

# MRSA-Positive Sternoclavicular Septic Arthritis Mimicking Mediastinal Malignancy in a Patient with Multiple Injection History: A Rare Case Report

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## MRSA-Positive Sternoclavicular Septic Arthritis Mimicking Mediastinal Malignancy in a Patient with Multiple Injection History: A Rare Case Report

### Abstract:

Infection of the sternoclavicular joint is exceptionally rare, accounting for less than 1% of bone infections. This case report describes an unusual presentation of MRSA-positive septic arthritis in a 60-year-old male with a complex medical history, including hypertension, diabetes mellitus, hepatitis C, and recurrent cellulitis due to multiple IV and IM injections, presented with drowsiness and a painful, erythematous swelling of the left anterior chest wall. Clinical examination revealed pallor, distended abdomen, and decreased left-sided airway entry. Diagnostic workup showed elevated creatinine, metabolic acidosis, and inflammatory markers. Imaging revealed extensive soft tissue swelling and a mediastinal mass. A core biopsy confirmed severe acute and chronic inflammation, abscess formation, and granulation tissue suggestive of an infectious etiology. CT scans further identified sternoclavicular septic arthritis, a rare diagnosis. The patient responded well to IV antibiotics and chest physiotherapy. The presence of a mass extending into the left superior mediastinum, mimicking a malignancy, adds to the diagnostic challenge. Our findings highlight the need for careful evaluation and management in such unique clinical scenarios. Our case report describes MRSA-positive sternoclavicular septic arthritis in a patient with a history of tramadol and multivitamin injections. Sternoclavicular joint (SCJ) infection is rare, complicating differentiation from mediastinal malignancies. Successful management required embolization, IV antibiotics, and physiotherapy. Our case highlights diagnostic challenges and underscores tailored treatment strategies for complex infections.

### Key clinical message:

MRSA-positive sternoclavicular septic arthritis, mimicking mediastinal malignancy, presents diagnostic challenges. Successful management involves tailored strategies, interdisciplinary collaboration, and consideration of IV drug injections.

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### Key Words:

## Introduction:

Infection of the sternoclavicular joint is a rare condition, representing less than 1% of all bone infections. Most patients who develop this condition have known risk factors, such as immunosuppression, diabetes, intravenous drug use, or rheumatoid arthritis<sup>1</sup>. The acquisition of MRSA-positive septic arthritis can be attributed to various factors and sources. Staphylococcus aureus, including methicillin-resistant strains, is a predominant pathogen responsible for a significant proportion of septic arthritis cases, with MRSA accounting for 6% to 22% of S. aureus isolates<sup>2</sup>. Particularly injection drug users are at a higher risk for MRSA infections and joint complications, including septic arthritis, though this association is relatively rare and lacks proper documentation<sup>3</sup>. This case report details a rare presentation of MRSA-positive septic arthritis in a patient with a history of multiple intravenous (IV) and intramuscular (IM) injections. The rarity of this case is the presence of a mass in the left sternocleidomastoid muscle extending into the left superior mediastinum with associated lymphadenopathy, giving the impression of a mediastinal malignancy. Radiology revealed sternoclavicular septic arthritis. The involvement of the sternoclavicular joint in septic arthritis is uncommon, and when coupled with atypical presentations mimicking other conditions like mediastinal masses, the diagnosis becomes challenging<sup>4</sup>. The combination of MRSA-positive septic arthritis, sternoclavicular joint involvement, mediastinal mimicry, and a history of multiple injections creates a unique and rare clinical scenario that requires careful evaluation and management<sup>5</sup>.

## Case Presentation:

### Clinical History and Clinical Examination:

A 60 year- old male, a known case of hypertension, hemorrhoids that were operated on accordingly, diabetes mellitus, hepatitis C (treated), and recurring cellulitis due to multiple IV and IM injections (specifically Tramadol and Multivitamins) for his constant complaints of bilateral knee pain presented to the ER department of a tertiary care hospital with the presenting complaints of drowsiness and a moderately defined swelling of his left anterior chest wall for 1 month that was warm, painful and erythematous, hard and stony in consistency, gradually increasing in size along with purulent discharge of small volume. On clinical examination, he had pallor, distended abdomen, umbilical hernia, and decreased left-sided airway entry on chest auscultation.

