



ORIGINAL RESEARCH PAPER

Gastroenterology

A RARE CASE OF RAOULTELLA PLANTICOLA BACTEREMIA ASSOCIATED WITH CHOLANGITIS

KEY WORDS: Cholangitis, Bacteremia, Gram negative bacteria, sepsis

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ABSTRACT

A 54-year-old male with a past medical history of hypertension, type 2 diabetes mellitus, hyperlipidemia and obstructive sleep apnea presented with complaints of nausea, vomiting, fever, right upper quadrant, and epigastric pain. He was found to have an elevated lipase, aminotransferases, and white blood cell count. Gallbladder and pancreas were poorly visualized on the ultrasound. Magnetic resonance imaging of the abdomen showed findings suggestive of acute pancreatitis, gall bladder with faceted gallstones and enhancement of the common bile duct in the distal segment extending to the ampulla with changes suggestive of recently passed stone. The patient also had positive blood cultures growing *Raoultella planticola*, a gram-negative bacteria. The patient was treated with intravenous meropenem and made a full recovery with repeat blood cultures being negative for any growth. We report this rare case of *Raoultella planticola* bacteremia secondary to cholangitis. **Learning points:** *Raoultella planticola* is a rare environmental bacterial pathogen that does not commonly cause invasive infections in humans but when it does, the infections can be serious and can involve multiple organ systems. Patients who are immunocompromised, have uncontrolled diabetes, those on dialysis or chemotherapy, transplant recipients, patients who have trauma with soil contamination, those undergoing invasive medical procedures, and patients who have significant comorbidities are at higher risk. This bacteria has been reported causing cholangitis, necrotizing pancreatitis, necrotizing fasciitis, urinary tract infection, bacteremia, and sepsis

Introduction:

Raoultella planticola (*R. Planticola*) is a gram-negative, aerobic non motile bacillus found commonly in aquatic, botanic and soil environments. In the 1980s, it was described as *Klebsiella planticola* and *Klebsiella trevisanii* and then later reclassified in 2001 as *Raoultella planticola*. It is a rare pathogen and does not commonly cause invasive infection in humans but can cause fatal infections in immunocompromised patients. The bacteria has been reported causing cholangitis, necrotizing pancreatitis, necrotizing fasciitis, urinary tract infection, bacteremia, and sepsis [1]. Here, we report a case of *R. planticola* bacteremia in a patient with cholangitis.

Case Presentation:

A 54-year-old male with a past medical history of hypertension, hyperlipidemia and obstructive sleep apnea presented with complaints of nausea, vomiting, fever, right upper quadrant and epigastric pain which was going on for the last 2 days and was gradually worsening. He denied any history of tobacco or alcohol use and family history was unremarkable. His temperature was 101.2° F, blood pressure was 135/79 mmHg, pulse was 92/minute, and respiratory rate was 14/minute. Physical examination was positive for moderate tenderness in the epigastrium on deep palpation. The patient had moderate tenderness in the right upper quadrant and epigastric palpation.

The patient was kept nothing-by-mouth and was started on intravenous fluids and intravenous pain medications. A set of blood cultures was drawn due to fever and intravenous Piperacillin-Tazobactam was started. On the second day after admission, all laboratory abnormalities were improving. AST, ALT, and Bilirubin levels had normalized. The lipase level was down to 2,579 U/L but white blood cell count increased to 19.9 10*3/uL. Abdominal pain was improving and nausea, vomiting, and fever had resolved. However, both sets of blood cultures grew *Raoultella planticola* within 24 hours. Gastroenterology and infectious disease consultations were obtained. His symptoms were believed to be secondary to acute cholangitis complicated by *Raoultella planticola* bacteremia. It was concluded that the patient probably had an obstructing common bile duct stone that he probably had

passed based on the MRI abdomen findings in light of his improving lab abnormalities and improving symptoms. Repeat set of blood cultures was obtained. Antimicrobial susceptibility testing showed that the pathogen was resistant to penicillins and cephalosporins and was susceptible to carbapenems. The patient was then switched to intravenous Meropenem and was treated for 7 days. Repeat set of blood cultures remained negative for any growth. The patient remained afebrile throughout the hospitalization and white blood cell count went up for one day after starting Meropenem but then started improving and eventually normalized on the seventh day of admission. The patient was then discharged home with a referral to see general surgery for elective cholecystectomy. Approximately 2 months after discharge, the patient underwent outpatient laparoscopic cholecystectomy and had an uneventful postoperative course.

