

Secondary pyomyositis complicated by septic shock and sepsis-induced cardiomyopathy causing a massive erector spinae abscess in a patient after trigger point injection

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Abstract

Trigger point injection is a common pain control method widely practiced around the world. We report the case of a 53-year-old female who presented with lumbago and septic shock complicated with sepsis-induced cardiomyopathy three days after receiving a trigger point injection. She responded to sepsis treatment and em-

piric antibiotics but later required extensive drainage and debridement after a follow-up CT scan revealed a massive abscess above the fascia of erector spinae spanning from the level of the 1st thoracic spine to the 5th lumbar spine. With extensive surgical drainage and effective antimicrobial treatment, the patient recovered fully and was discharged without any sequelae.

Key words: Pyomyositis, erector spinae abscess, sepsis-induced cardiomyopathy, trigger point injection.

Introduction

Trigger point injection is a common and safe pain treatment modality. Incidence of infectious complications is reported to be as low as 0.1%. (1) Previous literature had described pyogenic epidural abscess as a serious complication of pain control injections. We report the case of a 53-year-old female who presented with back pain and profound circulatory collapse due to septic shock and sepsis-induced cardiomyopathy after receiving trigger point injection. Despite broad spectrum antimicrobial coverage, the initially localized pyomyositis developed into a continuous and massive abscess requiring extensive surgical drainage and prolonged intensive care unit (ICU) stay.

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Case presentation

A 53-year-old female presented to the emergency department (ED) with a three-day history of back pain. Her only past medical history was sleep disorder for which she was on dogmatil, clonazepam and zolpidem. She is a one pack per day smoker. She does not consume alcohol. She denied any history of intravenous drug use and unsafe sexual practice. She had no recent travel history or sick contacts. Four days prior to her presentation to the ED, she developed acute lumbago after lifting her pet dog from the floor. Fracture was ruled out with an X-ray examination at a local clinic. She received trigger point injection on her right lower back at the level of 4th lumbar vertebra for her back pain. Over the next few days, she developed general myalgias and mild fever. Her pain worsened and spread to the shoulders and hips prompting her to visit our ED. Her vital signs on arrival to the ED were temperature of 36.8 °C, systolic blood pressure of 65 mmHg, heart rate of 90 beats per minute, respiratory rate of 20 breaths per minute with an oxygen saturation of 99% on room air. On examination, the patient was in moderate distress and appeared ill but her extremities were warm. Her cardiovascular exam revealed a regular tachycardia, without any murmurs, rubs or gallops. Osler nodes and Janeway lesions were absent. Her lungs were clear and her abdominal exam was un-

remarkable. Examination of her back revealed erythema and petechiae over the lower back. Knocking tenderness was observed over a wide area from the thoraco-lumbar junction to the sacrum. Her neurological exam was normal.

Bloodwork on initial presentation to the ED revealed leukocytopenia (2800 cells/ μ l). C-reactive protein (39.5 mg/dl), creatine kinase (823 U/L), serum creatinine (2.36 mg/dl), and lactate (25 mg/dl) were elevated. Liver function tests were normal. Urinalysis was negative for nitrates and leukocytes. A computed tomography (CT) scan was performed to investigate the source of infection. It revealed a small low density area above the right erector spinae at the level of 4th lumbar spine (**Figure 1**). Contrast agent was not used to avoid contrast nephropathy as the patient already had acute kidney injury at that time. Point of care cardiac ultrasound revealed a normal ejection fraction of 60% without any valvulopathy. Based on these findings, septic shock with a possible musculoskeletal source was diagnosed. Meropenem and vancomycin were administered after blood cultures had been drawn. The patient remained hypotensive after resuscitation with two liters of crystalloids and required vasopressors to maintain a mean blood pressure of more than 65 mmHg. Due to circulatory instability she was admitted to the ICU. Two hours after admission, she developed respiratory distress requiring endotracheal intubation. Post intubation chest X-ray was consistent with flash pulmonary edema. A repeat point of care cardiac ultrasound showed depressed left ventricular function with an ejection fraction of less than 40% and moderate mitral valve regurgitation. Her hemodynamics also deteriorated requiring high doses of norepinephrine (0.7 μ g/kg/min) and dobutamine (8 μ g/kg/min). Despite aggressive resuscitation, serum lactate remained at around 30 mg/dl on the day of admission. Sepsis-induced disseminated intravascular coagulation was diagnosed and treated with recombinant thrombomodulin.

