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CASE REPORT

Ultrasound-guided intra-articular corticosteroid injection in a patient with manubriosternal joint involvement of ankylosing spondylitis: A case report

Min-Hee Choi, In-Young Yoon, Won-Joong Kim

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Abstract

BACKGROUND

Manubriosternal joint (MSJ) disease is a rare cause of anterior chest pain but can be a major sign of systemic arthritic involvement. In patients with ankylosing spondylitis (AS), a type of systemic arthritis, chest pain can be due to MSJ involvement and can be improved by ultrasound-guided corticosteroid injection into the joint.

CASE SUMMARY

A 64-year-old man visited our pain clinic complaining of anterior chest pain. There were no abnormal findings on lateral sternum X-ray, but arthritic changes in the MSJ were observed on single-photon emission computed tomography-computed tomography. We performed additional laboratory tests, and he was finally diagnosed with AS. For pain relief, we performed ultrasound-guided intra-articular (IA) corticosteroid injections into the MSJ. After the injections, his pain nearly resolved.

CONCLUSION

For patients complaining of anterior chest pain, AS should be considered, and single-photon emission computed tomography-computed tomography can be helpful in diagnosis. In addition, ultrasound-guided IA corticosteroid injections may be effective for pain relief.

Key Words: Ankylosing spondylitis; Anterior chest pain; Manubriosternal joint; Single-photon emission computed tomography-computed tomography; Case report

Core Tip: Manubriosternal joint (MSJ) disease is a rare cause of anterior chest pain but can be a major sign of systemic arthritic involvement. In patients with anterior chest pain, systemic arthritic diseases such as ankylosing spondylitis should be considered but are difficult to diagnose. This report suggests that single-photon emission computed tomography-computed tomography can be an effective diagnostic tool for evaluating musculoskeletal causes of anterior chest pain, and this pain can be controlled by ultrasound-guided intra-articular corticosteroid injections into the MSJ.

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INTRODUCTION

Manubriosternal joint (MSJ) disease is an often undetected cause of anterior chest pain[1]. Diagnosis is difficult as it is based on exclusion of other causes[2]. Many diagnostic tools can be used to identify diseases that cause anterior chest pain. Particularly, single-photon emission computed tomography-computed tomography (SPECT-CT) can be helpful in differentiating the diagnosis due to musculoskeletal disorders such as arthritis.

Infection, trauma, crystal deposition disease, and inflammatory diseases such as ankylosing spondylitis (AS) and rheumatic arthritis (RA) can cause arthritis of the MSJ[3]. Although these diseases are often accompanied by systemic symptoms, in rare cases intermittent MSJ arthralgia can be a major sign of arthritic involvement.

We report a case in which a patient with anterior chest pain as the main symptom was diagnosed with AS through SPECT-CT, and the pain was relieved by ultrasound-guided intra-articular (IA) corticosteroid injections.

CASE PRESENTATION

Chief complaints

A 64-year-old man (180 cm, 81 kg) visited our pain clinic with intermittent anterior chest pain lasting 6 mo.

History of present illness

The patient's chest pain worsened when he engaged in exercises like pull-ups or changed position. This pain affected his ability to work and perform activities of daily living. He also had mild back pain, but it did not interfere with his daily activities and did not require treatment.

History of past illness

The patient had no history of trauma to his anterior chest. His symptoms worsened 3 mo prior to his visit, based on which an orthopedic doctor prescribed non-steroidal anti-inflammatory drugs (NSAIDs) and injected corticosteroids into the painful area. However, the pain did not improve.

Personal and family history

The patient had no family or personal history related to the symptom.

Physical examination

On physical examination, there was tenderness in the left anterior chest wall but no swelling or heat sensation. There was no back tenderness.

Laboratory examinations

Blood tests including complete blood count, inflammatory markers (C-reactive protein, erythrocyte sedimentation rate), blood biochemistry, and coagulation indices were within the normal ranges.

Imaging examinations

There were no abnormal findings on lateral sternum X-ray (Figure 1), but arthritic changes in the MSJ were observed on SPECT-CT (Figure 2). In bone scintigraphy, there was no active inflammation in the

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Figure 1 Lateral sternum X-ray. The X-ray showed normal findings.

sacroiliac joint (SIJ).