Discussion:

Raoultella planticola (*R. Planticola*) is a gram-negative, aerobic encapsulated, nonmotile bacillus found commonly in aquatic, botanic and soil environments. In the 1980s, it was described as *Klebsiella planticola* and *Klebsiella trevisanii* and then later reclassified in 2001 as *Raoultella planticola*. It is mainly found in aquatic and soil environments but has been isolated from human urine, blood, wound, and other body fluids like peritoneal fluids and have been reported causing cholangitis, necrotizing pancreatitis, urinary tract infection, peritonitis, necrotizing fasciitis, bacteremia, and sepsis. It is a rare pathogen and can be sometimes difficult to identify causing confusion with other bacteria from *Klebsiella* family. It rarely causes invasive infection in humans but can cause fatal infection in patients who are immunocompromised, uncontrolled diabetics, patients on dialysis or chemotherapy, transplant recipients, those requiring frequent blood transfusions, patients who have trauma with soil contamination, those who are undergoing invasive procedures and patients with significant underlying comorbidities [2][3][4][5]. Freney et al described the first case report in Lyon, France where a 69-year old patient was admitted 9 days after a mitral valve replacement in the intensive care unit with *R. Planticola* septicemia [6]. Later on, in 1986, Freney et al again described a 57-year old patient

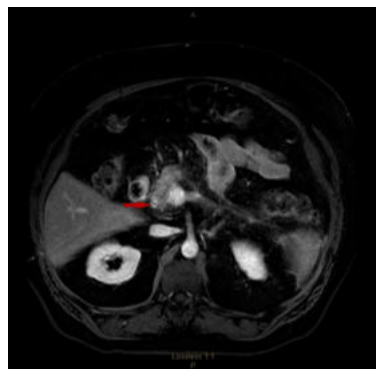
with severe pneumonia due to *R. Planticola* infection following a coronary artery bypass graft surgery [7]. Over the years, various cases have been reported from time to time including a case of acute pancreatitis and a retroperitoneal abscess, a case of soft tissue infection following a crush injury to the thumb in a soiled environment and a case of infection of the surgical site following a tibial fracture repair surgery where these patients had *R. Planticola* infection from abscess fluid culture or wound culture [8,9,10]. Two common themes emerge from these cases, first being patients having significant comorbidities and second being patients having some kind of trauma or invasive procedures. Our patient also was suspected to have low-grade cholangitis but probably passed the common bile duct stone spontaneously which reflected on the MRI findings and also was thought to be the cause of quick improvement in his symptoms and lab abnormalities despite having *R. Planticola* bacteremia. Since this is a rare pathogen and because only a limited number of cases have been reported in humans, the exact pathogenetic mechanism remains unknown as various case reports have shown a variety of human organ systems being affected with no affinity for a specific organ system. In one case reported in 2014, a 56-year old female was found to have *R. Planticola* bacteremia after consuming seafood salad containing squid and octopus. The mechanism behind this infection was thought to be the ability of *R. Planticola* to change histidine to histamine leading to scombroid poisoning especially in instances when a large quantity of poorly cooked seafood is eaten [11]. There is currently no standardized test available to identify subspecies of *Klebsiella* and many subspecies are difficult to distinguish by conventional methods used in the microbiology laboratory. Automated bacterial identification system (VITEK-2) with the gram negative identification card (bioMerieux) has a probability of close to 99% of identifying *R. Planticola* and can differentiate between *Raoultella* and other *Klebsiella* subspecies with high sensitivity [12]. The majority of patients respond well to the antibiotics and have a good outcome unless patients have polymicrobial bacteremia in the presence of other significant comorbidities where patients may fail to recover [13]. Treatment with empiric antibiotics with gram-negative coverage is usually sufficient with narrowing of the coverage per susceptibility but recently few cases of carbapenem-resistant *R. Planticola* have been reported [14]. We started empiric piperacillin/tazobactam on our patient but the isolated pathogen was resistant to piperacillin/tazobactam and hence we switched the patient to meropenem per the antimicrobial susceptibility report.

Figures:

Figure 1: Ultrasound showing poor visualization of the pancreas due to overlying bowel gas.



Figure 2: MRI of the abdomen: Red arrow showing enhancement of the distal common bile duct (donut shape) within its distal segment extending to the ampulla. This was thought to be due to recently passed stone in presence of finding gallstones in the gallbladder.



Conclusion:

Raoultella planticola is a rare environmental pathogen that does not commonly cause invasive infections in humans but when it does the infections can be serious and can involve multiple organ systems. Patients who are immunocompromised, have uncontrolled diabetes, those on dialysis or chemotherapy, transplant recipients, patients who have trauma with soil contamination, those undergoing invasive medical procedures, and patients who have significant comorbidities are at higher risk. Interestingly, our patient did not have any of those risk factors. Although the overall prognosis is good, a few cases of the pathogen being carbapenem-resistant have been reported. It is important to be aware of this pathogen which can help with accurate identification and early antibiotic treatment to improve clinical outcomes.

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