On day 2 of ICU, an orthopedic consult was made for suspected necrotizing fasciitis. However, it was ruled out on a basis of low Laboratory Risk Indicator for Necrotizing Fasciitis (LRINEC) score and relatively stable clinical status with only conservative management. (2) Transesophageal echocardiography was performed but could not detect any vegetation to support the diagnosis of infective endocarditis. Her condition gradually improved and inotropes were tapered. She was successfully extubated on the next day.

However on day 9 of ICU, she spiked a fever of 39 $^{\circ}$ C and became hypotensive. Erythema and pete-

chiae on her back also worsened (**Figure 2**). A follow-up contrast enhanced CT was performed which revealed a huge abscess superficial to the fascia of erector spinae spanning from the level of the 1st thoracic spine to the 4th lumbar spine (**Figures 3 and 4a**). To achieve adequate source control, an extensive surgical drainage and debridement was performed on day 10 under general anesthesia (**Figure 5**). After the surgery, her condition improved significantly. She was discharged from the ICU on day 13.

Blood culture collected at ED was negative, but culture of abscess sampled during surgery grew methicillin sensitive *Staphylococcus aureus*. The antimicrobial regimen was changed to vancomycin and cefazolin and continued for two months. Another follow-up CT confirmed resolution of the abscess (**Figure 4b**). She was discharged from the hospital on day 45 without any sequelae.

Discussion

Trigger point injection is an effective and safe treatment for pain associated with trigger points. Although the reported rates are low, this procedure may cause infectious complications such as pyomyositis leading to abscess formation. Primary pyomyositis is classically an infection of the tropics, characterized by a purulent infection of skeletal muscle that arises from hematogenous spread. Secondary pyomyositis is usually a consequence of direct extension from an infectious process. Severity can be categorized into three stages. Stage 1 (muscle edema only) is treated conservatively with antibiotics. Stage 2 (abscess formation) requires surgical intervention with either abscess aspiration or drainage. Stage 3 is associated with septic shock or multiple-organ failure which warrants comprehensive care in the ICU.

In the early stages, pyomyositis usually presents with vague symptoms making it difficult to diagnose. However, diagnostic delay may result in serious neurological sequelae in the case of epidural abscess and can sometimes be even life threatening if associated with severe sepsis. Currently, there is no clear guidelines to facilitate decision making in the ED, but a few diagnostic approaches have been proposed. (3) In some cases, the abscess may be too small to detect on initial imaging studies. If clinical suspicion is high, serial imaging studies can lead to early diagnosis of abscess. In cases where the abscess is deemed too small for surgical drainage initially, serial imaging studies should also be considered if clinical progress with conservative treatment is unsatisfactory as it may change the treatment approach such as in this case.

Timely intervention in this case was believed to have prevented neurological and other severe complications. In severe and complicated cases, based on our experience, we advocate repeat imaging within a week in the acute phase.

Although *Staphylococcus aureus* is the most common pathogen causing pyomyositis, broad spectrum antibiotics are usually required as empiric therapy in septic shock patients pending culture results. (4) Attempts to aspirate culture samples can be challenging and of low yield if the abscess is small. Despite broad spectrum antimicrobial coverage, our patient developed massive abscess extending through almost the entire length of the spine. Based on the culture sensitivity results, we postulated that poor drug penetration into the encapsulated abscess, rather than antimicrobial susceptibility, was responsible for the treatment failure. In such cases, surgical drainage is inevitable.

