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Rhizobium radiobacter: Another Cause for Hospital Acquired Bacteraemia in the Immunocompetent patients

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ABSTRACT

Introduction-Rhizobium radiobacter,a small, non-spore forming, Gram-negative aerobic bacillus, rarely behaves as an opportunistic human pathogen causing bacteremia, endocarditis and peritonitis.

Case presentation-We report a case of R. radiobacter bacteremia in an immunocompetent chronic asthmatic patient complicated with acute corpulmonale. Before isolation and identification of the pathogen by both conventional and automated methods the patient was empirically treated with antibiotics along with other supportive treatments. In spite of this the patient expired before getting the adequate doses of specific antibiotics,.

Conclusion-As Rhizobium radiobacter causes fatal infection especially in immunocompromised patients due to their drug resistant nature; prompt diagnosis along with early treatment is needed to save life of the patient.

KEYWORDS : Rhizobium radiobacter,Bacteraemia,Immunocompetent

Introduction

Rhizobium radiobacter, formerly known as *Agrobium radiobacter*,a small, non-spore forming, Gram-negative, aerobic bacillus is a plant-pathogenic soil inhabitant not characterized as a true human pathogen[1].In 1980 it was recognized as an opportunistic human pathogen as it caused prosthetic aortic valve endocarditis, the first case of human infection[2,3,4].Itrarely causes bacteremia, endocarditis and peritonitis, mostly in catheterized immune-compromised patients[5,6].Here we report *R. radiobacter* bacteremia in an immunocompetent, chronic asthmatic patient complicated with acute corpulmonale.

Case report

A 54yr old male patient was admitted in the ICU of our Hospital with severe respiratory distress. He was HIV seronegative, non-diabetic and had no past history of any other chronic illness except for bronchial asthma since childhood. After 3days of stay in the ICU, an intravenous catheter was inserted. Thereafter, the patient developed a high grade fever with chills, associated with progressive leucocytosis. He was diagnosed as a case of acute corpulmonale with sepsis. His haematological parameters were within normal range except for leucocytosis and eosinophilia with raised biochemical parameters like serum creatinine, urea, sodium and bilirubin. On clinical examination he had a very high blood pressure and high pulse rate. Chest-X-Ray revealed bilateral lower lobe consolidation.The patient was empirically treated with piperacillin-tazobactum along with steroid nebulisation and electrolyte correction. Simultaneously blood and clean- catch midstream urine samples were processed in our department for aerobic culture & sensitivity. Urine culture was negative by conventional method whereas blood culture by automated method, Bact/ALERT 3D, Biomerieux flagged positive after 48hrs of incubation. Thereafter pure bacterial colonies were isolated on blood agar (Fig-1) without showing any growth on Mac-Conkey agar. The bacterium was identified as a non-fermenter by conventional methods with motility, gram stain and oxidase reactions along with standard biochemical reactions. Further identification of the isolate was done by using VITEK 2 system. *Rhizobium radiobacter,* an ESBL-ve strain exhibited wide-spectrum sensitivity to a large group of antibiotics such as netilimycin, amikacin, levofloxacin and ciprofloxacin with resistance to ceftazidime, ceftazidime-clavulanic acid, amoxicillin-clavulanic acid and piperacillin/tazobactum was detected. In spite of all supportive treatments and before getting adequate doses of specific antibiotics the patient's condition worsened further due to development of metabolic acidosis and ultimately he expired.

Discussion

Human disease caused by members of the genus Rhizobiumis uncommon. *R. radiobacter* has been recognized as an opportunistic human pathogen. Catheter related bacteraemia, continuous ambulatory peritoneal dialysis associated peritonitis, urinary tract infections and pneumonia are the common clinical conditions caused by *R. radiobacter*[7].The underlying conditions contributing to disease include malignancies, bone marrow transplantation, chronic renal failure and HIV infection.It also occasionally causes endocarditis, cellulitis, myositis, endopthalmitis and foetal death due to maternal and foetal bacteraemia[8].But in our case it was responsible for causing bacteraemia in an asthmatic immunocompetent patient.

Human infections caused by *R. radiobacter* are most commonly community-acquired[9].Prolonged hospital stay and increased mortality was reported with antibiotic resistant Gram-negative organisms[10]. Similarly our patient had also acquired the infection in the hospital by a Gram negative organism.

In recent medical practice, there has been an increase in the proportion of nosocomial device-related infections in the presence of foreign plastic materials and effective treatment often demands removal of the device [11,9]. Our patient also acquired the infection after introduction of an intravenous catheter.

According to some studies, *R. radiobacter* was uniformly susceptible to cefepime, carbapenems, tetracyclines, piperacillin-tazobactam and ciprofloxacin, whereas resistance pattern to other antibiotics was common with a variable result[11,5]. In our case, it was sensitive to a number of antibiotics namely, netilimycin, amikacin, levofloxacin and ciprofloxacin but resistant to ceftazidime, ceftazidime-clavulanic acid, amoxicillin-clavulanic acid and piperacillin-tazobactum. The patient in our case could not survive as the bacterium was resistant to empirically treated piperacillin-tazobactum. Specific treatment with adequate doses of sensitive drugs was not possible as the patient succumbed just before getting the culture report.

Now days a large number of patients are treated in the ICU due to their critical conditions and better availability of specialised treatment devices. Due to the prolonged hospital stay coupled with the frequent use of intravascular devices, *R. radiobacter* may cause fatal in-

fection especially in immunocompromised patients due to their drug resistant nature. One must appreciate the clinical importance of this bacterium to cause serious illness, without ignoring it as an environmental contaminant. Prompt diagnosis, along with early treatment is needed to save lives of the patients.

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Legend
Fig. 1: Non-hemolytic colonies on the blood agar plate

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