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Transient sternoclavicular joint arthropathy, a self-limited disease

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Background: The sternoclavicular joint (SCJ) is a true diarthrodial synovial joint and therefore vulnerable to the same disease processes as in other synovial joints. We identified a group of patients with monarticular arthritis of the SCJ that had a benign process and a self-limited disease course.

Methods: This retrospective study included 25 female patients who presented with pain or swelling of the SCJ between January 2000 and December 2010. Their mean age was 59 years, and the average follow-up was 44 months. All patients underwent baseline radiographic imaging, technetium bone scan, computed tomography, and magnetic resonance imaging. Blood profiles were negative for rheumatoid factor in all patients. Functional outcome was assessed with the Rockwood SCJ score.

Results: The patients presented with complaints of pain (72%), local swelling (88%), and redness (8%) that progressed during 4 weeks. The physical examination revealed tenderness (84%), swelling (88%), and limited range of motion (16%). These findings persisted for a median of 5 months. Plain radiographs showed arthritic changes in 5 patients (20%). Increased uptake was observed in all 9 patients who underwent a bone scan. Soft tissue swelling was demonstrated on computed tomography in 5 patients (20%) and on magnetic resonance imaging in 5 patients (20%). One patient had osteoarthritic changes on magnetic resonance imaging. Pain resolved spontaneously in all patients, leaving only swelling in 9 patients and tenderness in 1 patient.

Conclusion: Our experience is that SCJ arthropathy may often be a self-limited disease. After being treated solely with nonsteroidal anti-inflammatory medication, 24 of the 25 study patients showed complete regression of pain and return to full function without recurrence of symptoms. Basic blood tests and radiographs are sufficient to rule out a septic joint.

Level of evidence: Level IV, Case Series, Treatment Study.

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Keywords: Sternoclavicular joint; arthralgia; inflammation; magnetic resonance imaging; osteoarthritis

The sternoclavicular joint (SCJ) is a true diarthrodial synovial joint that is vulnerable to the same disease processes as in other synovial joints.[7] Arthritis of the SCJ is its most common nontraumatic disease.[9] The most frequent types of arthritic illnesses include post-traumatic, septic, inflammatory seropositive (rheumatoid arthritis), seronegative (ankylosing spondylitis, Reiter syndrome, colitic, and psoriatic), and crystal (gout, pseudogout). Other less common SCJ-specific arthritides include Friedrich disease, condensing osteitis, SAPHO (synovitis, acne, pustulosis,

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hyperostosis, and osteitis), and palmoplantar pustulosis. Neoplasms involving the SCJ include primary tumors, such as Ewing sarcoma, and secondary neoplasm, such as squamous cell carcinoma and adenocarcinoma.

The SCJ lies in a subcutaneous position; therefore, a painful and swollen joint nearly always results in restricted range of motion and is already apparent at an early stage of disease. Isolated pain and an increased mass on the upper chest are often the presenting symptoms of patients. Conventional radiographs (anteroposterior and serendipity views) may show joint narrowing, subchondral sclerosis, osteophytes, narrowing of the joint space, and surrounding tissue calcification.[3] Computed tomography (CT) may detect disease processes that cause bone destruction. Magnetic resonance imaging (MRI) gives better resolution of inflammatory soft tissue enlargement. An isotope scan is useful in detecting remote foci of inflammation.

Laboratory blood tests include general inflammatory markers (white blood cell count, erythrocyte sedimentation rate, and C-reactive protein level), rheumatoid factor and antinuclear antibody levels, and tissue antigen tests for HLA-B27. These test results are expected to be normal in osteoarthritis. First-line treatment of SCJ osteoarthritis consists of conservative treatment with nonsteroidal anti-inflammatory drugs and rest, second-line treatment consists of intra-articular corticosteroid injection, and third-line treatment consists of excision arthroplasty of the medial clavicle.

We identified a group of 25 patients with monarticular arthritis of the SCJ that had a benign process with a self-limited disease course. In this study, we describe our therapeutic management of these patients.

Materials and methods

This is a retrospective case series study conducted between January 2000 and December 2010. A total of 25 women with symptoms of pain and swelling of the SCJ were identified from the departmental database. These patients were followed up for an average of 44 months (range, 12-118 months). Their mean age was 59 years (range, 50-71 years). The right side was affected in 19 patients, the left side in 5 patients, and both sides in 1 patient. All patients were referred to our medical center and seen at the outpatient clinic. Patients with a history of injury to the site were excluded. We used the patient's subjective recollection of the pain and swelling to establish the time of onset of the disease process. All patients gave a detailed history pertaining to arthritis, infectious disease, prior trauma, skin manifestations (e.g., acne, pustulosis), family history of arthritis, and drug use. Physical examinations were performed to rule out signs of palmar and plantar pustulosis, acne or infection typical of palmoplantar pustulosis, SAPHO syndrome, and septic arthritis.