Further diagnostic workup

Rheumatoid factor, anti-cyclic citrullinated peptide antibody, uric acid, fluorescent anti-nuclear antibody, and human leukocyte antigen-B27 tests were performed, and human leukocyte antigen-B27 was positive. SIJ pain provocation tests (distraction, thigh thrust, compression, Patrick, and Gaenslen) and the Schober test were negative. X-rays of the lumbar spine and SIJ showed syndesmophytes and sacroiliitis (Figure 3). Subsequent magnetic resonance imaging (MRI) of the SIJ revealed bilateral sacroiliitis with active inflammation at the left SIJ (Figure 4).

FINAL DIAGNOSIS

According to the modified New York Classification Criteria, the patient was diagnosed with AS.

TREATMENT

Before visiting our clinic, the patient received NSAIDs and local corticosteroid injections, but the pain did not improve significantly. Therefore, we performed ultrasound-guided IA corticosteroid injections into the MSJ. In the supine position, we prepared the skin of the anterior chest wall aseptically. Then, a 12-Hz linear transducer ultrasound probe was placed parallel to the midsternum to identify the MSJ[4]. We inserted a 25 G needle using ultrasound guidance and injected 1 mL of 0.375% ropivacaine and 2.5 mg dexamethasone into the MSJ (Figure 5). With IA corticosteroid injection, we prescribed NSAIDs.

OUTCOME AND FOLLOW-UP

After 1 wk of treatment, the pain was significantly relieved, decreasing from Numeric Rating Scale (NRS) 6 to NRS 3. Because the pain persisted after the injection, although it was relieved significantly, we performed another ultrasound-guided IA corticosteroid injection. Two weeks after the second injection, his symptoms improved from NRS 3 to NRS 2. However, the patient continued to experience discomfort in his anterior chest and requested an additional injection. Two weeks after this third injection, his pain had nearly resolved, and the patient did not revisit after the final injection. During follow-up, we recommended continuing the prescribed medication.

DISCUSSION

This case report is an account of a patient who complained of localized pain in the anterior chest and was diagnosed with AS on SPECT-CT. He experienced effective pain reduction after ultrasound-guided

