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Arthroscopic Treatment of Septic Arthritis of Acromioclavicular Joint

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Septic arthritis requires an early diagnosis and proper treatment to prevent the destruction of articular cartilage and joint contracture. This paper presents a rare case of septic arthritis of the acromioclavicular joint that was treated with arthroscopic debridement and resection of the distal clavicle.

Keywords: *Acromioclavicular joint, Septic arthritis, Acute, Arthroscopy*

Septic arthritis is a disease that can lead to joint cartilage destruction and joint contracture that limits joint motion.[1] Therefore, early diagnosis and proper treatment are essential for the resolution of this disease. Septic arthritis of the acromiocalvicular (AC) joint is relatively rare.[2-4] This paper presents a case of acute septic arthritis of the AC joint treated with arthroscopic debridement and resection of the distal clavicle.

CASE REPORT

A 63-year-old male was admitted to the emergency room complaining of severe pain in the left shoulder. The pain began 3 days earlier and was accompanied by fever. The patient had no history of either trauma or invasive treatment of the affected shoulder. At the time of admission, his vital signs were stable except for a 39°C fever. He had been on a hypoglycemic agent for 30 years due to diabetes mellitus. The physical examination revealed, flare and swelling of the left shoulder, and severe pain was noted upon palpation of the left AC joint. Active and passive motion of the shoulder was impossible, but neurological deficits were not identified. Aspiration of the glenohumeral joint, which was performed without imaging guidance showed no purulent joint fluid. The hematological examination revealed elevated leukocytosis (15,400/mm^3), erythrocyte sedimentation rate (ESR, 18 mm/hours), and C-reactive protein (CRP, 197 mg/dL). In the radiological examination, AC joint space widening was observed in the affected shoulder and bone erosion was noted in the inferior margin of the distal clavicle (Fig. 1). MR imaging confirmed the irregular bone erosion at the articular surface of the AC joint and widening of the AC joint space on the affected shoulder. The signal intensity in the joint space, was at the same level as the muscle on the T1-weighted oblique coronal image, was high on the fat-suppressed oblique coronal proton density-weighted and the T2-weighted oblique sagittal images, and was not increased in the fat-suppressed oblique coronal Gd-enhanced T1-weighted image. Compared to the normal bone marrow of the humeral head, periarticular bone marrow and periarticular soft tissue, showed low signal intensity on the T1-weighted oblique coronal image, high intensity on the oblique coronal proton density-weighted image, heterogeneous low or high signal intensity on the T2-weighted oblique sagittal image, and heterogeneous high signal intensity on the fat-suppressed oblique sagittal Gd-enhanced T1-weighted image. Contrast enhancement was observed in the subacromial soft tissues including the periarticular soft tissue, but diffuse infiltration into the subacromial space was not identified. Contrast enhancement and thickening were observed in the subdeltoid bursa (Fig. 2). Fever continued even after the intravenous injection of ceftriaxone, third-generation

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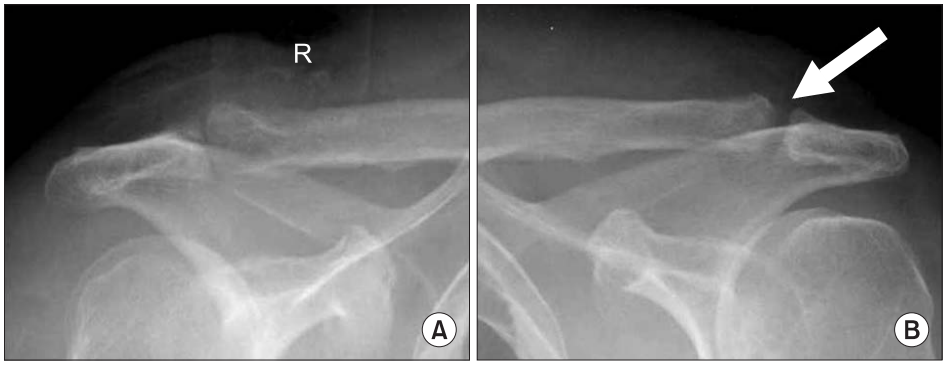

Fig. 1. Plain radiography of the right (A) and left (B) acromioclavicular (AC) joint. The left AC joint (B) shows joint space widening relative to unaffected right AC joint (A). The joint margin of the left AC joint shows periarticular bone erosions.