Sepsis-induced cardiomyopathy (SIC) is characterized by left ventricular dilatation and depressed ejection fraction that usually normalize within a week. Inadequate coronary blood flow and exposure of the heart to chemical mediators are the two proposed mechanisms of SIC. Interestingly, mortality rate among sepsis patients in a hyperkinetic state was reported to be higher than those in a hypokinetic or normal-output state. (4) Treatment

of SIC includes several pharmacological and mechanical modalities. Dobutamine is still the drug of choice despite several reports that its use failed to reduce mortality. Levosimendan, a calcium sensitizer that acts independently of β -adrenergic effect, is a promising alternative. (5,6) In refractory cases, intra-aortic balloon pump and extracorporeal membrane oxygenation are the last resorts although their uses are only based on anecdotal reports. (7) Our patient developed SIC rapidly within a few hours after presenting to the ED leading to severe circulatory and respiratory failure. SIC was treated with dobutamine to maintain adequate cardiac output. Along with the improvement of sepsis, her cardiac function normalized within five days.

Conclusion

Pyomyositis and paravertebral abscess should be suspected in septic patients with a recent history of trigger point injection in the back. Delay in treatment may result in devastating neurological complications and death. In complicated cases, serial imaging studies can be useful in guiding the decision-making process. Successful treatment requires early recognition, appropriate antimicrobial therapy and effective drainage of abscess complemented with multi-disciplinary critical care support in severe cases.

Figure 1. Non-contrast enhanced CT imaging performed on the day of presentation to the ED demonstrate a very small low density area superficial to the fascia of right erector spinae at L2 (arrow)

