Staphylococcus aureus Sternal Osteomyelitis: a Rare Cause of Chest Pain

Manjinder Kaur DO
Courtney Walker DO
Emily S. Nia MD
Jeffrey R. Lisse MD

Department of Medicine
Banner University Medical Center
Tucson, AZ USA

Abstract

Chest pain is a common presenting symptom with a broad differential. Life-threatening cardiac and pulmonary etiologies of chest pain should be evaluated first. However, it is critical to perform a thorough assessment for other sources of chest pain in order to limit morbidity and mortality from less common causes. We present a rare case of a previously healthy 45 year old man who presented with focal, substernal, reproducible chest pain and *Staphylococcus aureus* bacteremia who was later found to have primary *Staphylococcus aureus* sternal osteomyelitis.

Case Report

A 45 year old previously healthy man presented to the emergency department with sudden onset substernal chest pain of two days duration. The pain was described as constant, achy, worsened with movement, and improved with lying still. Palpation of the manubrium reproduced pain and was associated with an appreciable “bump”. The patient denied recent trauma or surgery and reported no fevers, weight loss, night sweats, cough, or history of intravenous drug use. He had multiple tattoos covering his thorax and abdomen obtained while incarcerated twenty years prior to admission. On examination, the patient was uncomfortable due to severe sternal pain. He was diaphoretic, tachycardic, tachypneic, and afebrile. His manubrium was tender to palpation and the overlying skin was warm and mildly swollen without apparent erythema, induration, or drainage. Laboratory results were remarkable for leukocytosis of 18,4000/uL with 92% neutrophils, serial troponins less than 0.01 ng/mL, ESR 15 mm/hr, c-reactive protein (CRP) 13.40 mg/dL, nonreactive HIV antibodies, and positive hepatitis C virus (HCV) antibody with detectable but unquantifiable HCV RNA. Electrocardiogram showed normal sinus rhythm without ischemia. Bibasilar atelectasis was appreciated on chest x-ray and chest CT with contrast revealed no bone or chest wall lesions. Sternum MR with contrast (Figure 1) showed enhancing edema in the subcutaneous soft tissues overlying the sternomanubrial joint with extension into the pectoralis major musculature symmetrically without abscess or bony involvement.

Figure 1. Sagittal and axial T2 fat sat images (A and B) demonstrate inflammatory changes involving the soft tissues overlying the sternum including the pectoralis muscles bilaterally. Sagittal and axial T1 post contrast images (C and D) demonstrate avid enhancement involving the soft tissues overlying the sternum consistent with phlegmonous change without a rim enhancing loculated fluid collection to suggest an abscess formation. No underlying osseous involvement is present. A tissue marker corresponds to the patient's site of pain.

On day two of admission, blood culture results were reported positive for *Staphylococcus aureus* oxacillin susceptible (MSSA). Positive blood cultures persisted despite appropriate antibiotics. A transesophageal echocardiogram (TEE) was performed and showed no vegetations. Although chest imaging was negative for osteomyelitis, the persistent bacteremia and focal sternomanubrial pain was clinically suggestive of primary sternal osteomyelitis. The patient was discharged to home and completed a six week course of intravenous cefazolin for presumed MSSA sternal osteomyelitis.

Repeat MR sternum performed eight weeks after initial presentation showed osteomyelitis across the sternomanubrial joint with improved soft tissue edema (Figure 2).

Figure 2. Sagittal and axial T2 fat sat images (A and B) demonstrate interval improvement in inflammatory changes involving the soft tissues overlying the sternum with persistent edema present at the sternomanubrial joint (red arrow). Sagittal T1 image (C) demonstrates focal hypointense bone marrow about the sternomanubrial joint (red arrow). Sagittal and axial T1 post contrast images (D and E) demonstrate enhancement of the sternomanubrial joint (red arrow). Overall findings are consistent with osteomyelitis of the sternomanubrial joint.

Given that the patient had completed six weeks of parenteral antibiotic therapy, his sternal chest pain had resolved, and CRP had normalized, additional antibiotics were not prescribed and the patient was asked to follow up with his primary care provider as needed. There was no incidence of further complication and the patient was diagnosed with primary MSSA sternal osteomyelitis.

Discussion

Primary osteomyelitis of the sternum in immunocompetent patients is extremely rare, accounting for 0.3% of all cases of osteomyelitis reported in the literature (1). Common risk factors for primary sternal osteomyelitis are trauma, pneumonia, diabetes, immunodeficiency, or history of IV drug use (2,3). Our patient had none of these risk factors. Risks for secondary sternal osteomyelitis are due to complications from sternal incision post-thoracic surgery(1-3). *Staphylococcus aureus* is the most common organism of both primary and secondary sternal osteomyelitis (2).

Early diagnosis of acute osteomyelitis is critical in order to prevent necrosis of bone, as well as other local and systemic complications, from delayed antibiotic therapy. Multiple imaging modalities are available to confirm the presumed clinical diagnosis of osteomyelitis. MRI is 82% to 100% sensitive and 75% to 96% specific and is considered the gold standard in diagnosis of acute osteomyelitis (4). However, as evidenced by our case, imaging findings may lag behind clinical presentation. Clinicians need to consider primary osteomyelitis in the differential diagnosis of a young patient who presents with focal sternal chest pain, swelling, and bacteremia. A strong index of suspicion for acute osteomyelitis is needed in order to promptly initiate antibiotic therapy to reduce morbidity and mortality associated with untreated osteomyelitis (1,2).

References

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