

Sternoclavicular Joint Abscess Necessitating Empyema: Four ED Visits in Six Days

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Abstract We report a case of Sternoclavicular Joint (SCJ) infection in a 52-year-old male who developed an empyema over six days. During the first three visits, he had worsening pectoral and shoulder pain and was symptomatically treated and discharged. During the first ED visit, a computed tomography (CT) scan of the neck was negative. During the second ED visit, CTA chest was negative for pulmonary embolism. Three days later, CTA of the neck showed density from the left first rib to the left sternoclavicular joint, suggesting a hematoma. During the final ED visit, CT of the chest showed a left anterior chest wall abscess contiguous with a left upper lobe empyema. VATS confirmed empyema and revealed costochondral and SCJ abscess. Decortication, SCJ resection, and pectoralis muscle debridement were performed. Methicillin-susceptible Staphylococcus Aureus (MSSA) was isolated from surgical cultures. After the pectoralis muscle flap closure, he was treated with IV cefazolin for a total of six weeks. Health care professionals should have a high index of suspicion for SCJ infections in patients with a similar clinical presentation. This case highlights the importance of early and prompt diagnosis of MSSA SCJ infections to prevent sequelae of the disease.

Keywords: sternoclavicular joint, video-assisted thoracoscopic surgery, decortication

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1. Introduction

Sternoclavicular Joint (SCJ) septic arthritis is a rare disease and accounts for 1% of all joint infections [1]. Patients typically present with an average of 14 days between symptom onset and hospital arrival compared to other joint infections [3]. Most patients present with tender SCJ (90%), chest pain (78%), fever (65%), but also can present with shoulder pain (24%) or neck pain (2%) [2,3,4]. Risk factors include intravenous (IV) drug use (25%), distant site infection (15%), diabetes mellitus (13%), trauma (12%), and infected central venous line (9%). However, 23% of cases have no risk factors identified (23%) [2,4]. Complications of SCJ septic arthritis include osteomyelitis, chest wall abscess, mediastinitis, or myositis [2].

2. Case Presentation

We present a 52-year-old white male patient who

visited the Emergency Department (ED) four times within six days. He has a past medical history significant for hypertension and type 2 diabetes and initially presented with 1 week of left-sided neck and shoulder pain radiating to the left arm. The patient denied IV drug use, recent infection, and trauma. During the first ED visit (day 1), vital signs included temperature 36.5 °C (97.7 °F), blood pressure 141/77 mm Hg, pulse 101 beats/min, respiratory rate 20 breaths/min, and SpO₂ 99% on room air. He exhibited tenderness to palpation of his left neck but no complaints on the right side. A computed tomography (CT) of the neck without intravenous contrast was negative for any acute osseous abnormality (Figure 1). Pain improved with IV morphine and he was subsequently discharged.

On day 2, he continued to have the same pain so he returned to the ED. His vitals were stable, laboratory data revealed leukocytosis of 20.2 × 10³ cells/uL and an elevated D-Dimer of 266 ng/ml. A computed tomography angiography (CTA) of the chest was negative for pulmonary embolism or other acute process (Figure 2). The elevated white blood cell (WBC) count was attributed

to recent steroid use. He was discharged after symptomatic improvement with pain medications.



Figure 1. CT Neck without contrast on the first ED Visit (Day 1) did not show any signs of sternoclavicular joint infection or other acute abnormality



Figure 2. CTA of the chest on the second ED Visit (Day 2) was negative for pulmonary embolism or any signs of sternoclavicular joint infection

On day 5, he returned to the ED with worsening and progressive chest and shoulder pain, along with swelling of the left chest. Upon examination, the left chest was tender to palpation. vital signs included temperature 36.9 °C (98.4 °F), blood pressure 147/88 mm Hg, pulse 102 beats/min, respiratory rate 18 breaths/min, and SpO₂ 98% on room air. Laboratory result was significant for leukocytosis of 20.2×10^3 cells/uL. CTA of the neck showed increased density surrounding the left internal mammary artery extending from the level of the anterior left first rib to the left SCJ, suspicious for a hematoma (Figure 3). He was diagnosed with a left chest wall

contusion and was discharged after symptomatic improvement with pain medications.