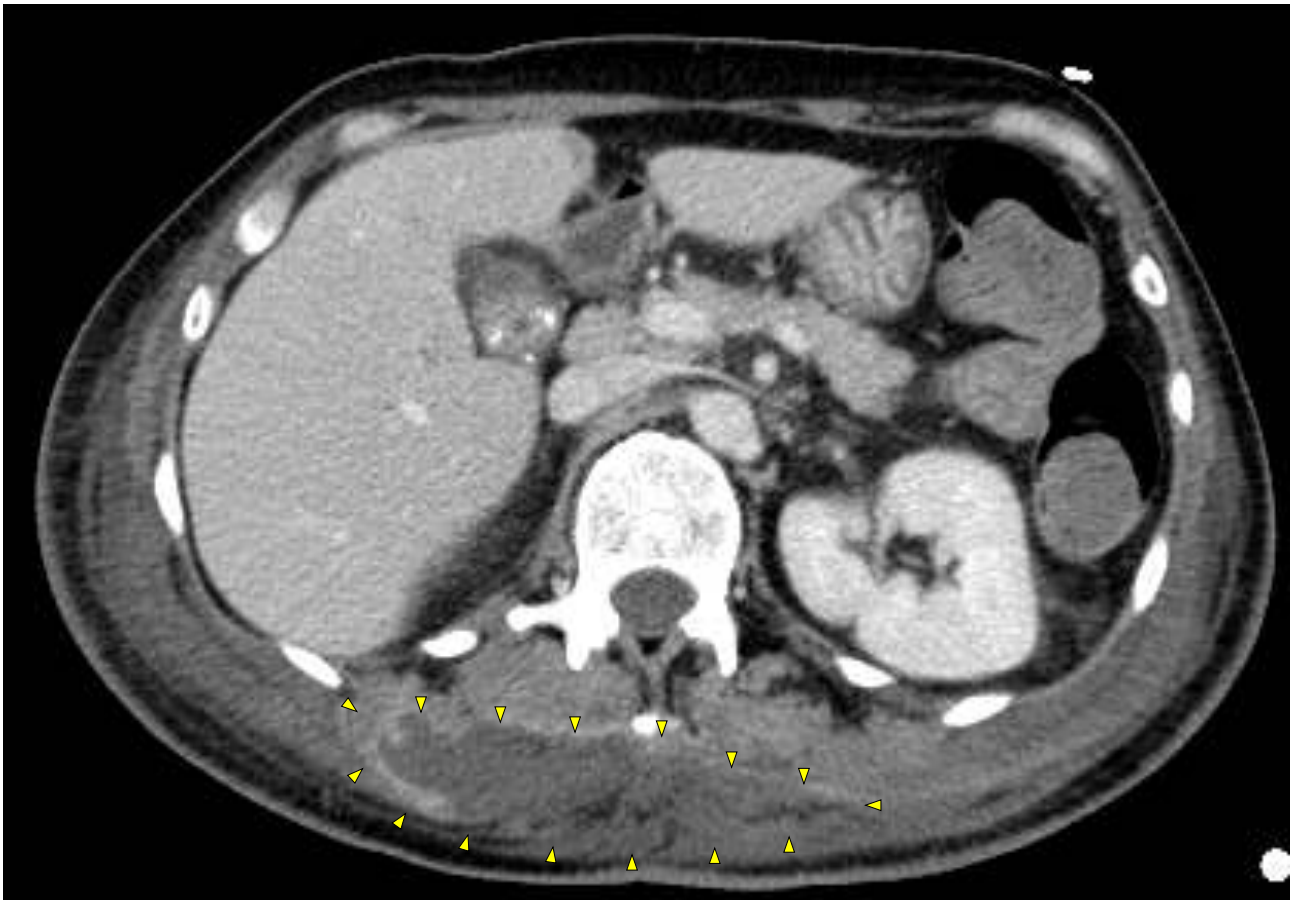


Legend: CT=computed tomography; ED=emergency department.

Figure 2. Pre-operative photo on day 9 illustrates the worsened erythema and petechiae



Figure 3. Contrast enhanced CT imaging performed on day 9 demonstrates an enlarged low density area with partial rim enhancement suggestive of abscess formation over bilateral erector spinae at L2 (small arrows)



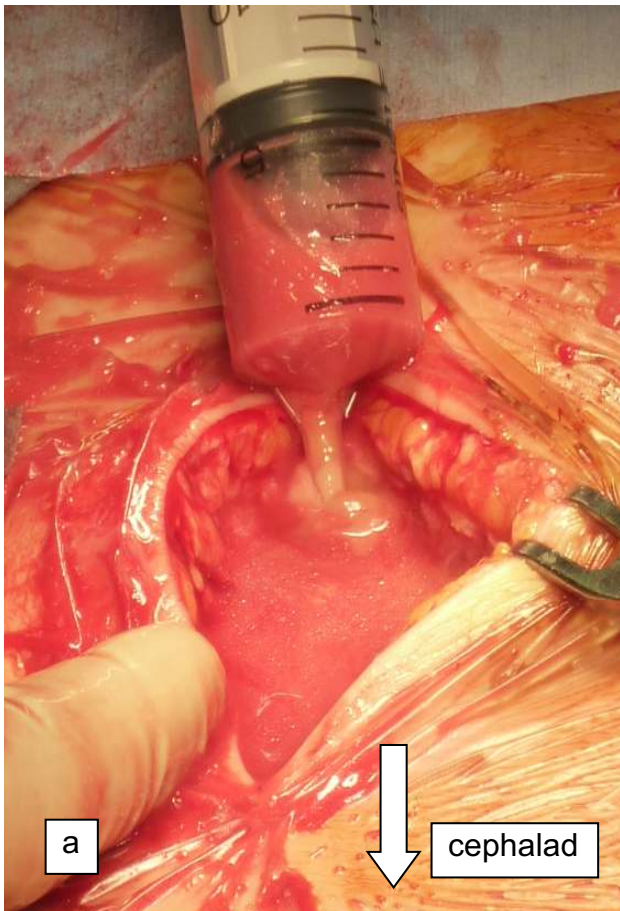
Legend: CT=computed tomography.

Figure 4 (a) Sagittal view of contrast enhanced CT performed on day 9 demonstrates a continuous massive abscess superficial to the fascia of erector spinae spanning from T1 to L5 (small arrows); (b) Sagittal view of contrast enhanced CT performed on day 30 demonstrates resolution of abscess



Legend: CT=computed tomography.

Figure 5. Intraoperative findings (a) Pus gushing out from a 10 cm midline incision from L1 to L4; (b) Abscess extending from subcutaneous tissue to the fascia of erector spinae. Another similar incision was made at T3-T6 level. After extensive drainage, debridement and irrigation, a continuous tunnel was formed from T1 to L5. Two multi-lumen drains were inserted at T6 level, each facing cephalad and caudad respectively.



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