Unusual Case of Non-HIV Patient With Multifocal Pyomyositis: Developed on Appropriate Antibiotic Therapy

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Abstract

Pyomyositis is a clinical condition classically associated with tropical climates, but there are an increasing number of reports in temperate climates. We present a diabetic patient, who presented with gastrointestinal symptoms and right foot ulcer. He was found to have methicillin-resistant *Staphylococcus aureus* (MRSA). Initial computed tomography (CT) scan of abdomen and pelvis was negative for any abscesses, but after persistent bacteremia developed pyomyositis being on appropriate antibiotic therapy. This case may make physicians aware that initial negative test results do not always preclude the presence of pyomyositis in the presence of risk factors.

Keywords: Pyomyositis; MRSA pyomyositis; Pyomyositis in diabetes; Multifocal myositis

Introduction

Pyomyositis is a rare clinical condition in temperate climates, characterized by primary intramuscular abscess. It was classically described in tropical settings, but it has been increasingly recognized in temperate climates [1]. *Staphylococcus aureus* is the commonest organism involved [2]. In the early stage of the presentation, the diagnosis can be missed due to unawareness of the condition, and non-specific clinical presentation. In the United States, bacterial pyomyositis is increasingly reported, especially among human immunodeficiency virus (HIV)-infected patients [3, 4]. Usually the presentation described in literature is unifocal in the majority of patients (81%) [4]. We present an unusual case of multifocal pyomyositis in a male with diabetes mellitus, who presented with bacteremia and no evidence of pyomyositis on admission.

Case Report

Investigations

A 63-year-old male was admitted to the hospital with complaints of nausea, vomiting, abdominal pain, and diarrhea of 5 days duration. He had multiple comorbidities including previously treated hepatitis C, cirrhosis, hypertension, hyperlipidemia, and diabetes mellitus. Patient’s HIV status was negative. Six months prior to the current admission, he presented with abdominal pain, diarrhea, fever, and a non-healing right foot ulcer. At that time, he underwent esophagogastroduodenoscopy (EGD), and was found to have small epigastric varices. Due to a non-healing ulcer with erythema, edema and pain concerning for infection, a magnetic resonance imaging (MRI) of the foot was done. The imaging study reported cellulitis, myositis, and tenosynovitis. The patient underwent incision and drainage, as well as a first metatarsal head bone biopsy to rule out osteomyelitis. The culture from the incision and drainage grew methicillin-resistant *Staphylococcus aureus* (MRSA), but bone biopsy remained negative. Given there was still a high suspicion of osteomyelitis, intravenous (IV) vancomycin therapy was started with a plan to complete 6 weeks of therapy. One month prior to the current admission, the patient presented again to an outside hospital with epigastric abdominal pain, vomiting, and diarrhea. Another EGD revealed erosive esophagitis and gastritis. Testing for *Clostridioides difficile* (*C. difficile*) was performed and found to be positive. Oral vancomycin was started with a plan to finish 14 days of therapy. Five days prior to the current evaluation, the patient started to experience epigastric pain. Three days prior, coffee-ground emesis was noted, along with episodes of watery diarrhea. Due to progressive worsening of abdominal pain and vomiting, the patient decided to call the ambulance.

Diagnosis

Upon admission, the patient was tachycardic with a heart rate of 133/min, and slightly elevated temperature of 37.6 °C. He...
was alert and oriented, not in acute distress, with some epigastric tenderness without rebound tenderness. There was right plantar foot ulceration of 4 × 6 cm with small purulent drainage and a tunnelling sinus which did not probe to bone. The workup revealed leukocytosis (white blood cells (WBCs) 22.90 × 10³/mm³), mild anemia (hemoglobin (Hb) 12.9 g/dL), hyperglycemia (519 mg/dL), and HbA1c of 12.4%. Creatinine was within normal range (1.39 mg/dL), bicarbonate level decreased (17 mmol/L), aspartate aminotransferase (AST) slightly elevated (62 IU/L), normal alanine aminotransferase (ALT) (44 IU/L), total bilirubin (0.7 mg/dL), and normal lipase (5 IU/L) (Table 1). Computed tomography (CT) scan of the abdomen and pelvis with IV contrast (Fig. 1a) was done as the patient presented with coffee-ground emesis and epigastric pain, but no extravasation of the contrast from the vasculature was seen. There was no intra abdominal collection, or intramuscular fluid collection noted in this study.

Further imaging with MRI of the abdomen and pelvis were not done as the abdominal CT scan did not reveal any abscess or muscle involvement. Given leukocytosis and tachycardia with recurrence of diarrhea and purulence from the right foot, infectious disease was consulted for further evaluation and treatment. Upon evaluation by the infectious disease on the next day of admission, the vomiting and diarrhea was already

| Measure                        | Initial laboratory results on admission | Reference range   |
|--------------------------------|----------------------------------------|-------------------|
| White blood cell count (per µL) | 22,900                                  | 4,000 - 11,000    |
| Red blood cell count (per µL)   | 5,210,000                               | 4,500,000 - 5,900,000 |
| Absolute neutrophil count (per µL) | 20,840                               | 1,800 - 7,500     |
| Platelet count (per µL)         | 188,000                                 | 150,000 - 400,000 |
| Hemoglobin (g/dL)               | 12.9                                    | 13.5 - 17.5       |
| Sodium (mmol/L)                 | 141                                     | 135 - 145         |
| Potassium (mmol/L)              | 4.1                                     | 3.5 - 5.4         |
| Chloride (mmol/L)               | 98                                      | 98 - 109          |
| Carbon dioxide (mmol/L)         | 17                                      | 23 - 34           |
| Anion gap (mmol/L)              | 26                                      | 4 - 14            |
| Glucose (mg/dL)                 | 519                                     | 70 - 200          |
| Blood urea nitrogen (mg/dL)     | 27                                      | 8 - 20            |
| Creatinine (mg/dL)              | 1.39                                    | 0.7 - 1.5         |
| Albumin (dm/dL)                 | 3.9                                     | 3.5 - 5.0         |
| Total bilirubin (mg/dL)         | 0.7                                     | 0.0 - 1.5         |
| Alanine aminotransferase (IU/L) | 62                                     | 0 - 45            |
| Aspartate aminotransferase (IU/L) | 44                                  | 0 - 45            |
| Total creatine kinase (IU/L)    | 2,645                                   | 0 - 195           |
| Vancomycin trough goal (µg/mL)  | 19.4                                    | 15 - 20           |