On day 6, he returned to the ED with worsening left-sided chest pain and swelling associated with nausea and diaphoresis. Vital signs included a pulse of 120 bpm, a blood pressure of 130/71 mmHg, a temperature of 99.5 °F, a respiratory rate of 16/minute, and SpO₂ of 97% on room air. On examination, he had swelling of the left chest wall in the absence of erythema and warmth. Ultrasound of the left chest wall demonstrated possible intramuscular mass measuring 5.7 x 5.2 x 2.3 cm, suspicious for a hematoma. Given the persistent of

symptoms, patient was admitted for surgical evaluation and hematoma evacuation. Preoperative CT chest showed a left anterior chest wall abscess contiguous with anterior left upper lobe abscess with bony erosions at the costochondral and sternoclavicular joints (Figure 4). He subsequently became febrile with a temperature of 101.5°F, tachycardic, and tachypneic. Laboratory results demonstrated WBC 13.3×10^3 cells/uL, erythrocyte sedimentation rate (ESR) 107 mm/h, and C-reactive protein 286 mg/L. Blood cultures were obtained and he was started on empiric IV antibiotic therapy with piperacillin/tazobactam and vancomycin. Video-assisted thoracoscopic surgery (VATS)

confirmed empyema and revealed costochondral and SCJ abscess (Figure 5). Decortication, SCJ resection, and pectoralis muscle debridement were performed. Methicillin-Sensitive Staphylococcus Aureus (MSSA) was isolated from both the chest wall aspirate and blood cultures. Transesophageal echocardiogram (TEE) ruled out any valvular vegetation. A histopathological study of bone specimen was significant for osteomyelitis. Antibiotics were subsequently switched to IV cefazolin for a total of six weeks following the pectoralis muscle flap closure. The patient's clinical status improved and he was discharged home with physical therapy.

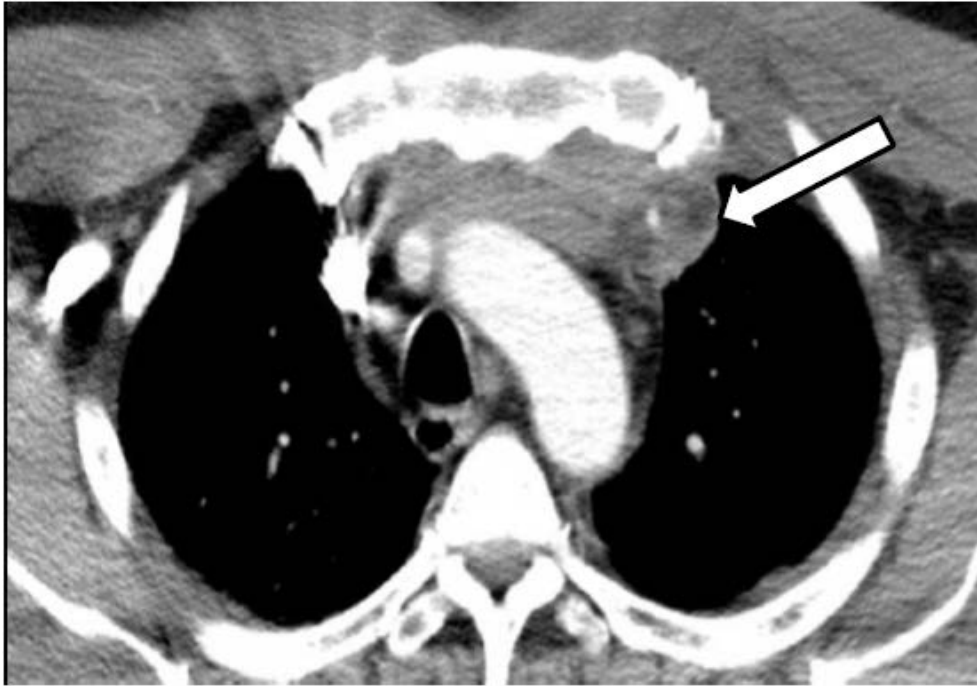


Figure 3. CTA of the Neck on the Third ED Visit (Day 5) showing the first radiological changes of the left sternoclavicular abscess (white arrow)