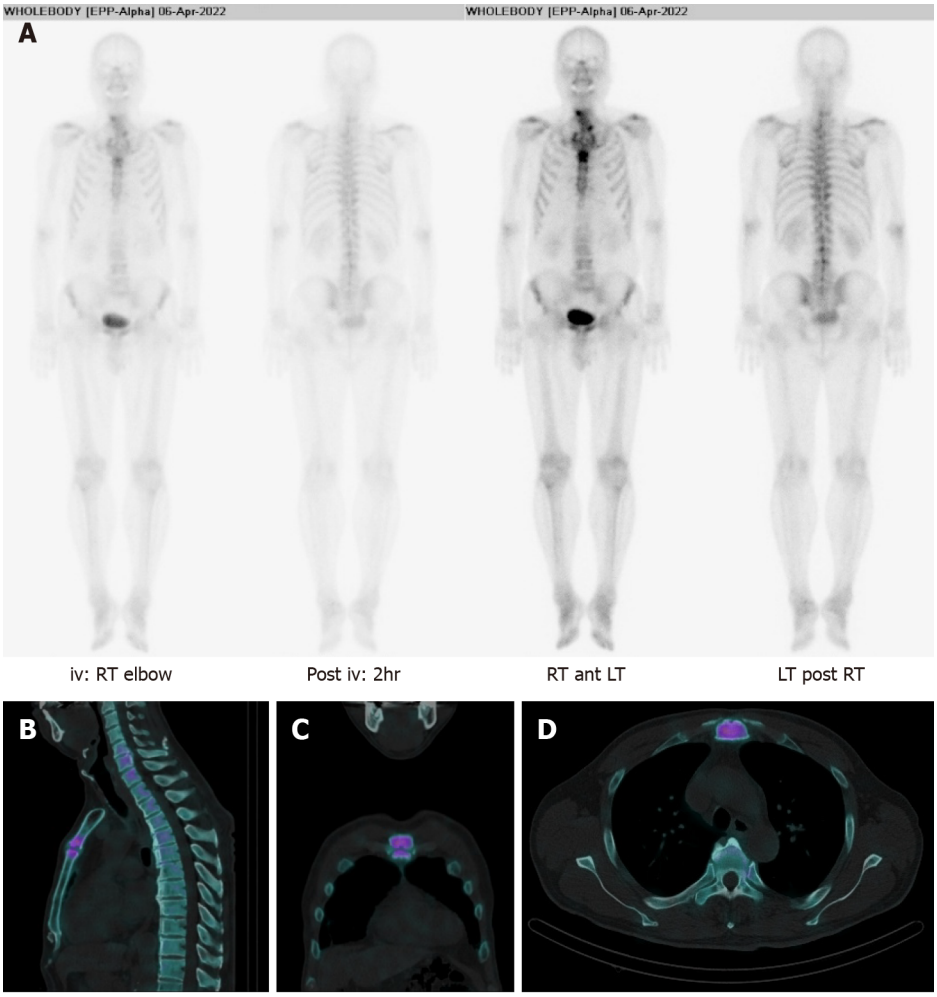

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Figure 2 Bone scintigraphy and single-photon emission computed tomography-computed tomography of the manubriosternal joint. A: Bone scintigraphy; B: Sagittal; C: Coronal; D: Axial images of single-photon emission computed tomography-computed tomography indicated arthritic change in the manubriosternal joint. iv: Intravenous; RT: Right; LT: Left.

IA corticosteroid injections.

It is important to identify life-threatening diseases in a patient with chest pain, although such pain is benign in approximately 80% of cases, of which musculoskeletal chest pain accounts for almost 50%[5-8]. Musculoskeletal chest pain can be caused by a variety of factors, grouped into three categories of isolated musculoskeletal pain, rheumatic diseases, and non-rheumatic systemic causes. Even though critical causes of anterior chest pain might be ruled out, various diseases should be considered for differential diagnosis of benign anterior chest pain, such as costochondritis, Tietze syndrome (isolated musculoskeletal pain), fibromyalgia, RA, AS, septic arthritis, psoriatic arthritis (rheumatic disease), neoplasm, and osteoporotic fracture (non-rheumatic system causes)[9]. An MSJ problem is a possible cause of benign chest pains.

The MSJ is a complex joint between the manubrium and the body of the sternum[1]. This secondary cartilaginous joint (symphysis) may resemble a synovial joint susceptible to osteoarthritic degeneration, as 30% of patients undergo fibrocartilage disk absorption. Primary MSJ osteoarthritis (OA) has no identifiable etiology; secondary OA results from RA, AS, psoriatic arthritis, or gout[10]. In most cases, MSJ arthralgia due to secondary MSJ OA is accompanied by systemic symptoms, but it can be the main sign of systemic arthritis[11,12]. Our patient did not complain of systemic symptoms including back pain but only of anterior chest pain. Therefore, evaluation for systemic diseases should be considered when a patient complains of MSJ arthralgia even if there are no other symptoms.

AS is a systemic disease that can cause secondary OA of the MSJ and is a chronic inflammatory disease that mainly affects axial joints[13]. Baek *et al*[14] reported clinical features of AS in Korean patients, and chronic back pain was a presenting symptom in approximately 75% of AS patients. The most frequently affected extraspinal joints in AS are the hips and shoulders and are involved at presentation in up to 15% of cases. Other peripheral joint involvement presents in 10%-20% of patients. The proportion of patients with enthesis involvement at disease onset is about 1.5%[14]. The most characteristic clinical symptom of AS is inflammatory back pain. Pain and stiffness in the mid-thoracic

