Septic Arthritis of the Acromioclavicular Joint
A Report of Four Cases

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Septic arthritis of the acromioclavicular (AC) joint is a rare diagnosis that has been limited to case reports in the literature.1-6 It is primarily seen in patients who are immunocompromised, for instance, by AIDS,6 chronic steroid use,1 intravenous drug use,3 and lymphoma.3 The presentation of septic arthritis of the AC joint may be difficult to differentiate from septic arthritis of the shoulder joint. The patient may be febrile, have erythema, warmth, swelling, and pain on palpation over the AC, or shoulder, joint. There may be pain with range of motion (ROM) of the shoulder joint or cross-arm adduction. Radiographs may demonstrate widening, erosion, or destruction of the AC joint.2 Magnetic resonance imaging (MRI) is helpful in differentiating the AC joint from the glenohumeral joint as the site of infection. Ultrasound may also be effective in making the diagnosis.5 Aspiration of the AC joint should be performed to identify an organism. The causative organism is usually a Staphylococcus5,6 or Streptococcus2,5 species. Cryptococcus neoformans has also been reported.1 This report presents four cases of AC joint septic arthritis found in three patients and the management strategies used to treat them.

Case One: Patient A
A 55-year-old African-American female presented to the hospital complaining of severe left shoulder pain. The pain had begun 3 days prior to admission and was associated with subjective fevers. There was no history of trauma or prior shoulder complaints. The patient’s past medical history was significant for multiple myeloma, diagnosed two years prior, as well as for anemia and renal insufficiency. The patient was receiving VAD [vincristine, doxorubicin (Adriamycin®), and dexamethasone] chemotherapy through a right subclavian mediport. She had been admitted to the hospital three times during the previous year for pneumonia but was never found to be neutropenic.

On presentation to the emergency department, the patient had a fever of 39° C. Physical examination demonstrated tenderness on palpation of the left AC joint. She had full ROM of her left shoulder, with minimal pain at 120° of forward flexion, 10° of internal rotation, and 20° of external rotation. The pain was localized to the AC joint with a painful cross-arm adduction test. She was neurovascularly intact distally. Arthrocentesis of the left glenohumeral joint was attempted, but no fluid was obtained. The patient was subsequently placed in a sling for comfort.

Left shoulder radiographs demonstrated no evidence of a fracture or dislocation. White blood cell (WBC) count at the time of admission was 9,600/mm³. Blood cultures were obtained that demonstrated gram positive cocci on gram stain. The patient was placed empirically on cefepime and vancomycin.

An MRI of the left shoulder was performed that demonstrated an effusion in the AC joint, minimal effusion in the glenohumeral joint, and a partial supraspinatus tear (Fig. 1). The following day, the patient continued to be febrile, with a maximum temperature of 38.3° C, a WBC count of 9000 mm³, an erythrocyte sedimentation rate (ESR) of 105 mm/hr, and C-reactive protein (CRP) of 11.1 mg/dl. Blood
cultures were positive for *Streptococcus pneumoniae*. At this point, the infectious diseases consult recommended changing the antibiotic to ceftriaxone. Further clinical studies were negative for other etiologies of infection.

On day four of this admission, the patient was taken to the operating room where she underwent arthroscopic irrigation and debridement of the left glenohumeral joint and subacromial space, as well as an open AC joint resection. Synovitis was appreciated in the left subacromial joint, and 3 cc of purulent loculated fluid was found in the AC joint. Pathology of the distal clavicle revealed acute osteomyelitis.

On postoperative day one, the patient was afebrile, with a WBC of 12,400/mm$^3$. A course of 8 weeks of intravenous linezolid was initiated. The patient’s symptoms resolved and her clinical course was unremarkable following discharge.

**Case Two: Patient A**

Ten months later, the patient presented to the hospital complaining of severe right shoulder pain, a fever of 38.9°C, and chills. The pain had begun the day of presentation and was atraumatic in onset. The patient was afebrile in the emergency room, with tenderness on palpation of her right AC joint and decreased ROM of her right shoulder, secondary to pain. WBC count was 17.7, ESR was 102 mm/hr, and CRP was 5.4 mg/dl. The patient was empirically started on intravenous vancomycin. Her mediport had been removed 2 months prior, due to malfunction. Right shoulder radiographs revealed that there was no fracture or dislocation. An MRI of the right shoulder revealed no gross pathology. Laboratory testing demonstrated a WBC of 9400/µL, with 86% neutrophils, an ESR of 110 mm/hr, and a CRP of 14.70 mg/L. An MRI was attempted; however, the patient was unable to tolerate the procedure.

Using an 18-gauge needle, arthrocentesis of the AC joint was performed, yielding approximately 2 cc of purulent fluid, confirming the diagnosis of septic arthritis of the AC joint. Ten cc of sterile water was then injected into the AC joint to determine if there was communication with the glenohumeral joint. No capsular distension was appreciated. The patient was started empirically on vancomycin.