All study patients underwent blood tests and plain radiography; 9 of them also underwent technetium bone scans, 6 had CT scans, and 10 had MRI studies, all of which were evaluated at the time of the first consultation. The plain radiographs were used to assess gross arthritic changes in the SCJ. The technetium bone scan was used to assess the local uptake around the SCJ and to rule out additional skeletal uptake typical of systemic disease, such as polyarthritis, multiple myeloma, and metastatic bone disease. CT and MRI studies were used to image the extent of the soft tissue involvement and the articular damage as well as to rule out bone tumors. Blood samples were assessed for rheumatoid factor, C-reactive protein level, erythrocyte sedimentation rate, and complete blood count. At the last examination, the Rockwood SCJ score was used to assess functional outcome.[9] The scale rates 5 categories on a scale of 0 to 3, the highest score being 15. The categories are pain, range of motion, strength, limitation, and subjective result. The final score is a combination of subjective and objective assessment criteria.

Transient arthropathy was defined when imaging studies ruled out the presence of lesions and when the symptoms resolved with conservative treatment.

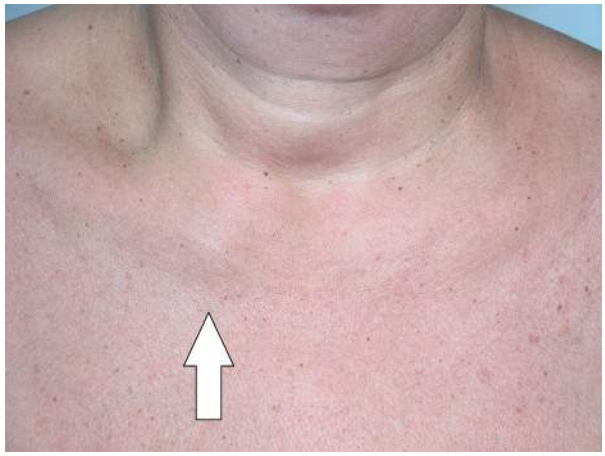

Figure 1 A 57-year-old woman presented with swelling and pain over the right sternoclavicular joint. The pain and swelling increased during 4 weeks and persisted for an additional 2 months. She was treated conservatively with anti-inflammatory medication and the symptoms resolved. She has since been observed for 4 years without recurrence.

Results

The presenting complaint was swelling (Fig. 1) in 22 patients (88%), pain in 18 patients (72%), and local redness in 2 patients (8%) (Table I). The onset of symptoms was characterized by a progressively growing mass over the affected SCJ during a median of 4 weeks (range, 1 to 16 weeks). On clinical examination, 22 patients (88%) had swelling of the SCJ area, 21 (84%) had tenderness over the SCJ, 4 (16%) had a limited shoulder range of motion on the affected side, and 2 (8%) had local redness. All patients underwent blood tests for infection (white blood cell count, erythrocyte sedimentation rate, C-reactive protein level) or rheumatoid arthritis (rheumatoid factor), and the results were negative. They also underwent radiographic studies, in which only 5 showed arthritic changes. Of the 6 patients

Table I Demographics of 25 patients with sternoclavicular joint arthropathy

	Patients
Gender	
Female	25
Age	59 years (51-70 years)
Side	
Right	19
Left	5
Bilateral	1
Presenting symptoms	
Pain	18
Swelling	22
Redness	2
Clinical signs	
Tenderness	21
Swelling	22
Redness	2
Limitation of range of motion	4
Palmoplantar pustulosis	0

who underwent a CT scan, 5 had joint narrowing, sclerosis, and subchondral cysts (Fig. 2). The results of 5 of the 10 patients who underwent MRI studies demonstrated synovial and soft tissue swelling and excessive synovial fluid (Figs. 3 and 4), and 1 patient had osteoarthritic changes. All 9 patients who underwent a technetium bone scan had increased uptake limited solely to the SCJ site. One patient had an incidental finding of SCJ arthritis on a bone scan.

