

Suspected Asymptomatic Diverticulitis Leading to Bacteremia
and Septic Arthritis

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Abstract

A previously healthy 57-year-old male presents with gram-negative bacilli bacteremia and left hip septic arthritis. Literature search was conducted in attempt to answer two questions. The first was “Did the bacteremia developed first or did the septic arthritis develop first?” The second was “If the bacteremia developed first, where was the source of primary infection?” Given the timeline of the patient’s signs and symptoms, as well as identifying the presence and absence of risk factors, we concluded the patient developed bacteremia first. Literature identified several common primary infection sources that can cause gram-negative bacteremia, supplemented with diagnostic imaging and patient’s previous diverticulitis history, we suspect the patient had a relapse episode of diverticulitis. However, in this instance it was asymptomatic, complicated by micro-perforations that led to the subsequent bacteremia. This was a unique case as the patient did not have signs and symptoms of the primary infection, rather he experienced symptoms as the infection seeded to the bloodstream and joint.

Case History

Mr. A is a 57-year-old male with a 1 week history of intermittent fevers and chills. He also had diffuse joint aches and stiffness. There were no precipitating factors. He denies any other specific symptoms. He had no recent travel. He had gone to see his family physician on June 6th, bloodwork done at that time showed no elevated WBCs and normal urinalysis. Over

the next several days, the diffuse joint aches localized to the left hip, with worsening pain. He has no significant past medical history, and is a retired delivery driver.

He presented to the ER on June 9th with these symptoms, physical exam showed an increased temperature and hip exam was tender with movement, external rotation and weight bearing. Laboratory investigations showed normal CBCs, electrolytes, and urinalysis, but CRP was elevated at 28. X-ray of the chest and hip was normal. Blood cultures were taken and he was sent home.

The next day, June 10th, the patient returned to ER with worsening of his symptoms. He could no longer ambulate due to pain of the left hip. Blood culture results had returned growing gram-negative bacilli (*E. coli*). He was then admitted to BRHC for bacteremia with possible septic arthritis. CT imaging of the pelvis did not show evidence of left hip pathology at the time. He was empirically started on ceftriaxone 2g IV q24 hours.

Mr. A was seen on the ward by myself and Dr. Minders. He is still complaining of severe left hip pain, and any movement is difficult. His vitals were as follows: BP 126/67, HR 75, RR 20, O₂Sat 95% on RA, and Temperature 37.4°C. Physical exams of the CNS, cardiovascular, respiratory, and abdominal systems were unremarkable. On MSK exam, physical exam showed intact skin with no erythema overlying the left hip. Palpation of the over area did not show any deformities or elicited pain. Both active and passive ROM were reduced due to pain. Pain was elicited on external rotation, and with knee and hip flexed at 90° and pressure applied posteriorly. No other abnormal findings identified on MSK exam.

On June 11th, additional investigations were done. Echocardiogram of the heart was normal. CT abdomen showed mild colitis/diverticulitis. MRI of the hip showed a suspected

phlegmon of the left superior medial iliac muscle with adjacent superior sacral osteitis. It extended anteriorly to the left SI joint. Bone scan of the left hip shows inflammation changes around the SI joint. General surgery and orthopedic surgery were consulted for the findings of diverticulitis and phlegmon, respectively. Both agreed that no immediate intervention is necessary.

Blood culture susceptibility results had come back as sensitive to Flagyl (metronidazole). With the other results in mind, Flagyl 500mg IV q8h for 10 days was added.

Over the next two weeks, the patient improved greatly on antibiotics. His hip pain improved, and he now able to ambulate with a walker. His CRP started to normalize to 10mg/L. It had peaked at 95 shortly after admission, but has been decreasing daily since. His white cell count had also normalized, however the highest was only 10. Infectious Diseases was consulted, it was recommended the patient continue Flagyl 500mg until he has had 14 days, and ceftriaxone should be given daily for 6 weeks.

On June 24th, the patient was discharged with Flagyl 500mg orally for 3 days. He will receive his IV ceftriaxone daily at the Outpatient Care Unit and will be scheduled for an outpatient colonoscopy.

Literature Search

Bacteremia caused by gram-negative bacilli is more prevalent in the community setting compared to the hospital setting.¹ Gram-negative bacteremia rarely occurs spontaneously without infection at another site.¹ The most frequent source of gram-negative bacteremia is from the urinary tract.¹ The GI tract, biliary tract, and skin are less frequent sources. Conditions that are risk factors in acquiring gram-negative bacteremia are:¹

- Hematopoietic stem cell transplant
- Liver failure
- Serum albumin <3 g/L
- Solid organ transplant
- Diabetes
- Pulmonary disease
- Chronic hemodialysis
- HIV
- Treatment with glucocorticoids