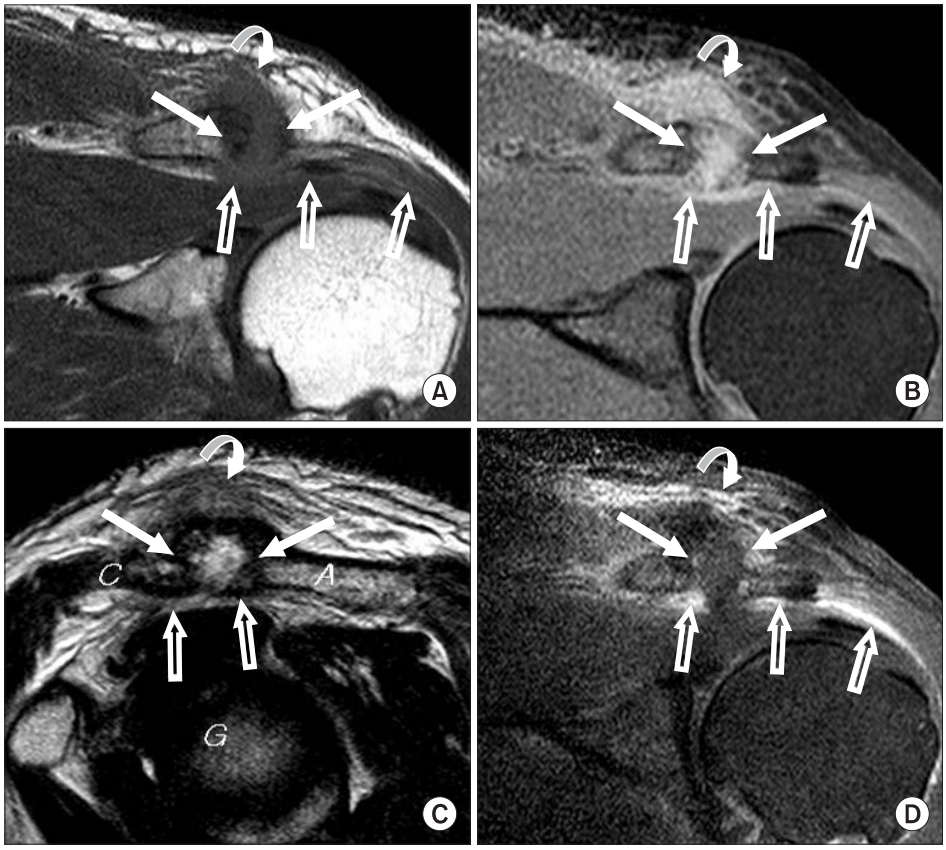

Fig. 2. MR images of the left shoulder. (A) T1-weighted image oblique coronal scan shows periarticular bone erosions and joint space widening of the acromioclavicular (AC) joint (arrows). The AC joint shows isosignal intensity relative to the muscle. Periarticular soft tissue shows low signal intensity relative to the adjacent normal fat tissue (curved arrow). The subacromial and subdeltoid space shows low signal intensity relative to the normal fat tissue (open arrows). (B) Fat suppressed proton density weighted image oblique coronal scan shows periarticular bone erosions and joint space widening of the AC joint (arrows). The AC joint shows high intensity relative to the muscle. Periarticular soft tissue shows high signal intensity relative to the adjacent normal fat tissue (curved arrow). The subacromial and subdeltoid space shows high signal intensity relative to the normal fat tissue (open arrows). (C) The T2-weighted image obique sagittal scan show periarticular bone erosions and widening of the AC joint space (arrows). The AC joint shows heterogenous high intensity relative to the muscle. The periarticular soft tissue shows high signal intensity relative to the adjacent normal fat tissue (curved arrow). The subacromial and subdeltoid space shows heterogenous low signal intensity relative to normal fat tissue (open arrows). (D) Fat suppressed Gd-enhancement T1-weighted image oblique coronal scan shows joint space widening (arrows). Periarticular bone marrow and periarticular soft tissue (curved arrow) shows heterogenous contrast enhancement. Subacromial-subdeltoid bursa shows diffuse thickening and contrast enhancement (open arrows). *A*: Acromion, *C*: Clavicle, *G*: Glenoid.