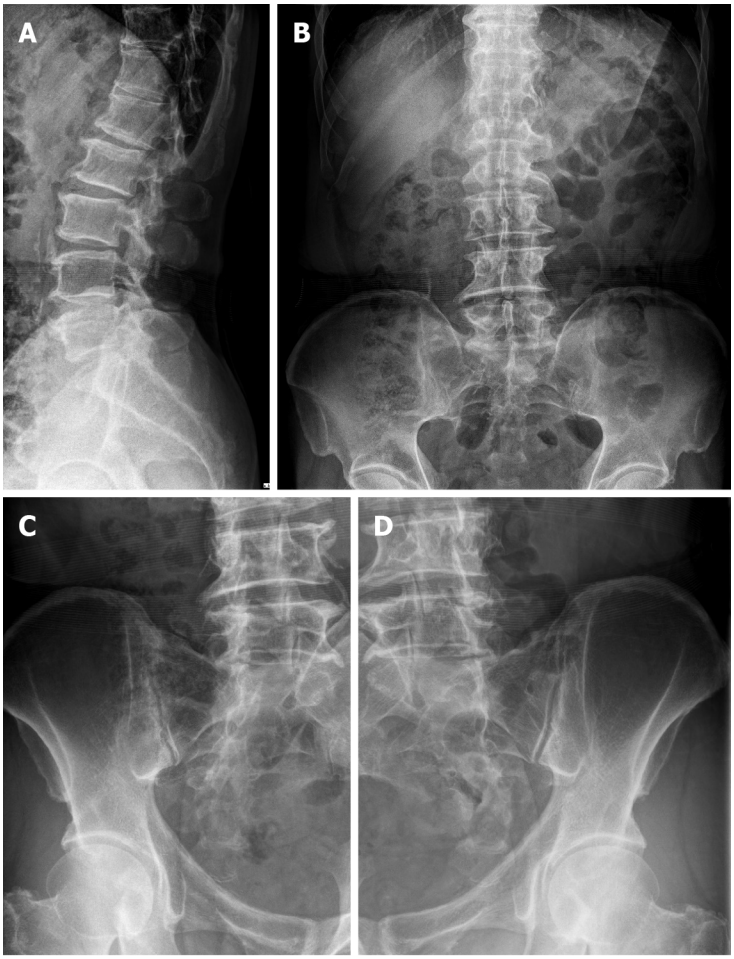

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Figure 3 X-rays of the lumbar spine and sacroiliac joints. A and B: Syndesmophytes and degenerative spondylosis were shown; A: Lateral view; B: Anterior posterior (AP) view of the lumbar spine; C and D: Bilateral sacroiliitis was found; C: AP view of the left sacroiliac joint; D: AP view of right sacroiliitis.

or cervical region may be the initial symptom instead of the more common presentations of AS[15]. On the other hand, MSJ causing anterior chest pain is a rare presenting symptom[12,16]. In a retrospective study performed in 275 patients with spondyloarthritis, 37% experienced spondyloarthritis-associated chest pain[17]. However, anterior chest wall pain as the presenting symptom occurred in only 4%-6% of cases[18]. For this reason, it is difficult to suspect AS in patients with anterior chest pain, and diagnosis of AS can be delayed in patients with anterior chest pain.

The diagnosis of AS is based on radiologic evidence of sacroiliitis. Therefore, it may be essential to evaluate SIJ in patients with AS. Various physical examination tests have been advocated as diagnostic aids in patient with SIJ problems; however, reliability of SIJ provocation tests have been questioned[19,20]. Although the patient in this case had no symptom related to SIJ and SIJ provocation tests were negative, bilateral sacroiliitis was observed on MRI. Hence, if AS is suspected, imaging of SIJ should be performed even if there is no abnormality on physical examinations.

SPECT-CT offers functional information about increased bone turnover in combination with morphological details[21]. The modality can detect not only metastatic lesions but also benign lesions such as infective, inflammatory, or traumatic bony lesions[22]. The evidence base for the role of SPECT-CT in benign musculoskeletal pathology is emerging, and several studies have revealed the clinical significance of SPECT-CT in the diagnosis of benign musculoskeletal disease[23]. Some prospective studies suggested the usefulness of SPECT-CT as a diagnostic tool for benign musculoskeletal diseases [24,25]. In the present case, SPECT-CT revealed inflammatory arthritic change in the MSJ, although a simple X-ray showed normal findings. Likewise, in a patient complaining of pain in the focal area that is not easily determined with simple X-ray or other general imaging tests, SPECT-CT can be used as a diagnostic method. Since there are many structures in the thorax that can produce musculoskeletal pain such as the costoverterbral, sternocostal, costochondral, and MSJs, it is difficult to identify an exact lesion in the thorax. Considering this, SPECT-CT can be useful in locating the precise lesion in patients with musculoskeletal chest pain.

Oye *et al*[12] suggested anterior chest pain due to MSJ involvement as a presenting symptom of AS and MRI as a valuable diagnostic tool. MRI has been increasingly used as an imaging modality in