The most common microorganism in cases of community-onset gram-negative bacteremia is *E. coli*, at 76%.¹ Patients typically present with fever, and the presence of shaking chills might indicate a bloodstream infection.¹ Disorientation, hypotension, and respiratory failure are signs that the patient may be developing sepsis and septic shock, which can be associated with a mortality rate of 38%.¹ For immunocompetent patients without signs of sepsis or septic shock, empiric use of a broad-spectrum single agent antibiotic should be used. One suggested regimen is ceftriaxone 2g every 24 hours.¹ Once final culture results and antimicrobial results are available, regimen should be switched to the specific pathogen based upon the susceptibility and ideally to the narrowest spectrum single agent antibiotics.¹ For patients that clinically improve following antibiotics, repeat blood cultures to check for clearance of bacteremia is unnecessary.¹ Factors that are associated with a higher mortality are:¹

- Acute respiratory distress syndrome (ARDS)
- Septic shock

- Disseminated intravascular coagulation (DIC)
- Anuria
- Presence of a central venous catheter
- Unknown origin of infection
- Inappropriate antibiotics treatment

Infection of a joint is referred to septic arthritis. Factors that increases the risk of an individuals from acquiring septic arthritis are:²

- Age >80
- DM
- Rheumatoid arthritis
- Presence of a prosthetic joint
- Recent joint surgery
- Skin infection
- IVDU, Alcohol
- Prior intraarticular corticosteroid injections

For individuals that have bacteremia, septic arthritis is more likely to localize in a joint with preexisting arthritis, particularly if associated with synovitis.² Septic arthritis due to gram-negative bacilli is generally observed in the setting of trauma, intravenous drug users, neonates, older adults, and in association with underlying immunosuppression.² The common symptoms of septic arthritis include fever, joint pain, warmth, swelling, and restricted movements. Synovial joint fluid aspiration is used to diagnose septic arthritis, however infection in the hip

may require surgical arthroscopy.² Initial treatment should be empiric antibiotics, in the setting of gram-negative bacilli, 2g q24 hours ceftriaxone can be used.² After the resolution of infection, it is difficult to predict the functional outcome of individuals.² It is related to host factors, pre-existing joint damage, the infecting organism, and the duration of therapy prior to initiation of treatment.²

Discussion

This is a very interesting case, as the patient presented with signs and symptoms that suggest different possible infectious sites. As indicated in the literature, it is vital to determine the source of infection as it can provide clues to the pathogens involved. Depending on the primary sites of infection, the empiric therapy may vary.¹ The question Dr. Minders and I had to answer first was “Did the bacteremia develop first or did the septic arthritis develop first?” Looking at the literature for gram-negative bacteremia, it is more common in the community setting.¹ Mr. A did first complained of fever and chills prior to admission, suggestive of a bloodstream infection. However he did not have any of the risk factors that was identified in the literature search. Nor did he had any symptoms that suggested a primary infection, such as a UTI or a GI infection. In terms of septic arthritis developing first, he did not have any predisposing trauma to the area, nor did he had any of the risk factors identified in the literature. The pathogen that grew from the blood culture can give us a clue of the originating source. The most common community-onset bacteremia is caused by *E. coli*, whereas the most common pathogen involved in septic arthritis in adults is *S. aureus*.^{1,2} The timeline of Mr. A’s symptoms is also helpful, his initial symptoms of fever, chills, and diffuse joint aches developed first. Then the localized hip pain developed a few days later. Considering all of the above, we

concluded that it was most likely Mr. A developed the bacteremia first, with subsequent hematogenous seeding of the left hip.

With the assumption of bacteremia developing first, the next question was “Where is the source of primary infection?” As it was indicated in the literature, sources of gram-negative bacteremia include the urinary tract, GI tract, biliary tract, and the skin. Since the patient did not experience any urinary symptoms and urinalysis had been negative, it was ruled out as a potential source. Skin was also ruled out as the source, since the patient did not have signs of skin infection or trauma on physical exam. The CT abdomen that was ordered when the patient was admitted to hospital helped differentiate whether the source is coming from either the GI or biliary tract. The result of the CT scan showed that the patient had diverticulitis. Given the patient had a previous history of diverticulitis, we suspect the patient had a relapse episode causing micro-perforation into the retroperitoneal space. Thus eventually caused the bacteremia. In acute diverticulitis, common symptoms are abdominal pain, nausea and vomiting.³ When perforations occur, symptoms are diffuse guarding, rigidity and rebound tenderness of the abdomen.³ For this patient, he had no abdominal symptoms, which is atypical in an acute diverticulitis episode. To confirm our theory, a colonoscopy would be required. Since the patient was improving on antibiotics, and advice from general surgery, it was agreed that the patient will finish the course of antibiotics, and will undergo an outpatient colonoscopy.

Conclusion

This was a good case for me to see during my Home for the Summer experience in Brandon. It challenged me to use the patient’s history to differentiate complex signs and

symptoms. This case prompted me to always think broadly and systematically, and using laboratory investigations to help with a diagnosis and guidance of treatment.

References

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