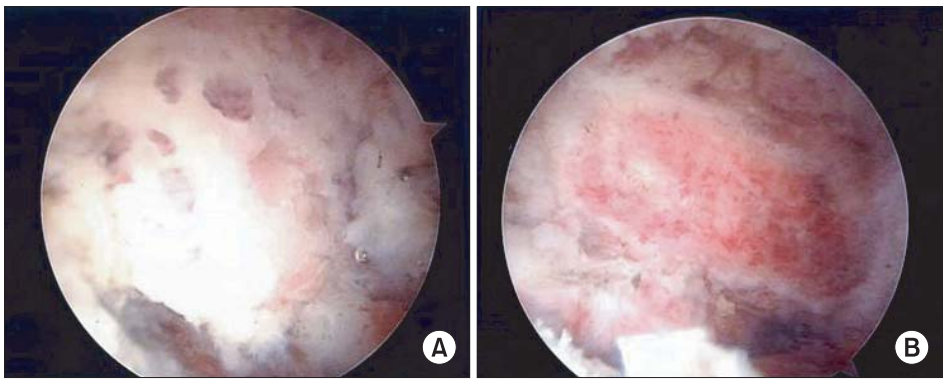

Fig. 3. Arthroscopic views show a multiple subchondral punched out bony lesion of the acromioclavicular joint (A) and postoperative findings of arthroscopic debridement and distal clavicle resection (B).

Fig. 4. There is no clavicle elevation of the left acromioclavicular joint on the 2 year follow-up X-ray after arthroscopic debridement and distal clavicle resection.

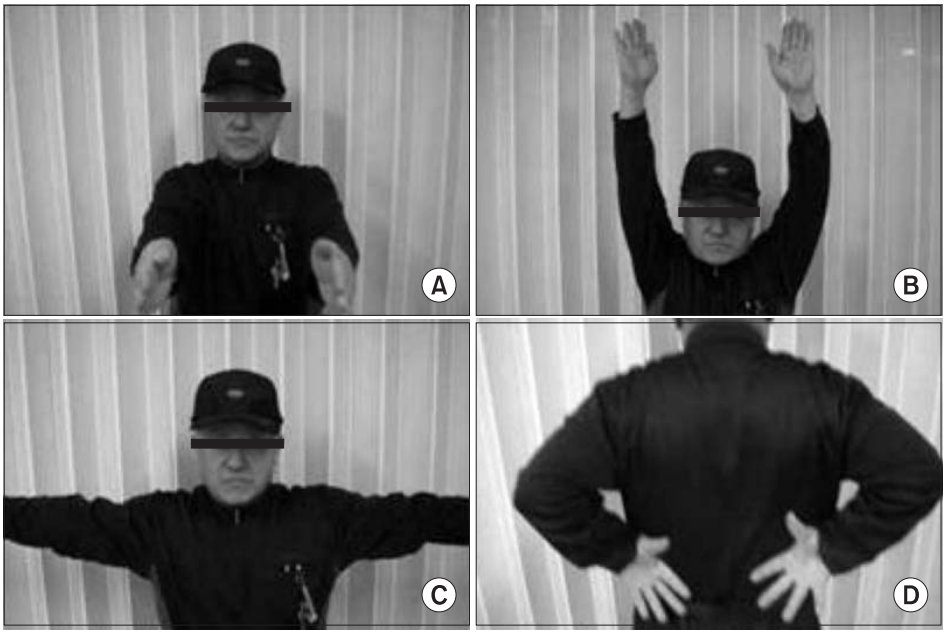

Fig. 5. The patient shows a good range of motion on the left shoulder at the 2 year follow-up.

cephalosporin, and the pain in the left shoulder was not improved with conservative treatments. The cause of the infection could not be identified in additional tests. On the 3rd day of admission, surgery was determined to be the treatment of choice, An arthroscopic examination revealed diffuse synovitis in the subacromial space, purulent fluid from the AC joint, severe erosion of the articular cartilage of the distal clavicle, exposure of the subchondral bone in various sites, and non-involvement of the subacromial space. Arthroscopic debridement and distal clavicle resection (5 mm) were performed (Fig. 3). The fever disappeared 2 days after surgery and staphylococcus aureus was detected in the bacterial culture. Intravenous antibiotic treatment was continued for 6 weeks under the diagnosis of acute osteomyelitis with bone erosion of the distal clavicle. The ESR and CRP fell to 37 and 21.3, respectively, at the 1st postoperative day and then to a normal level of 10 and 0.6, respectively, at the 3rd postoperative day. No clavicle elevation of the left AC joint was observed on the radiographs taken at the last follow-up (Fig. 4). The Constant-Murley shoulder score measured at the last follow-up examination, 2 years after surgery, was excellent (Fig. 5).