On day three of admission, the patient reported that the pain over her AC joint was improved, and the swelling and...
erythema had also decreased. Cultures from the AC joint aspirate grew Group B *Streptococcus* that was sensitive to ceftiraxone. Since the patient’s clinical course improved rapidly and continued to improve, no surgical intervention was performed; the patient was discharged 3 days later with a PICC (peripherally inserted central catheter) line for 6 weeks of ceftiraxone. The patient’s infection resolved and her symptoms improved with medical treatment. There was no recurrence of infection.

**Case Four: Patient C**

A 65-year-old male presented to the emergency department complaining of 7 days of left shoulder pain and subjective fever. The patient denied any prior shoulder pain or trauma. Past medical history was significant for uncontrolled diabetes, gout, and renal insufficiency.

On physical examination, the patient was febrile at 38.8°C. The AC joint was fluctuant and tender on palpation. The patient had pain on performing ROM tests of the shoulder. Laboratory values included a WBC of 15,800/µL, an ESR of 121 mm/hr, and a CRP of 15.9 mg/L. No gross pathology was appreciated on the left shoulder radiograph. However, an MRI of the left shoulder revealed fluid in the AC joint, as well as a small supraspinatus tear.

The AC joint was aspirated using the same method as detailed in the previous case. The patient had been empirically started on ceftiraxone prior to aspiration. After 2 days of IV antibiotics, the patient reported a significant improvement in shoulder pain. All blood and joint aspirate cultures were negative. An independent consult was obtained, and the patient was discharged with 4 weeks of Zosyn® (piperacillin sodium and tazobactam sodium) and nafcillin. At the 3-month follow-up visit, the patient was doing well and had no further complaints about the left shoulder.

**Discussion**

Septic arthritis usually affects the weightbearing joints of the lower extremity, comprising 61% to 79% of all reported cases of septic arthritis.⁶ The knee is the most commonly affected large joint.⁶ The differential diagnosis of acute arthralgia includes traumatic synovitis, cellulitis, acute rheumatic fever, acute osteomyelitis, hemophilia, and in children, Henoch-Schoenlein purpura and Legg-Calve-Perthes’ disease.⁸ The diagnosis of septic arthritis of the AC joint may be difficult to differentiate from septic arthritis of the shoulder. While MRI and ultrasound are useful, a definitive imaging study may not always be available. In the second patient, aspiration of the AC joint, followed by infiltration with saline to confirm that the infection did not spread to the shoulder joint, proved useful and may be applied as an alternative diagnostic modality.

The guiding principles for treatment include adequate drainage of the joint and administering antibiotics.⁸ Management of septic arthritis in larger joints, such as the knee or shoulder, is typically via irrigation, either through an arthrotomy or arthroscopically, with IV antibiotics. In the treatment of septic arthritis of the AC joint, operative treatment, usually by irrigation and debridement, followed by distal clavicle excision, has been the mainstay of treatment.¹ ² ⁶ However, aspiration and administration of IV antibiotics has also been documented.⁴ Adams and McDonald reported on a patient with sarcoidosis and cryptococcal arthritis of the AC joint that was treated with irrigation and debridement, distal clavicle excision, and IV antibiotics.¹ Blankenstein and colleagues also had success with a similar protocol in a patient with AC joint septic arthritis due to *Streptococcus viridans.*² They resected the AC joint instead of simply the distal clavicle. Zimmerman and associates also resected the AC joint, using oral antibiotics instead of IV antibiotics, in a patient with AIDS who had septic AC joint arthritis due to *Staphylococcus aureus.*⁶ On the other hand, Sobrino and coworkers⁷ reported on a case of septic arthritis of the AC joint due to *Streptococcus equisimilis* that resolved with IV penicillin in 4 weeks, with the addition of IV gentamicin for 2 weeks. We have been able to successfully treat septic arthritis of the AC joint with both protocols. In the first patient, irrigation of the AC joint, followed by distal clavicle excision and IV antibiotics, successfully treated septic arthritis of both AC joints. Septic arthritis of the AC joint in the second and third patients resolved with aspiration and IV antibiotics alone.

To our knowledge, this is the first documented case of bilateral AC joint septic arthritis. The patient was immunocompromised secondary to multiple myeloma. Septic arthritis in a patient with multiple myeloma has been reported in the literature, primarily in case reports. To date, septic arthritis has been documented in the knee,⁹ ¹³ the shoulder,¹⁴ ¹⁵ the elbow,¹⁶ and the sternoclavicular joint.³

Thus, in any patient who has clinical symptoms resembling septic arthritis of the shoulder, septic arthritis of the AC joint should be included as part of the differential diagnosis, especially if the patient is immunocompromised. Treatment can consist of open or arthroscopic irrigation and debridement, followed by distal clavicle excision or AC joint excision. Unlike other larger joints, septic arthritis of the AC joint can also resolve after joint aspiration and the administration of long-term antibiotics.

**Disclosure Statement**

None of the authors have a financial or proprietary interest in the subject matter or materials discussed, including, but not limited to, employment, consultancies, stock ownership, honoraria, and paid expert testimony.

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