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### Investigations:

A preliminary diagnostic workup of the patient revealed several concerning findings: creatinine was slightly elevated at 1.4 mg/dL (normal range: 0.8-1.3 mg/dL), bicarbonate was below normal at 18.5 mmol/L (normal range: 22-29 mmol/L) and PCO2 also, indicative of metabolic acidosis. The CRP level, indicating inflammation, was markedly elevated at 398 mg/L (normal range: 0-10 mg/L). A complete blood count (CBC) showed anemia as hematocrit and RBC were reduced, and a notable elevation in white blood cell count to  $15 \times 10^9/L$  (normal range:  $4.8-11.3 \times 10^9/L$ ). Specifically, neutrophils were significantly elevated at 83.4% (normal range: 34.9-76.2%), while lymphocytes were severely decreased to 7% (normal range: 17.5-45%). Subsequent liver function tests (LFTs) showed elevated levels of total bilirubin (2.1 mg/dL; normal range: 0.1-1.2 mg/dL) and direct bilirubin (1.5 mg/dL; normal range: 0-0.2mg/dL). Glucose levels were also consistently elevated. Pus culture came back positive for Methicillin-Resistant Staphylococcus aureus. CT Head and Neck with contrast showed extensive soft tissue swelling on the left anterior chest wall with active contrast excavation, representing hematoma with active bleed for which the patient underwent successful embolization of pseudo aneurysm arising from the left internal thoracic artery by Histoacryl glue (Figure 1). A core biopsy of an anterior mediastinal mass was also done to rule out that the mass was not due to any underlying malignancy and granulomatous disease. Biopsy revealed severe acute and chronic

inflammation, abscess formation and granulation tissue suggestive of an infectious etiology (Figure 2). A CT chest with contrast was performed that revealed heterogeneous enhancing soft tissue identified in the left sternocleidomastoid muscle, extending infero laterally along the subcutaneous tissues of the left anterior chest wall (Figure 3). There was also deep extension into the left upper lobe and superior mediastinum via the thoracic inlet, causing the contralateral tracheal shift that diagnosed it as a case of Sternoclavicular Septic Arthritis. Furthermore, a limited Ultrasound of the arm also revealed significant subcutaneous edema in the left upper limb.

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### Treatment and Follow-up:

The patient was managed by placing a PICC (Peripherally inserted central catheter) line for the long-term need of IV antibiotics. Vancomycin, Rifaximin and linezolid antibiotics were mostly administered along with Omeprazole capsule and Sodium bicarbonate tablet. Chest physiotherapy and mobilization was encouraged and done daily. His hemoglobin and creatinine were improving and then was discharged along with advice to take the aforementioned drugs till the next follow-up on which his symptoms showed improvement.

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### Discussion:

Septic arthritis among individuals who use intravenous (IV), or intramuscular (IM) tramadol can be a serious complication, especially considering the potential for introducing pathogens into the bloodstream or deep tissues during drug administration. Studies have shown a strong association between the practice of injecting drugs and the incidence of septic arthritis caused by *Staphylococcus aureus*, including MRSA strains. Individuals with a history of injecting drugs have been found to be at higher odds of developing septic arthritis due to *S. aureus*, highlighting the role of this risk factor in the pathogenesis of the infection<sup>6</sup>.

In this case report, the patient had MRSA-positive sternoclavicular septic arthritis following repeated intravenous and intramuscular tramadol and multivitamin injections. Sternoclavicular joint (SCJ) infection is an uncommon condition, accounting for only 0.5% - 1.0% of all septic arthritis cases and less than 0.5% of septic arthritis in healthy patients<sup>7</sup>.

The proximity of the sternoclavicular joint to the mediastinum complicates differentiating between mediastinal masses and malignancies. A similar case was reported of septic arthritis being initially mistaken for malignancy, but that case involved Methicillin-Sensitive *Staphylococcus aureus* (MSSA) and rhGH (Recombinant human growth hormone) abuse, which could have influenced the infection's development<sup>5</sup>. In contrast, our case involved Methicillin-Resistant *Staphylococcus aureus* (MRSA) and tramadol/multivitamin abuse, with no apparent role of the drugs in infection pathogenesis. Our patient was managed with embolization, long-term IV antibiotics, and physiotherapy, whereas the above-mentioned patient required multiple surgeries and extended antibiotics due to an inadequate initial response.