All 25 study patients were treated with COX-2 inhibitors with good response. None needed local steroid injection or surgery. Neither open biopsy nor fine-needle aspiration was required. The extent of swelling and pain worsened during the first 4 weeks, after which the levels reached a plateau. Those symptoms persisted (without progression of the swelling) for a median of 5.6 months (range, 2 to 72 months; Std = 3.94; 95% CI, 54.27, 57.73). The outcomes at the final examination are presented in Table II. Only 1 of the 25 patients (4%) had SCJ tenderness and 9 (36%) had local swelling. None of the patients had residual limitation of range of motion or local redness. None had recurrence of symptoms. The final diagnosis for all 25 study patients was transient arthropathy of the SCJ.

Discussion

We preferred the term *transient arthropathy* because the SCJ does not sustain mechanically degenerating loads and because all of our study cases presented a single flare-up episode that did not recur within the follow-up period (average, 44 months). The superficial location of the SCJ makes the clinical onset of swelling and localized joint tenderness easy to establish. The initial phase may be dramatic, with marked painful soft tissue swelling

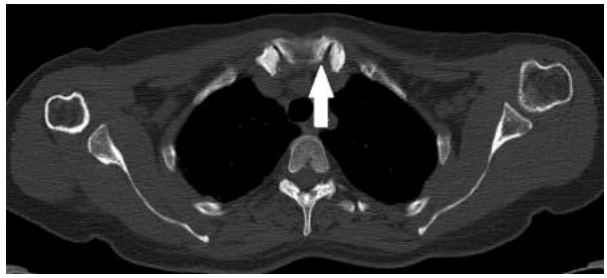

Figure 2 Computed tomography scan of a 53-year-old woman who presented with pain and swelling over the left sternoclavicular joint. Right and left axial cuts demonstrate narrowing and sclerosis of the joint's articular surfaces. Small erosions can be seen at the left clavicular articular surface of the joint.

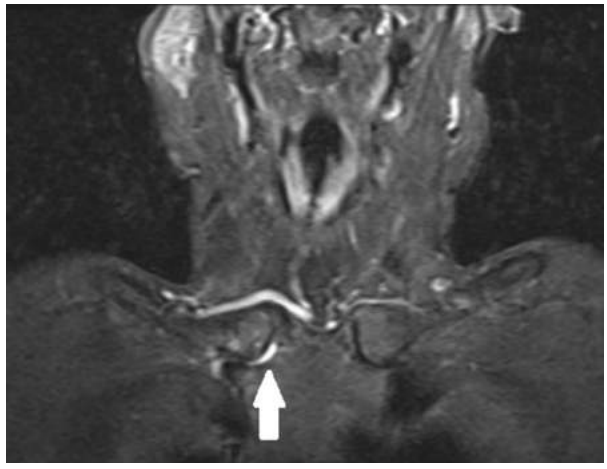

Figure 3 Magnetic resonance image of a 58-year-old woman with pain and swelling over the right sternoclavicular joint. Coronal T2 imaging with fat suppression demonstrates a small joint effusion at the right joint with a thickened capsule. A small cortical erosion can be seen at the inferior clavicular articular surface without adjacent bone marrow edema.

appearing as a spurious lesion. The initial progressive phase lasted 4 weeks among the patients in our cohort. This is mainly a subjective measure of the pain and tenderness caused by the disease process. After several weeks, those symptoms plateaued and slowly diminished, eventually leaving some residual soft tissue swelling. Initial imaging studies and laboratory tests were useful in ruling out other possible diagnoses. Routine clinical follow-up was useful for monitoring the course of the disease process.

The differential diagnosis of SCJ swelling can be divided into 5 major groups: infectious, crystal, inflammatory, osteoarthritis,[8] and SCJ-specific disease. Infectious conditions, such as septic arthritis, osteomyelitis, and chronic recurrent multifocal osteomyelitis, were ruled out by normal values of C-reactive protein, erythrocyte sedimentation rate, and white blood cell count in peripheral blood. SCJ-specific diseases, including Friedrich disease (osteonecrosis of the medial clavicle with cystic changes), condensing osteitis (expansion of the medial clavicle and

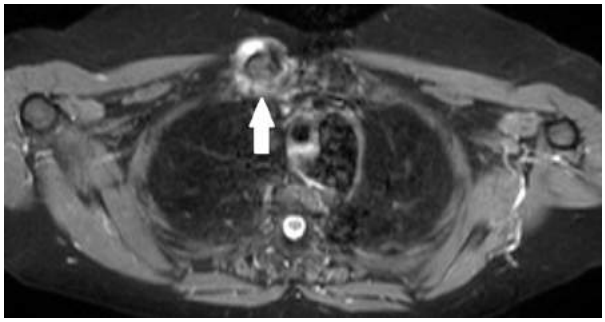

Figure 4 Axial fat-suppressed T2 image demonstrates a significant amount of fluid surrounding the right sternoclavicular joint with irregularity of the articular surfaces suggestive of erosive arthritis.