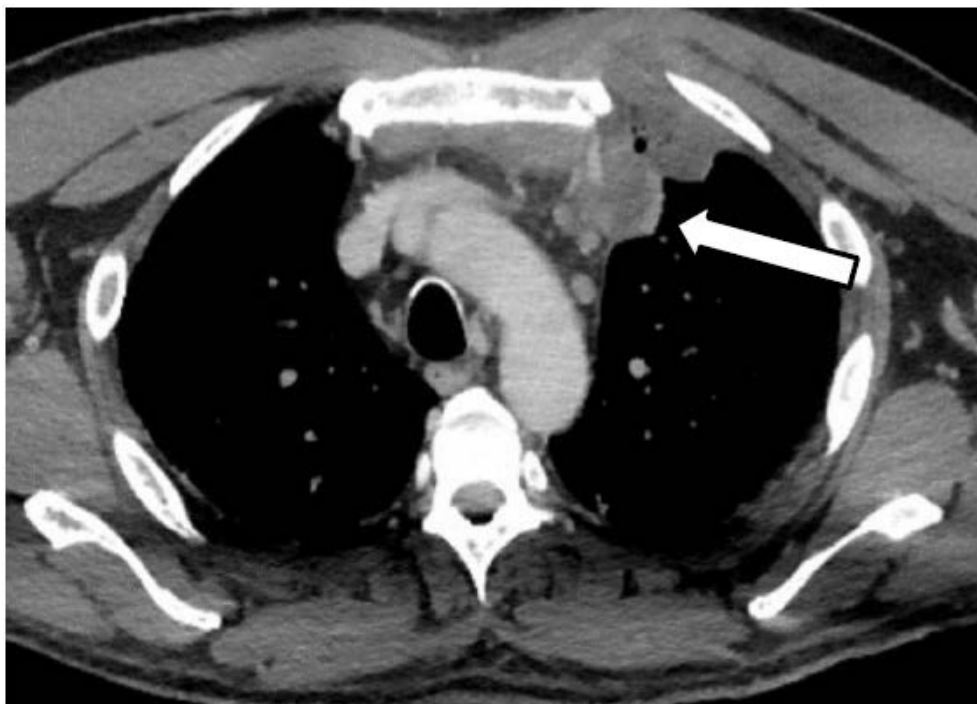


Figure 4. CT Chest on the Fourth ED Visit (Day 6) showing progression of the SCJ with expansion into a left anterior chest wall abscess contiguous with anterior left upper lobe abscess with bony erosions at the costochondral and sternoclavicular joints (white arrow)

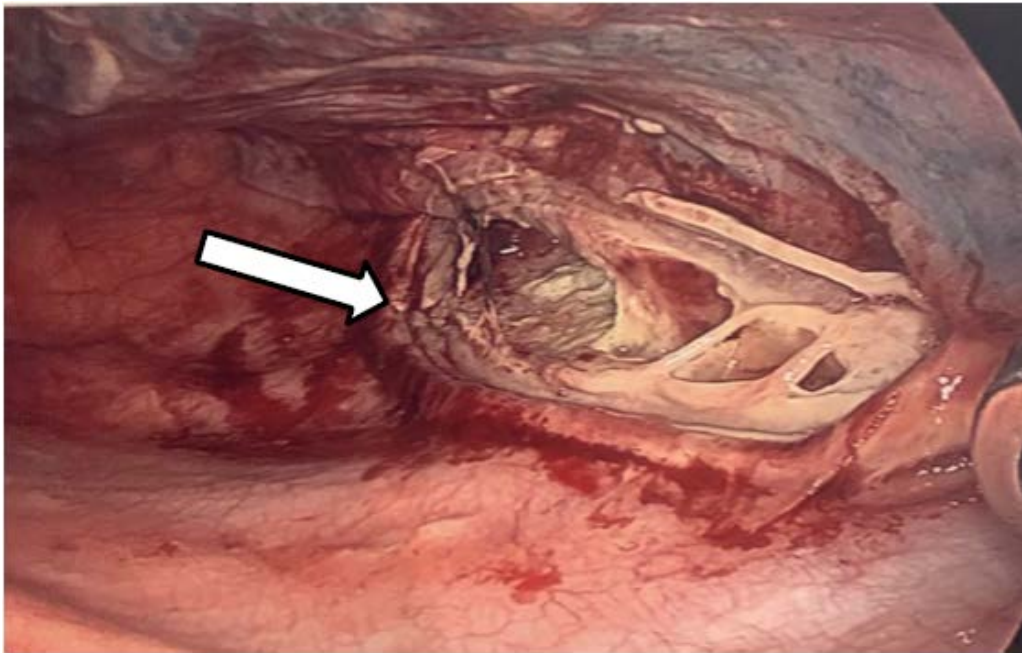


Figure 5. VATS on the Fourth ED Visit (Day 6) showing the SCJ abscess (white arrow)