We believe that the spread of infection to the sternoclavicular joint in particular was due to the injections being frequently administered in the deltoid region. This is supported by a study that discussed the possibility of bacteria entering the sternoclavicular joint from adjacent veins after the injection of contaminated drugs into the upper extremity<sup>8</sup>.

Our case of sternoclavicular septic arthritis presenting as a mediastinal malignancy contributes to the literature by highlighting the diagnostic challenges when infections mimic malignancies. It demonstrates the importance of distinguishing between severe infections and cancer through comprehensive diagnostic approaches and underscores the effectiveness of advanced imaging and surgical interventions, such as embolization of a pseudoaneurysm. The case also illustrates the need for tailored treatment strategies and interdisciplinary

collaboration in managing complex infections, providing practical insights into clinical decision-making and resource considerations.

The case has several limitations: it focuses on immediate treatment without long-term follow-up on recurrence or outcomes; advanced diagnostic and therapeutic techniques used may not be available in low-resource settings; the patient's multiple pre-existing conditions may have complicated the infection's presentation and management; and the initial mimicry of a malignancy required extensive and potentially delayed diagnostic workup, which may not be feasible in all clinical settings.

### Conclusion:

**This case illustrates the diagnostic and therapeutic challenges posed by MRSA-positive sternoclavicular septic arthritis, especially when presenting with atypical features that mimic malignancy. Successful management required a multifaceted approach, including advanced imaging, precise diagnostics, embolization, and prolonged antibiotic therapy. The case underscores the critical need for thorough evaluation in atypical infections to differentiate from malignancies, highlighting the importance of tailored treatment strategies and interdisciplinary collaboration in achieving favorable outcomes. This unique presentation enriches medical literature and offers valuable insights into the complexity of diagnosing and treating rare infections in patients with multiple comorbidities.**

### Author Contribution Statement:

**Aneeqa Qureshi:** Conceptualization, Supervision, Data curation, Methodology, Writing -original draft, Writing - reviewing and editing

**Saad Saleem:** Conceptualization, Methodology, Data curation, Writing -original draft

**Huzafa Ali:** Conceptualization, Methodology, Writing-original draft, Writing -reviewing and editing

**Huzaifa Saqib:** Methodology, Writing -original draft, Writing -reviewing and editing

**Dipendra Adhikari:** Methodology, Writing -original draft, Writing -reviewing and editing

**Ayesha Nazeef:** Conceptualization, Writing -original draft, Writing -reviewing and editing

**Aisha Tariq:** Conceptualization, Writing -original draft

**Zeeshan-Ud-Din:** Data curation, Writing -reviewing and editing

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### Protection Of Humans and Animals:

The authors declare that the procedures were followed according to the regulations established by Clinical Research and Ethics Committee and to the Helsinki Declaration of the World Medical Association updated in 2013.

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The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

### Data Availability Statement:

All the necessary clinical images and case details are already provided within the manuscript along with comprehensive literature sources.

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### Consent:

Written informed consent was obtained from the patient to publish this report in accordance with the journal's patient consent policy.

### Competing Interests:

The authors have declared that no competing interests exist.

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### Figures and Figure Legends:

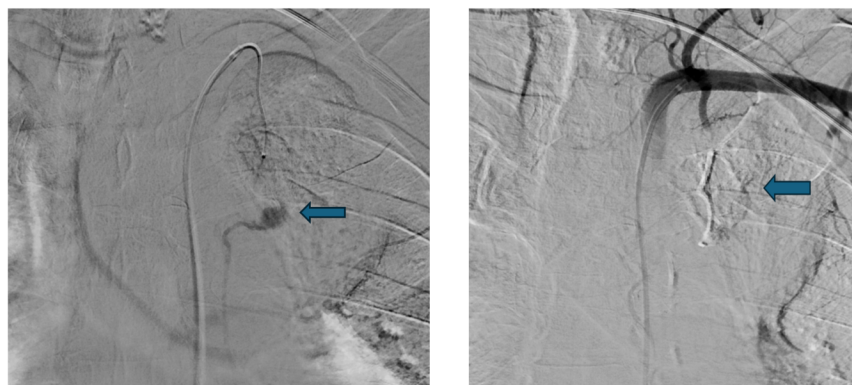


Figure 1: Focal out pouching representing pseudoaneurysm arising from left internal thoracic artery at the level of anterior second rib, measuring approximately 7 x 7 mm as noted on prior CT scan examination (left). Subsequently, using combination of 5 Fr guiding catheter, parkway microcatheter and .014 micro wire the left internal thoracic was cannulated and embolization was successfully performed using 0.5 mL Histoacryl glue and 1.5 mL of lipoidal solution (right).

