A Rare Case of *Pseudomonas putida* Bacteremia in a Patient with Cirrhosis of Liver

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**Abstract**

*Pseudomonas putida* (*P. putida*) is a rare pathogen that primarily causes nosocomial infection. It is usually seen in immune dysfunction or immunocompromised patients and patients with invasive medical devices. Here, we present a rare case of *P. putida* bacteremia in a patient with cirrhosis of the liver.

**Background**

*Pseudomonas putida* (**P. putida**) is a gram-negative, rod-shaped bacterium. *P. putida* is a rare pathogen that primarily causes nosocomial infection. To date, only a few cases of *P. putida* bacteremia in adult patients have been reported. Case reports describe a range of conditions due to *P. putida* bacteremia, including pneumonia,¹ ² catheter-related bloodstream infections (CRBSI),³ ⁴ and skin and soft tissue infections.³

Cirrhosis is well-known immunocompromised state due to associated immune dysfunction. However, *P. putida* bacteremia in cirrhotic patients has not been reported until now. We present a rare case of *P. putida* septicemia in cirrhosis of the liver patient.

**Case Description**

A 61-year-old man was diagnosed with alcohol-associated liver disease leading to cirrhosis of the liver in 2017 (Fig. 1). He underwent transjugular intrahepatic portosystemic shunt (TIPSS) in the same year for the management of complications of cirrhosis. Later in the course, he developed generalized weakness and altered sensorium in the form of disorientation to place and person. He was diagnosed with hepatic encephalopathy and treated for the same; subsequently, he improved and was discharged from the hospital. The patient became febrile and also developed one episode of generalized tonic-clonic convolution. He was evaluated with a magnetic resonance imaging (MRI) scan of the brain, which showed ischemic changes in the left gangliocapsular region. He was treated with levetiracetam and clopidogrel. He was discharged in stable condition. Again, within 1 day of discharge, patient developed a high-grade fever with altered sensorium in the form of disorientation to place and person. He was diagnosed with hepatic encephalopathy and treated for the same; subsequently, he improved and was discharged from the hospital. The patient became febrile and also developed one episode of generalized tonic-clonic convolution. He was evaluated with a magnetic resonance imaging (MRI) scan of the brain, which showed ischemic changes in the left gangliocapsular region. He was treated with levetiracetam and clopidogrel. He was discharged in stable condition. Again, within 1 day of discharge, patient developed a high-grade fever with altered sensorium in the form of disorientation to place and person. He was diagnosed with hepatic encephalopathy and treated for the same; subsequently, he improved and was discharged from the hospital. The patient became febrile and also developed one episode of generalized tonic-clonic convolution. He was evaluated with a magnetic resonance imaging (MRI) scan of the brain, which showed ischemic changes in the left gangliocapsular region. He was treated with levetiracetam and clopidogrel. He was discharged in stable condition. Again, within 1 day of discharge, patient developed a high-grade fever with altered sensorium in the form of disorientation to place and person. He was diagnosed with hepatic encephalopathy and treated for the same; subsequently, he improved and was discharged from the hospital. The patient became febrile and also developed one episode of generalized tonic-clonic convolution. He was evaluated with a magnetic resonance imaging (MRI) scan of the brain, which showed ischemic changes in the left gangliocapsular region. He was treated with levetiracetam and clopidogrel. He was discharged in stable condition. Again, within 1 day of discharge, patient developed a high-grade fever with altered sensorium in the form of disorientation to place and person. He was diagnosed with hepatic encephalopathy and treated for the same; subsequently, he improved and was discharged from the hospital. The patient became febrile and also developed one episode of generalized tonic-clonic convolution. He was evaluated with a magnetic resonance imaging (MRI) scan of the brain, which showed ischemic changes in the left gangliocapsular region. He was treated with levetiracetam and clopidogrel. He was discharged in stable condition. Again, within 1 day of discharge, patient developed a high-grade fever with altered sensorium in the form of disorientation to place and person. He was diagnosed with hepatic encephalopathy and treated for the same; subsequently, he improved and was discharged from the hospital. The patient became febrile and also developed one episode of generalized tonic-clonic convolution. He was evaluated with a magnetic resonance imaging (MRI) scan of the brain, which showed ischemic changes in the left gangliocapsular region. He was treated with levetiracetam and clopidogrel. He was discharged in stable condition. Again, within 1 day of discharge, patient developed a high-grade fever with altered sensorium in the form of disorientation to place and person. He was diagnosed with hepatic encephalopathy and treated for the same; subsequently, he improved and was discharged from the hospital.

**Discussion**

*Pseudomonas putida* (*P. putida*) is not a very common cause of bacteremia, with only a few cases reported in the literature. Yoshino et al. described a series of five cases of *P. putida* bacteremia; out of five patients, three were cases of CRBSI, one case of indwelling biliary...
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The current case of P. putida bacteremia is probably due to pyelonephritis. As previously noted, most patients with infections due to P. putida had indwelling medical devices or an underlying immune-dysfunction state. Cirrhosis is a state of altered immune response that predisposes to various infections; the most common culprits are gram-negative bacteria. Reduced intestinal motility and increased intestinal permeability lead to increased bacterial translocation, an important contributor to cirrhosis-associated immune dysfunction (CAID). CAID is acquired alteration of both innate and acquired immunity and results in systemic inflammation as well as immunosuppression. CAID, there is an impaired synthesis of acute-phase proteins, deficiencies of the complement system, and decreased number of receptors that are meant to recognize antigens. Negative changes are evident in the field of cell responses, for example, changes in the quantities of monocytes and macrophages generated as well as changes in their capabilities to phagocytose and chemotaxis. Impaired humoral response results in the distorted synthesis of particular antigen categories. Due to their altered cellular and humoral immune response, patients with cirrhosis are more likely to develop spontaneous bacterial infections, hospital-acquired infections, and infections caused by uncommon pathogens. Once an infection develops, it predisposes to the development of complications like shock, acute on chronic liver failure, acute kidney injury, hepatic encephalopathy, etc.

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CONCLUSION
Cirrhosis of the liver leads to immune dysfunction state, predisposing to various typical and atypical infections. A high index of clinical suspicion and appropriate cultures for both typical and atypical organisms need to be considered for timely diagnosis and effective management of infection while maintaining appropriate antibiotic stewardship.

CREDIT AUTHORSHIP CONTRIBUTION STATEMENT
Shriwastav Vishal Ramchandra—data collection and original draft preparation.
Pravin Rathi—editing and critical review of the manuscript.
Khwaja Aminoddin Siddiqui—manuscript review.

REFERENCES