3. Discussion

SCJ septic arthritis is a rare and life-threatening disease with a mortality rate of 8-15% [1,3]. If left untreated, it can be associated with severe complications, such as infections in the bones, neck, pleural cavities, spine, and mediastinum, leading to septic shock and death. Diagnosis of SCJ septic arthritis is difficult as the radiological changes may lag behind onset of symptoms [1,3]. Same as in our reported case, the first 2 imaging studies did not catch any signs of infection. Twenty percent of osteomyelitis cases have abnormal findings by the second week [1,3]. Computed tomography and magnetic resonance imaging studies can help to identify early signs of abnormalities in the joints including joint effusion, erosion, osseous destruction, soft tissue swelling, and abscess formation [3]. Approximately 50% of positive cultures are due to *Staphylococcus aureus* and are usually confined to the joint [4]. This is expected as *Staphylococcus aureus*

causes 44% of all septic arthritis cases, which is the result of surface proteins binding to the connective tissue. Other infectious causes include *Pseudomonas*, *Brucella melitensis*, *Escherichia coli*, *Streptococcus*, *Mycobacterium tuberculosis*, anaerobes, *Neisseria gonorrhoeae*, and *Candida albicans* [3,4].

Surgical debridement and intravenous antibiotics are the mainstay of treatment. All patients with SCJ should be started on empiric intravenous antibiotics that cover *S. aureus*. If methicillin-resistant *S. aureus* is suspected, then vancomycin should be added [3]. Ross et al. reported 180 cases of SCJ infections, where 58% of the patients required surgical intervention. Of those patients, 47% underwent limited debridement of necrotic tissue. The remaining patients underwent more extensive debridement, including resection of the SCJ, one-half of the manubrium, and the medial third of the clavicle [2,4]. Given the severity and progression of the SCJ infection, our patient required extensive debridement, SCJ resection, and decortications.

Table 1. Classification of SCJI and management

Grades	Clinical presentation	Radiological findings	Management
I	- Local signs of inflammation but no systemic symptoms.	- No signs of osteomyelitis - Minimal or no effusion at SCJ	Antibiotic therapy alone. If not successful consider Incision& Drainage (I&D)
II	- Local signs of inflammation - Moderate to large swelling at SCJ - +/- systemic symptoms	- No signs of osteomyelitis - Moderate to large effusion at SCJ	Antibiotics + I&D If not successful consider I&D + Curettage
III	Same as above	- Minimal radiological signs of osteomyelitis - Moderate to large effusion at SCJ	Antibiotics + I&D + Curettage If not successful consider SCJ resection
IV	Same as above plus any of the following: 1-Sinus formation 2- Persistent or recurrent infection 3- Sever osteomyelitis	Sever osteomyelitic changes at SCJ or sinus formation on imaging	Antibiotics + SCJ resection
V	Any of the previous grades plus evidence of mediastinitis	Imaging showing signs of mediastinitis	Antibiotics + extensive surgical debridement, SCJ resection, and decortication

Muesse et al. described 4 possible modalities of treatment for twelve patients with SCJ septic arthritis. Only 25% were cured successfully with antibiotics alone. The success rate was 33% for patients who underwent debridement with bone resection, and 50% for patients who underwent simultaneous debridement, bone resection, and muscle flap coverage of the acquired defect. However, debridement with delayed bone resection and muscle flap coverage was found to be associated with the highest success rate of 100% [5]. Abu Arab et al. proposed a model that classifies SCJI into five grades based on clinical presentation, radiological changes and the presence or absence of mediastinitis which helps to guide clinicians in the management of SCJ infection (Table 1) [6]. Early debridement of the joint, prompt initiation of empiric antibiotics, and joint resection is recommended. The need for a muscle flap depends on the healing process and the size of the wound [7].

4. Conclusion

The compelling factor in our case is how fast a MSSA SCJ infection progressed to empyema, and how elusive the diagnosis was, evading multiple health care professionals. CT findings of SJI might not be seen in the first 2 weeks. So early recognition and prompt initiation of

empiric antibiotics and surgical intervention is highly recommended. Also, our case highlights the good outcome with extensive surgical debridement, SCJ resection, and decortication in such a complicated case.

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