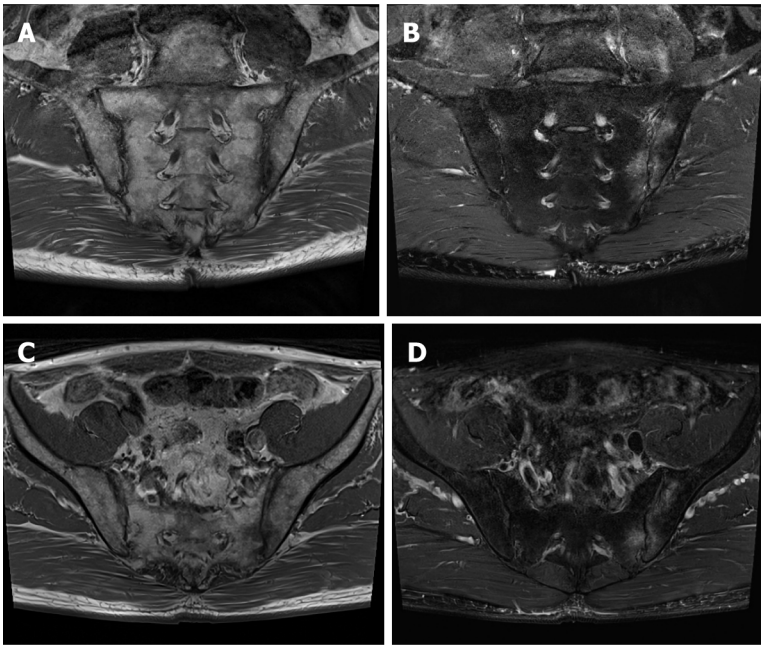

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Figure 4 Magnetic resonance imaging scans of sacroiliac joints showed bilateral sacroiliitis with active inflammation at the left sacroiliac joint. A: T1-weighted image of sacroiliac joints, coronal view; B: T2-weighted image of sacroiliac joints, coronal view; C: T1-weighted image of sacroiliac joints, axial view; D: T2-weighted image of sacroiliac joints, axial view.

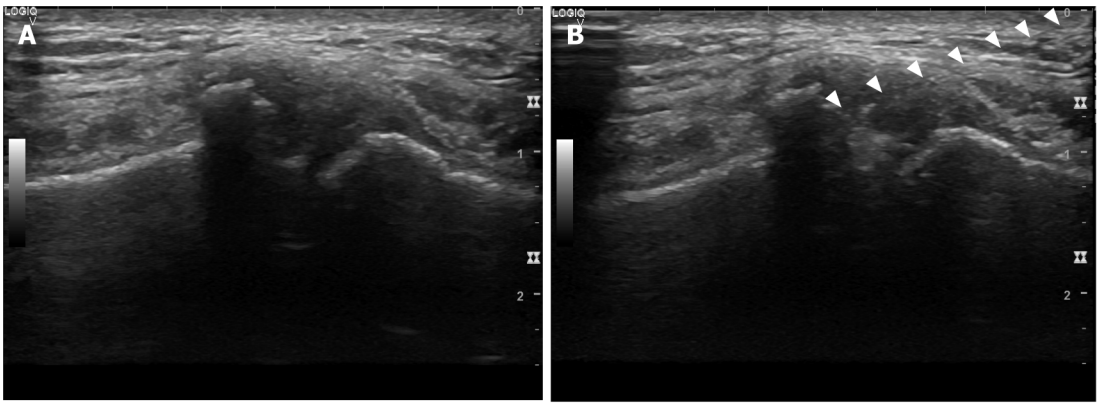

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Figure 5 Ultrasound view of the manubriosternal joint. A: Manubriosternal joint view with a 12-Hz linear probe parallel to the midsternum; B: Ultrasound-guided intra-articular corticosteroid injection into the manubriosternal joint. Arrowheads: Points at needle.

patients with AS because of its capacity to identify both active inflammation and chronic structural changes in axial skeletal structures[26]. However, in patients with claustrophobia, pacemakers, or metal implant, use of MRI is limited[27]. SPECT-CT can be an alternative to MRI in these cases.

Systemic drugs like NSAIDs are the primary treatment of AS, but IA corticosteroid injections into the painful joint often satisfactorily ameliorate acute inflammatory pain[28]. Since the MSJ is a narrow space and it can be difficult to inject a corticosteroid, IA corticosteroid injection into the joint space can be performed more easily and accurately using ultrasound guidance. Therefore, in systemic diseases like AS, when symptoms are limited to specific joints, ultrasound-guided IA corticosteroid injections may be effective for pain relief.

CONCLUSION

Inflammatory arthritis including AS should be considered in patients complaining of anterior chest pain, and SPECT-CT can be helpful in differential diagnosis. Ultrasound-guided IA corticosteroid injections may be an effective treatment option.

FOOTNOTES

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