CLINICAL VIGNETTE

Spontaneous Bacterial Peritonitis Caused by Listeria Monocytogenes

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Case Presentation

A 57-year-old male with decompensated cirrhosis presented with 5 days of fever, fatigue, shortness of breath, and worsening abdominal distension. The patient was febrile and tachycardic on arrival. Initial evaluation revealed leukocytosis, clear chest x-ray, and a negative urine analysis. Physical examination was notable for significant abdominal dissension and tenderness. There was high suspicion for spontaneous bacterial peritonitis (SBP), and paracentesis was performed.

Peritoneal fluid analysis revealed 3,368 WBC/mm3 with 81% polymorphonuclear leukocytes. He was started on ceftriaxone for treatment of SBP, however, he remained febrile without clinical improvement and the ascitic fluid cultures remained negative after 48 hours, he was switched to ertapenem empirically cover resistant organisms. CT chest/abdomen/pelvis were unrevealing and the patient remained with persistent fever and abdominal pain. On hospital day 5, peritoneal cultures grew *Listeria monocytogenes* and he was switched from ertapenem to ampicillin with subsequent clinical improvement and resolution of fevers. The patient was discharged on oral amoxicillin to complete a 3-week treatment course. After completing treatment he will start daily trimethoprim-sulfamethoxazole for SBP prophylaxis.

Discussion

Spontaneous bacterial peritonitis (SBP) is a widely known, life-threatening complication in patients with liver cirrhosis. Prompt recognition and treatment of SBP is critical, as the risks of complication and mortality are high for those not appropriately treated. Patients typically present with fever and/or significant abdominal pain. However, SBP can also manifest solely with altered mentation, diarrhea or laboratory abnormalities such as leukocytosis or metabolic acidosis,[1] thus warranting a high index of suspicion in cirrhotic patients. The diagnosis of SBP is established with >250 nucleated cells/mm3 in ascitic fluid. The pathophysiology of SBP in cirrhosis involves an impaired immune system combined with increased intestinal bacterial overgrowth and intestinal permeability.[2] This eventually leads to bacterial translocation into sterile ascitic fluid. Consequently, the most common pathogens found in SBP involve gram-negative "gut" bacteria including *Escherichia coli* and *Klebsiella pneumoniae*. Strep species, especially, *Streptococcus pneumoniae*, are also commonly found in SBP.[3] With the wide use of quinolones for SBP prophylaxis, gram-positive organisms have become more prevalent in SBP.[4]

Listeria monocytogenes is a facultative anaerobic gram-positive bacillus. It is typically associated with diseases affecting newborns, pregnant patients, and immunocompromised adults including the elderly, and patients with AIDS, on dialysis, and on chronic immunosuppressive therapies. In these hosts, listeriosis causes a variety of diseases ranging from a mild febrile gastroenteritis to meningitis, encephalitis, and/or sepsis with bacteremia. Human transmission has been from food to infected meat or dairy products.

Listeria rarely causes SBP. In 2008, there were only about 50 cases reported, mostly outside the United States.[3] Though the exact pathogenesis is not clear, it is hypothesized that Listeria is transmitted to humans via a fecal-oral route from tainted food. This leads to gut colonization and subsequent translocation to ascites in the setting of cirrhosis. More importantly, early recognition and treatment of listeriosis associated with SBP is critical as the mortality rate is high. One of the largest case series of listeriosis-related SBP was in Spain which reported a mortality rate as high as 30.7%.[5] Generally, once diagnosis of SBP is suspected, standard treatment is to empiric 3rd generation cephalosporin such as ceftriaxone or cefotaxime, while awaiting ascetic culture results. Up to 40% of patients with SBP have negative ascitic fluid cultures which can make targeted antimicrobial therapy difficult. Empiric therapy is usually sufficient in treating >95% of cases of SBP. Unfortunately, the typically used empirical antibiotics are usually ineffective against Listeria. Thus, clinicians should consider Listeria as a cause for SBP, particularly in patients who are not responding to empiric therapy after 48-72 hours. Other patient populations in whom to consider Listeria-associated SBP are particularly those with liver disease secondary to hemochromatosis, exposure to farm animals and impaired cell-mediated immunity.[6]

Ampicillin is the antibiotic of choice in treating listeriosis causing SBP, with or without an aminoglycoside.[7] The duration of treatment is not well established, though it is generally recommended to treat for a prolonged course greater than 14

days, and up to 4-6 weeks, in consultation with infectious diseases. Acceptable alternatives to ampicillin are penicillin or trimethoprim-sulfamethoxazole. Cephalosporins widely utilized in SBP treatment are typically ineffective in treating Listeria.[8] While carbapenems such as meropenem and imipenem have been used to successfully treat listeriosis in the past, ertapenem specifically has limited activity against Listeria.[9] This is likely the reason for treatment failure in our patient, after changing antibiotics from ceftriaxone to ertapenem.

Repeat paracenteses is not routinely recommended to confirm resolution of infection. However, in those patients who are not clinically responding to antibiotic therapy after 48-72 hours, repeat paracentesis is warranted. While awaiting repeat studies, empiric coverage of listeriosis with ampicillin should be considered. Additionally, for those patients who are not improving on usual treatment for SBP, consideration of a secondary peritonitis, alternative source of infection, or the possibility of a pathogen resistant to standard therapy is recommended. For secondary SBP prophylaxis involving Listeria, trimethoprim-sulfamethoxazole is the antibiotic of choice, while norfloxacin should be avoided.[10]

In conclusion, *Listeria monocytogenes* is a known but uncommon pathogen associated with spontaneous bacterial peritonitis. Prompt recognition and treatment are important, as the risk of complications and mortality is high when inappropriately treated. High clinical suspicion of listeriosis is warranted in patients with SBP who do not respond to standard empiric therapy within 48-72 hours. Ampicillin or trimethoprim-sulfamethoxazole are treatment of choice for SBP caused by Listeria.

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