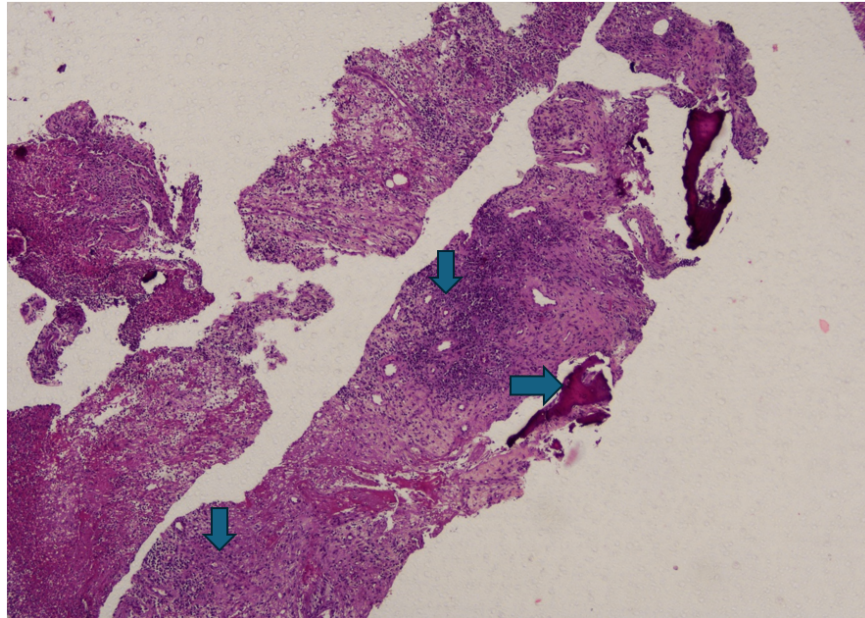


Figure 2: Histological features of the anterior mediastinal mass on core biopsy showing fibro collagenous tissue with severe inflammation (—) and abscess formation. Intervening necrotic bony chips also noted (-). These findings are consistent with an infective etiology. (H&E, 4X)

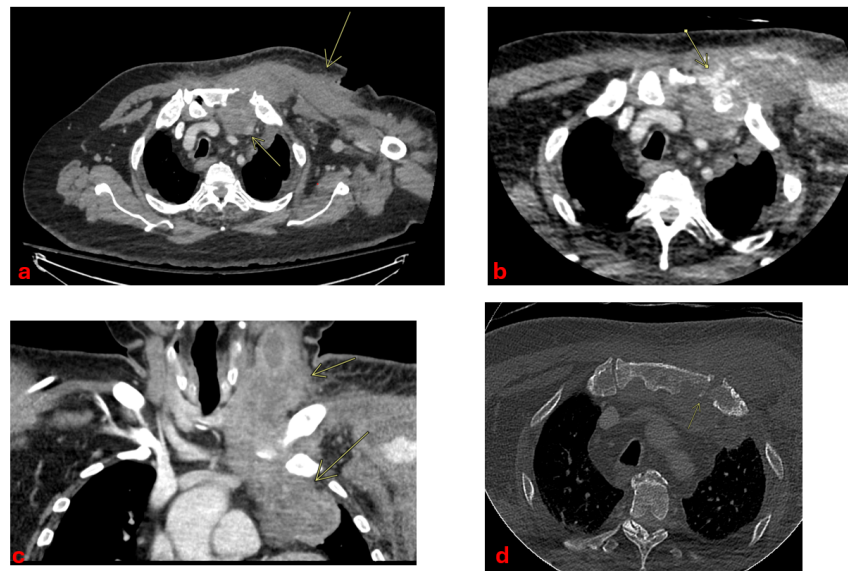




Figure 3: The post-contrast CT scan of the chest and neck reveals erosion and destruction of the left sternoclavicular joint. Additionally, a large, heterogeneous necrotic soft tissue mass extends both superiorly into the neck and anteriorly into the mediastinum. Notably, there is active contrast enhancement from the left internal thoracic artery and pooling in an anterior chest wall collection.

