

Raoultella planticola septicaemia in an immunocompromised patient - A Case Report

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Introduction:

Bacterial bloodstream infections (BSI) account for approximately 20 – 30% of all febrile neutropenic episodes in adults with malignancy. (1) There has been a shift in aetiology of BSI from Gram-positive to Gram-negative organisms depending on the geographic area. (2) In cancer patients, the Peripherally Inserted Central Venous Catheter Related Bloodstream Infection (PICCR-BSI) incidence rate is 2.6 per 1000 catheter days, 78% of which are mainly caused by Gram-negative bacteria and 43% are caused by Gram-positive bacteria. (3) *Raoultella planticola* (*R. planticola*) is a gram-negative, aerobic, nonmotile bacterium that can be found in soil and water. Urine, faeces, and sputum of 9 – 18% of humans have *R. planticola* colonization. Although both immunocompetent and immunocompromised persons can develop *R. planticola* bacteraemia, 82.4% of patients are immunocompromised. (4) There have been multiple case reports of urinary tract infections and a few reports of bacteraemia with *R. planticola* as the cause.

Case report:

A 57-year-old female of European descent presented to our hospital with fevers and feeling unwell for two days prior to admission on a background of extensive metastatic stage (IV B) non-small cell lung cancer. She was receiving palliative radiotherapy to brain, chest and neck and had completed 6 cycles of carboplatin and etoposide chemotherapy. On examination, her temperature was 37.90C, she had a Glasgow Coma Scale of 15/15, her vitals were stable. However, she was clinically dehydrated with loud upper airway sounds heard on chest auscultation. A PICC line was present in the right upper arm. Infection markers, biochemistry and blood culture were sent. Investigations revealed anaemia (Haemoglobin: 87 g/L, Haematocrit: 0.26) and elevated white cell count (16.6/nL). The neutrophils showed left shift with moderate toxic changes (14.7/nL). C-Reactive Protein (CRP) had raised to 394 mg/L (Normal: <5mg/L). Biochemistry revealed features of acute kidney injury [estimated Glomerular Filtration Rate (eGFR): 50mL/min/1.73m² and serum creatinine: 106 micromol/L]. Polymerase chain reaction test for Coronavirus disease-19 (SARS-CoV-2) was negative. Chest X-Ray showed an ill-defined confluent right upper lobe consolidation with coarse reticular markings. There was no evidence of pulmonary embolus on computerised tomography pulmonary angiography (CTPA). However, new metastatic masses were noted along with superior vena caval occlusion and enlarged mediastinal and hilar lymph nodes. Suspecting right sided pneumonia, Piperacillin/Tazobactam was advised and started along with intravenous fluids and her regular medications.

She had a Medical Emergency Team (MET) call on the second day of admission for tachycardia (Heart rate: 140s). No other symptoms and signs were noted. Sinus tachycardia was observed on electrocardiogram. Vital parameters were stable. Blood investigations were repeated, and metoprolol was added. Initial blood culture did not show any growth. However, the subsequent blood culture revealed *Stenotrophomonas maltophilia* and *R. planticola* (from anaerobic bottle), with both being sensitive to Cotrimoxazole. Clinically, the patient

was improving apart from the cough with minimal sputum production. No visible signs of infection were noted at the PICC line site. Inflammatory markers including CRP were trending downwards.

The Infectious Disease (ID) team was consulted. Piperacillin/Tazobactam was changed to oral Cotrimoxazole. Repeat blood cultures from two different sites were ordered. Renal functions were monitored. PICC was removed and the tip was sent for culture and sensitivity. Repeated blood culture report showed growth of *R. planticola* – from the PICC line. However, the tip of PICC line did not reveal any growth. The ID team advised to continue oral Cotrimoxazole for 4 weeks.

She responded to treatment with Cotrimoxazole. However, her overall condition declined due to metastatic disease. Her condition deteriorated gradually; palliative team was involved for end-of-life care. She passed away comfortably in hospital after 6 weeks of admission on account of metastatic disease.

Discussion:

R. planticola is an aerobic, gram-negative rod predominantly found in water and soil. It was previously known as *Klebsiella planticola* but in 2001, it was later reclassified in the new genus of *Raoultella*, partly due to its histamine-producing properties. *R. planticola* is generally innocuous and rarely causes infection in humans. (4) The first reported infection was in 1986, but there has been an increasing number of associated reports since the year 2000. (5) The incidence of *R. planticola* infection might have previously been underestimated due to the difficulty in isolating the bacterium and confusion with other bacteria, including *Klebsiella* spp.

R. planticola has been a cause for pneumonia, urinary tract infection, cholangitis, conjunctivitis, peritonitis, necrotizing fasciitis, bacteraemia, cellulitis, and soft tissue infection in both adult and paediatric populations. Shotaro Yamamoto et al., found 34 cases of *R. planticola* bacteraemia in their review of the literature in 2018. According to their findings, 70.6% patients with *R. planticola* infection had a malignancy. Haematological malignancies and biliary tract neoplasms comprised of 29.2%, pancreatic neoplasms were 16.7%, and others were 25.0%. They opined that the immunocompromised state either due to malignancy itself or with the associated chemotherapy appeared to be associated with the development of *R. planticola* bacteraemia. (6)

R. planticola is sensitive to a wide range of antibiotics except Ampicillin. However, a few articles have suggested that the bacteria develop antibiotic resistance especially with the Carbapenems which have led to severe infections. (7, 8) The mechanism of its pathogenesis remains unclear in humans given the limited data availability. Immunocompromised state, proton pump inhibitor use, and chemotherapy increase the chances of infection. (9) *R. planticola* infection can occur when poorly cooked sea food has been consumed in a large quantity and has affected various human organs, with no inclination towards a particular organ system. (10)

Conclusion:

- We report a case of *R. planticola* in an immunocompromised patient. It is prudent to be aware of this organism as a cause of bacteraemia in such patients. The organism has been involved in infecting multiple organ systems.
- Individuals who are immunocompromised, with multiple comorbid diseases, including malignancy and stage 5 chronic kidney disease are at risk.
- *R. planticola* infection has a good prognosis if identified early and treated with the appropriate antibiotics.

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