DISCUSSION

Septic arthritis is commonly found in immunodeficient patients and mostly involves the weight bearing joints of the lower limbs, particularly the knee joints.[5] Septic arthritis of the AC joint is rare with few case reports.[2-4] It is not easily distinguishable from septic arthritis of the glenohumeral joint with a clinical examination alone and should be differentiated from traumatic synovitis, phlegmon, acute rheumatoid fever, and acute osteomyelitis. In septic arthritis, the protease of leukocytes is released into the affected joint, which leads to cartilage destruction and irreversible joint injury within 48 hours.[6] When septic arthritis is suspected, thedifferential diagnosis should be made using a physical examination, plain radiography, and imaging modalities, such as ultrasound and, MR imaging and rapid bacterial identification through joint aspiration is important for a clinical diagnosis. However, joint aspiration of the AC joint is difficult to perform due to its anatomical characteristics. Chirag et al.[4] attempted joint aspiration in 3 out of 4 cases with septic arthritis of the AC joint and identified the causative bacteria in only 1 case. The joint fluid could not be obtained in 1 case, and the culture test result was negative in 1 case. Therefore, physical tests and other methods using imaging modalities, such as ultrasound and MR imaging can be essential for diagnosing the disease. Inflammatory diseases that involve the AC joint are degenerative arthritis, rheumatoid arthritis, tuberculous osteoarthritis, and calcium pyrophosphate dihydrate arthritis. Tuberculous arthritis can be differentiated from septic arthritis because a decrease in joint space distance occurs either at a moderate level and a slow pace or it is not visible on the radiographs.[7] Rheumatoid arthritis can be distinguishable in that the joint space distance increases and the distal clavicle becomes prominent affecting several joints as opposed to septic arthritis, which involves one joint. Degenerative arthritis can be characterized by a decrease in joint space distance, osteophyte formation, and eburnation of the joint surface. In calcium pyrophosphate dihydrate arthritis, calcium deposits build up in the joint space, the joint space decreases, and osteophyte formation occurs.[7] Radiographic evidence that fistinguishes acute septic arthritis from these includes periarticular soft tissue distension, rapid bone erosion, and changes in the joint space distance that increases due to joint effusion and bone erosion in the early stages and then decreases rapidly in later stages. An increase in the distance between the clavicle and the acromion caused by bone erosion was observed in the present patient (Fig. 1). According to Widman et al.,[8] septic arthritis of the AC joint can be diagnosed by ultrasound, which enables identification of joint distension. Some authors suggested that ≥ 3 mm of distance of the joint capsule from the bone could be an indication of joint arthritis, and septic arthritis should be ruled out if AC joint fluid is not observed by ultrasound. MR imaging was also described as a sensitive method for identifying inflammation of the periarticular soft tissues and joint fluid, and can detect bacterial arthritis of a small joint early.[9] Streptococcus is the most common causative organism in the AC joint and staphylococcus aureus and cryptococcus neoformans have also been reported.[2] Septic arthritis of the AC joint can be treated using conservative methods if fever and pain improve with antibiotics administered either before or after the bacterial culture. However, joint irrigation and surgical interventions involving invasive debridement and distal clavicle resection should be taken as treatment options when antibiotic treatment is ineffective, the fever and pain continue, and bone erosion and signs of osteomyelitis are observed on the imaging studies.[4] The present patient had suffered from long-term diabetes mellitus and had no history of prior invasive treatments. Therefore, the septic arthritis of the AC joint eas attributed to hematogenous osteomyelitis of the distal clavicle. It was believed that arthroscopic debridement and a distal clavicle resection

would result in low morbidity compared to invasive surgical methods, which have been associated with complications and a long surgery time.

Septic arthritis of the AC joint should be considered as part of a differential diagnosis in patients presenting with fever, severe pain in the shoulder, and a limitation of movement. Arthroscopic debridement and distal clavicle resection should be considered as a treatment option for septic arthritis of the AC joint.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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