count of 22,000 million/cu mm, neutrophils 85%, lymphocytes 6%, Hb. 9gm%, prothrombin time 31.9% sec, INR 3-12, B.urea 102 mg/dl, S.creatinine 3.2 mg/dl, S.sodium, S. potassium, albumin and globulin were within normal limits. S.bilirubin was 16.8 mg/dl, direct and indirect bilirubin were 12.3 mg/dl and 4.5 mg/dl, SGOT 950 U/l and SGPT 176 U/l. Ascitic fluid aspiration was done which was haemorrhagic. CECT abdomen revealed minimal left pleural and pericardial effusion and complete thrombosis of superior mesenteric vein extending near total splenic infarct with perisplenic hematomas. ? spontaneous splenic rupture . Blood and urine cultures were negative.



Colonies of *Rhizobium radiobacter* on nutrient agar [Fig.1]

Emergency laparotomy was planned and splenectomy was performed for splenic rupture. Intra-abdominal drain was inserted. Patient was put on injection merogram, lizomac and metrogyl. Post operatively patient developed hypotension and coagulopathy renal dysfunction. Patient was desaturated and was kept on mechanical ventilation. Central dialysis catheter was inserted into right jugular vein. His hemoglobin was 6.9gm%, PT 38.48 sec, INR 3.95, S.amylase 82mg/dl, Serum calcium 6.6 mg/dl and creatinine kinase 2352U/L. PR was 57/min, RR 16/min and BP 180/110 mg Hg. CVS-S1S2 +, RR NVBS and per abdomen soft. Received 1 unit of blood transfusion. He was put on injection lasix, 10mg stat, inj. Tranexa 1gm IV stat, 500mg TID, inj. fentanyl 15 ml/hr infusion along with others. On third post-operative day, blood was collected from 2 separate sites, (central and peripheral) and were inoculated into two separate commercial BACTEC vials for automated culture on the BACT/ Alert system (BioMerieux). Once the system has detected the growth, subcultures were done on nutrient agar, blood agar and MacConkey agar and incubated. [Fig1] Isolates were identified by subjecting the colonies to automated vitek 2 system (Biomerieux). Blood cultures (both central and peripheral) have grown *Rhizobium radiobacter* which was sensitive to imipenem, cefepime, ciprofloxacin, levofloxacin, amikacin, gentamycin, co-trimoxazole, tetracycline, tobramycin, aztreonam and resistant to piperacillin/ tazobactam, ceftazidime, meropenem. The antibiotic regimen was changed to inj. magnex 3gm IV BD, inj. metrogyl 500mg IV BD, inj.targocid 400 mg IV OD, inj. lizomac 600 mg IV BD along with IV fluids and Ryles tube feeds. Three days later, patient was doing well, conscious, coherent, obeying commands. She was extubated.

On 7th post operative day, patient c/o pain at the surgical site. On examination, abdominal distension with oozing serous discharge from the surgical site was noted. Abdominal drain was performed. 1700 ml of blood stained fluid was collected. Ultrasound abdomen revealed mild ascites with internal septation, bilateral mild to moderate pleural effusion and bilateral Grade I renal parenchymal changes.

In view of desaturation, tachypnoea and ABG showing respiratory metabolic acidosis patient was intubated again. Her medications included inj. micropime 2.25 gm

BD, inj. hydrocortisone 100 mg TID, infusion nor-adrenaline 10ml/hr, dobutamine 5 ml/hr and vasopressin 1.2 ml/hr. Post ventilation, patient was not doing well. Due to financial problems patient left hospital against medical advice. He was transferred to GGH with VT tube insitu and given ambubag.

DISCUSSION

Human disease caused by members of *Rhizobium* genus is uncommon. Two initial reports published in 1964 and 1977 found no evidence implicating them in human infections despite isolation from clinical specimens.^[17,18] Agents were thought to represent colonisers or laboratory contaminants. It was not until 1980 that its pathogenic potential was recognised when it was identified as a causative agent of prosthetic valve endocarditis.^[19] The organism is now recognised as an emerging opportunistic pathogen affecting mostly immunocompromised and chronically debilitated hosts. Underlying conditions contributing to disease include malignancies, bone marrow transplants, chronic renal failure and HIV infection.^[20] Corticosteroid therapy and diabetes have also been identified as predisposing factors.^[21]

Catheter related bacteraemia [CRB], continuous ambulatory peritoneal dialysis associated peritonitis, urinary tract infections and pneumonia are the common clinical conditions caused by *R.radiobacter*.^[21] Other clinical conditions include endocarditis, cellulitis, myositis, endophthalmitis and foetal death due to maternal and foetal bacteraemia.^[20] Infection with *R.radiobacter* is often associated with the presence of a foreign plastic body such as central venous catheter(CVC), nephrostomy tubes, intraperitoneal catheters and prosthetic cardiac valves. The frequent correlation between these organisms and plastic indwelling devices can be attributed to the capacity of this organism to adhere to silicon tubes.^[19]

Patients with intravascular device associated infections caused by *R.radiobacter* were defined as those with a body temperature of $\geq 38.3^{\circ}\text{C}$ and malaise, chills or tachypnea with no obvious identifiable source of infection, as well as cultures of ≥ 2 blood samples [obtained through the central catheter or from a peripheral source] positive for *R.radiobacter*. Episodes of infection that developed ≥ 48 hours after admission were regarded as nosocomial, while episodes of infection identified by positive cultures earlier than 48 hours after admission were considered community acquired.^[22]

Our patient underwent emergency laparoscopic splenectomy for splenic rupture. Postoperatively she developed coagulopathy renal dysfunction following which dialysis catheter was introduced into right jugular vein. Two days after insertion, blood cultures were repeated. *R.radiobacter* grew from both catheter lumen and also from peripheral blood sample.

Catheter related blood stream infection is the most common frequent route of *R. radiobacter* infection and the usual presentation reported in literature is fever without localising signs. The mode of transmission remains largely unclear as most of the infections reported in literature give no history of unusual plant or soil exposure.

R. radiobacter infections are most commonly community acquired.^[21] However our case should be considered as nosocomial since the episode of blood stream infection identified by positive cultures occurred later than 48 hours of hospital admission and after insertion of dialysis catheter. Unfortunately due to financial problems, patient left against medical advice and follow up was not possible.

According to the susceptibility test results, the promising agents for treating infections caused by *R. radiobacter* seems to be cefepime, piperacillin-tazobactam, carbapenems and fluoroquinolones. However, standard dilution method should be performed to elucidate the correlation between in vitro susceptibility testing and clinical efficacy.

Due to lack of facilities in our institute, we were unable to reconfirm the isolate by other methods like Microscan, API system or PFGE analysis.

CONCLUSION

We thus report a case of central dialysis catheter associated *R. radiobacter* blood stream infection. This report emphasizes the need for including *R. radiobacter* in the list of pathogens causing bacteraemia especially in the presence of an intravenous catheter.

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