Table II Final outcome of 25 patients with sternoclavicular joint arthropathy

	Patients
Final examination	
Tenderness	1
Swelling	9
Redness	0
Limitation of range of motion	0
	Score
Median Rockwood outcome score	
Pain score (0-3)	2.7
Range of motion score (0-3)	3
Strength score (0-3)	3
Limitation score (0-3)	3
Subjective result	2.8
Final score	14.6

The pain score and the subjective results ranged between 2 and 3.

medullary canal obliteration), and SAPHO syndrome (synovitis, acne, pustulosis, hyperostosis, and osteitis), were ruled out by CT, MRI, and bone scan imaging studies. Inflammatory and crystal arthropathies were only partially ruled out because the SCJ was not aspirated. One case of an atraumatic SCJ arthropathy that was not inflammatory or infectious (i.e., no fever, normal acute-phase reactant levels, nonrecurrent) was diagnosed as SCJ swelling by exclusion. The imaging findings that often include a positive bone scan and soft tissue swelling and only sometimes include degenerative joint changes on plain radiography and CT are typical, even in painless SCJ arthrosis.[2,3] This subgroup of conditions is frequently labeled osteoarthritis in the literature,[1,2,8] but our results lead us to believe that transient arthropathy better describes them.

SCJ swelling with tenderness is not an uncommon complaint. Pain is often elicited by forward flexion or abduction of the glenohumeral joint above 90°. Only 4 of our patients (16%) were initially limited in their range of motion, and they all returned to full range of motion without surgical intervention. The average Rockwood SCJ score, which gives a measure of pain and function, was 14.6 (maximum score, 15) at the end of follow-up, showing a full functional recovery.

None of the patients underwent local biopsy. Neoplasms around the SCJ are exceedingly rare. Ewing sarcoma is an example of a primary neoplasm; metastatic bone disease, such as adenocarcinoma and squamous cell carcinoma, is an example of a secondary neoplasm.[11] Imaging studies often clarify the picture regarding the likelihood of neoplasm, SCJ-specific disease, and inflammatory disease. The next stage in the patient's workup after imaging studies is often ultrasound-guided joint fluid fine-needle aspiration or medial clavicle core needle biopsy as indicated.[8] We deferred local biopsy because all imaging studies and blood test results were negative. After watchful waiting, the SCJ disease process regressed, and there were no recurrences, thus precluding the need for late biopsy. This protocol took into account the fact that ultrasound-guided SCJ biopsy is painful and carries with it a small risk of iatrogenic injury and should therefore be performed only when necessary.

Treatment of transient SCJ arthropathy is often noninvasive and includes rest and anti-inflammatory medications. Nonresponsive cases may be treated with intra-articular corticosteroid injection. Resistant cases may be treated with surgical resection of the medial clavicle or reconstruction.[4-6,10,11] This study draws attention to a considerable number of patients for whom conservative treatment is warranted because they were all pain free after 12 months and none had recurrence of symptoms.

Our cohort included individuals who were referred to our medical center, and all of them were women. Of the 22 patients reported by Sadri and Swann, 20 were also middle-aged women who were diagnosed as having anterior SCJ dislocation without injury history.[12] Those authors diagnosed the problem as anterior SCJ dislocation, but the clinical description, a lump at the root of the neck, is similar to the symptoms of our patient group.

The limitations of this study are that it is retrospective and focuses only on 1 subgroup of patients with transient arthropathy of the SCJ. Moreover, we could not provide information on its prevalence. A longer follow-up is needed to validate that this is not a recurring process. Because SCJ biopsy was not performed, we cannot fully rule out cases of crystal arthropathy and septic arthritis. The symptoms of pain regressed spontaneously in all of our study patients, but we are aware that there are probably patients with long-standing symptoms that can be relieved only by surgical intervention.

Conclusion

Transient SCJ arthropathy may often be a self-limited disease that can be effectively treated solely by the administration of nonsteroidal anti-inflammatory drugs. All of our patients showed complete regression of pain

and returned to full function without recurrence of symptoms. We therefore recommend basic blood tests and conventional radiographs to rule out a septic joint and conservative treatment.

Disclaimer

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