Case Report

Sternal Osteomyelitis due to Pseudomonas aeruginosa in an IV Drug Abuser: A Case Report and Literature Review

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Abstract

Chest pain is among the most common presentations in the Emergency Department. It encompasses an expansive and varied list of differentials. At initial presentation in the emergency department, our attention is mainly focused on determining if this pain is cardiac or pulmonary in origin as these are the most life-threatening scenarios that merit acute care delivery. However, once these have been ascertained and ruled out, it is very important to consider other less common causes of the chest pain. Here, we present a case of a 52 years old Intravenous drug abuser with the chief complaint of chest pain. A chest CT scan suggested underlying sternal osteomyelitis. Further investigations concluded that the gram-negative organism, Pseudomonas aeruginosa was the etiological agent implicated. P. aeruginosa is a rather rare cause of sternal osteomyelitis as compared to Staphylococcus aureus.

INTRODUCTION

Sternal osteomyelitis can be called a rare disease. It can be further divided into primary and secondary types. Primary sternal osteomyelitis (PSO) occurs in the absence of any previous local condition, as opposed to secondary sternal osteomyelitis which may be a complication of a local infection, such as that occurs post-sternotomy. Primary sternal osteomyelitis is mostly found in intravenous drug abusers and in immunodeficiency states [1]. The two most common pathogens for PSO in IV drugs abusers are Staphylococcus aureus and Pseudomonas aeruginosa, yet the latter accounts for approximately 0.3% of all cases of osteomyelitis [2]. Here, we describe a 52 years old patient with a history of intravenous drug abuse who was diagnosed with PSO.

CASE PRESENTATION

A 52 years old man presented to the emergency department with gradually increasing chest pain with accompanying fever and chills. The pain was described as sharp, 7/10 in intensity that worsened on movement and improved with immobility. Further history revealed the patient had been using intravenous heroin for 3 years by injecting it in the veins of his right arm most frequently.

On examination, the patient showed distress. He was dyspneic and diaphoretic. Vital signs were significant for oral temperature of 100°F and pulse of 100 beats per minute. His respiratory rate was 18 breaths per minute, blood pressure was 130/80. Upon palpation, the central chest area was tender to touch, warm and a notable swelling could be felt. There were visible needle marks on the right forearm. The remaining physical examinations, including the cardiovascular system, were normal.

On further evaluation, the electrocardiogram showed a normal sinus rhythm. Laboratory investigations showed a white cell count of 17000/uL with 90% neutrophils, and troponin level of less than 0.01 ng/mL. The erythrocyte sedimentation rate was higher than normal, at 52 mm in the first hr. Rest of the investigations were normal which included evaluation of serum electrolytes, liver function tests, and renal function tests. A transesophageal echocardiogram (TEE) was performed that showed no unusual findings like vegetation or valvular abnormalities. On further testing, an axial chest CT scan was ordered which showed some unusual findings such as extensive subcutaneous and anterior mediastinal fluid collection and a lytic osseous lesion in the sternum. The patient then underwent a diagnostic needle aspiration with the following results. Cell count revealed 42,000 WBCs /mm3 and blood cultures showed gram-negative rods identified as Pseudomonas Aeruginosa. The patient was started on Intravenous Vancomycin and referred to the care of the orthopedic department after which he underwent drainage and debridement of the wound. After surgery, he was started on a 6 week course of ciprofloxacin 750mg, twice daily.

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Submitted: 17 july 2018
Accepted: 08 August 2018
Published: 08 August 2018
Copyright © 2018 Tariq et al.
ISSN: 2373-9819
OPEN ACCESS

Keywords
• Sternal osteomyelitis
• Pseudomonas aeruginosa
• Primary sternal osteomyelitis
• Transesophageal echocardiogram (TEE)
The patient was discharged on the fifth day and he did not return for follow-up.

**DISCUSSION**

Primary Sternal osteomyelitis is a relatively rare disease, and as a result in most cases, timely diagnosis and management are delayed [3]. With Staphylococcus aureus as the most commonly implicated infectious organism in osteomyelitis, very few cases have been shown to be due to Pseudomonas aeruginosa infection, and this too is most commonly among intravenous drug abusers. It significantly presents as sternal pain, redness, and swelling. The differential diagnosis must include superficial dermal infections like cellulitis, soft tissue abscess and neoplasms [4]. Delayed diagnosis can lead to an extensive infection further complicating treatment.

In recent times, sternal osteomyelitis secondary to Pseudomonas aeruginosa is rarely seen. A study of sternal osteomyelitis looked at 170 cases and showed a male predominance of 73%. 62% of the cases were due to bacteremia of which 21% of the cases were attributed to IV drug abuse [5]. 49% of the cases showed Staphylococcus aureus as the underlying cause. There was a significant decrease in the Pseudomonas aeruginosa infection in IV drug abusers which is thought to be due to a decrease in the pentazocine abuse since the 1980s [5]. The decrease in the incidence of the Pseudomonas aeruginosa infections in the intravenous drug abusers could be attributed to the change in the abuse of narcotics. However, it may be added here that the method of preparation of the drug while injecting may contribute to the bacteria transmission as well [6].

There are several imaging modalities that could be used to diagnose the condition. However, it may take up to 21 days for an osseous lesion to become visible on a radiograph [7]. Hence, a bone scan is useful during the early phase of the disease to differentiate cellulitis from osteomyelitis [8]. MRI has more specificity in disease diagnosis when compared to a CT scan.

The treatment of sternal osteomyelitis is antibiotic therapy and orthopedic incision and drainage. Less than 10% of the cases may be treated with antibiotic therapy alone [9]. However, surgical intervention is necessary for P. aeruginosa infection in some cases. This is when antibiotic treatment has failed, or when abscesses have developed, or extensive bone necrosis has occurred. In the case of an infected sternum, limited surgical resection and preserving the posterior peristeme is the procedure of choice [10]. Postoperatively, 6 weeks of ciprofloxacin 750mg twice daily is recommended.

**CONCLUSION**

The diagnosis of primary sternal osteomyelitis, may sometimes be missed due to inadequate clinical suspicion owing to its rarity. However, PSG should always be made a part of the differential diagnosis in patients presenting with chest pain, fever and swelling over the sternum. Although not commonly implicated in osteomyelitis, Pseudomonas aeruginosa is one of the infectious organisms causing PSO in IV drug abusers.

**REFERENCES**