**Table 1. Clinical Laboratory Results**

Figure 1. CT scan of the abdomen and pelvis with IV contrast: (a) On admission, no abscess was found; (b) At 10th day of admission, right psoas abscess (arrow) was observed. CT: computed tomography; IV: intravenous.
subsiding. Attention was directed to the right foot, and infectious disease recommended treatment with IV vancomycin (target trough levels: 15 - 20 mcg/L) and to consult podiatry. Podiatry drained the abscess from the right foot, and the fluid sample was sent for aerobic and anaerobic cultures. Two sets of blood cultures were also collected before the start of antibiotic therapy. On the next day, both sets of blood cultures turned positive for MRSA, and sensitivity showed minimal inhibitory concentration (MIC) of 1.5 mg/mL for vancomycin. Transthoracic echocardiogram was done to rule out endocarditis in a setting of high-grade bacteremia, followed by transesophageal echocardiogram for persistence of bacteremia, with both studies negative for vegetation. The patient continued to receive vancomycin with trough levels within the therapeutic range, but the blood cultures were persistently positive. Persistent bacteremia led to the second CT scan of chest, abdomen and pelvis searching for occult source of infection. It was done on the 10th day of admission. This time, there were foci of air and abscesses on two different sites. The first was left pectoralis major muscle (Fig. 2), and the second, a big right psoas abscess measuring 8 × 3 × 2.4 cm (Fig. 1b).

The focus for pectoralis muscle was small and it was not considered a target for the drainage. The right psoas abscess on the other hand was aspirated under CT guidance and 20 mL of purulent fluid mixed with blood was removed, and a drain was left in place. After drainage of the abscess, one more set of blood cultures turned positive, but two subsequent blood cultures on different days remained negative. Around the same time the second CT scan was performed, the patient complained about worsening of chronic back pain without other new neurological findings on physical exam. MRI of cervical, thoracic, and lumbar spine with contrast was performed to rule out paraspinal processes. Bone marrow of the L1 and L2 vertebral bodies showed enhancement, concerning for osteomyelitis without any abscess or phlegmon (Fig. 3).

Treatment

Neurosurgery was consulted, but no further surgical treatment was required. On day 23 of admission, serum creatinine increased to 5.23 from normal baseline creatinine level. The antibiotic was switched from vancomycin to daptomycin (10 mg/kg/day) with a plan to complete at least 6 weeks of therapy from the time of negative blood culture. The patient was advised at the time of hospital discharge to follow up at the infectious disease clinic.

Follow-up and outcomes

The patient was lost to follow up, but no further hospitalizations were recorded in our medical records.

Discussion

Pyomyositis is a common disease in tropical countries through several continents, including Asia, Africa, Oceania, and part of the American Caribbean Islands [1]. It accounts for up to 4% of hospitalizations in a country with a high prevalence such as Uganda [5]. Other commonly used names for this condition are tropical pyomyositis and myositis tropicans, due to the geographical distribution in warmer climates. The incidence is increasing in temperate climates as in the United States, especially among immunocompromised patients. In a study which included over 100 million discharges in the United States be-
MRSA was negative. The culture did not have any growth, and the nasal screen for from the surgical site was positive for gram positive cocci, but treatment was vancomycin and it was switched to daptomycin py was not reported. A case of pyomyositis reported successful breakdown of outcomes according to each antimicrobial therapy [10]. The overall success rate was 84%, but the retrospective study included cases of pyomyositis treated with daptomycin. A recently published retrospective study compared cases of pyomyositis treated with daptomycin with those treated with vancomycin. The overall success rate was 84%, but the breakdown of outcomes according to each antimicrobial therapy was not reported. A case of pyomyositis reported successful treatment with daptomycin [11], but as in our case, the initial treatment was vancomycin and it was switched to daptomycin for suspected drug fever. Also, the gram stain of the sample from the surgical site was positive for gram positive cocci, but the culture did not have any growth, and the nasal screen for MRSA was negative.

In our case, the patient had a prolonged period of bacte-

Learning points

Cases of pyomyositis are increasingly reported in temperate climates. Diagnosis can be challenging. Staphylococcus aureus is the commonest cause. In patients with risk factors for developing the infection, along with continuous high suspicion, may require clinicians to reconsider the diagnosis even after initial negative workup. Treatment should be aggressive, with medical and surgical management removing the foci of infection. Educating the patient about the importance of being compliant with the medication and glycemic control, is probably an important measure for a successful therapy.

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Conflict of Interest

There is no conflict of interest.

Informed Consent

Informed consent was obtained by the patient.

Author Contributions

EA contributed to the design of the work, the acquisition, interpretation, and initial drafts. AB contributed to designing and revising the manuscript critically for important intellectual content. Both authors gave final approval of the submitted version.
Data Availability

The authors declare that data supporting the findings of this study are available within the article.

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