Sternoclavicular joint septic arthritis in a previously healthy adult
Artrite séptica da articulação esterno clavicular em um adulto previamente saudável

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ABSTRACT
Sternoclavicular joint infection is a rare condition that usually occurs in patients with predisposing factors. There are few cases of spontaneous septic arthritis of the sternoclavicular joint in healthy adults reported in the medical literature. Diagnosis may be difficult since sternoclavicular pain may be referred to distant sites and depends on specialized radiological studies. It is presented the case of a 45-year old, previously healthy male, with sternoclavicular septic arthritis due to Staphylococcus aureus diagnosed by computed tomography of the sternoclavicular joint region and blood cultures.

Keywords: Sternoclavicular joint; Arthritis, infectious; Staphylococcus aureus; Bacteremia; Case reports

INTRODUCTION
Spontaneous sternoclavicular joint (SCJ) infection is an unusual clinical entity, rarely seen in healthy individuals(1). SCJ infection has mainly been described in patients with predisposing risk factors including intravenous drug abuse, use of subclavian vein catheters, diabetes mellitus and rheumatoid arthritis(2).

Diagnosis of SCJ infection may be difficult to determine, during the early stages of the disease, since a high level of awareness and suspicion is required(2) as well as targeted image studies.

Here it is reported a case of SCJ septic arthritis in a previously healthy patient with no risk factors for infection in this site.

CASE REPORT
A previously healthy, 45-year old, male lawyer, presented with pain on the right side of the neck and supraclavicular region which radiated toward the right ear and shoulder.

The pain began abruptly one week before and the patient was treated at an emergency unit on two occasions, where he was given anti-inflammatory drugs and tramadol, which did not relieve the pain.

He did not report fever, chills, local trauma and the use of illicit drugs. He reported an old trauma on his right hallux with subsequent local infra-ungueal callosity, prone to minor local traumas.

Physical examination revealed a healthy individual in distress due to the intensity of the pain. He was non-febrile and presented severe tenderness during palpation on the right side of the neck, supraclavicular region and proximal clavicular extremity, with swelling and tenderness over the right SCJ. Right shoulder and arm movements were normal, there were no enlarged lymph nodes and the carotid pulse was normal. Redness was observed around the right hallux callosity. The remainder of the physical examination was normal.

A computed tomography (CT) scan showed a small right clavicular irregularity and erosion near the SCJ.
with slight swelling, suggesting a bacterial infection (Figures 1 and 2).

The patient was admitted to the hospital. The laboratory test results are shown in Table 1. Morphine sulfate plus vancomycin (1 g every 12 hours) and ceftazidime (2 g every eight hours) were administered intravenously.

A 99mTc radionuclide scintigraphy revealed increased uptake in the right clavicular extremity and SCJ, and an upper abdominal ultrasound was normal. Magnetic resonance imaging (MRI) of the chest at the level of the SCJ showed inflammation and edema of the proximal clavicle, periarticular tissue and SCJ (Figures 3 and 4). Methicillin-sensitive Staphylococcus

Figure 1. Chest CT scan at SCJ level showing right anterior clavicular erosion, bone window (panel A circle); and effusion of the SCJ with dense periarticular fat, soft tissue window (panel B arrow)

Figure 2. Chest CT scan at SCJ level showing dense superficial fat (arrow)

Figure 3. MRI at the level of SCJ, axial images obtained using the short-inversion-time inversion recovery (STIR) technique, demonstrating increased T2-weighted signal in proximal clavicle and periarticular fat, characteristic of inflammation and edema (circles)

Figure 4. MRI at level of SCJ, coronal images obtained using the STIR technique, demonstrate increased T2-weighted signal in proximal clavicle and periarticular fat, characteristic of inflammation and edema


**Sternoclavicular joint septic arthritis in a previously healthy adult**

*aureus* was isolated in blood culture and ceftazidime was withdrawn.

The patient remained at the hospital for seven days and was then referred to a home care facility. He was given vancomycin 1 g intravenously every 12 hours for 21 days with progressive improvement regarding pain and SCJ swelling, followed by cephalexin 500 mg, orally, every six hours, for 21 days.

**DISCUSSION**

Local trauma, rheumatologic diseases, infection and metastases may cause SCJ inflammation(3). SCJ irritation causes local somatic pain over the joint as well as referred pain to various distant ipsilateral anatomical regions, such as the lateral clavicle, neck, shoulder, jaw, ear and chest, making it difficult to diagnose the source of pain. Hasset and Barnsley injected hypertonic saline solution in normal volunteers and described the patterns of referred pain in distant sites(3).

The mean duration of symptoms at the first visit is significantly higher than for septic arthritis (14 days versus three days)(4). Upon admission, the patient of this study had suffered pain for seven days.

SCJ septic arthritis is rare in healthy people. SCJ infection has mainly been described in patients with predisposing risk factors, such as intravenous drug abuse, use of subclavian vein catheters, *diabetes mellitus* and rheumatoid arthritis(3). In a review of 180 cases, the most common risk factor was intravenous drug use (21%), followed by infection at a distant site (15%), *diabetes mellitus* (13%), trauma (12%), and an infected central venous access (9%). No underlying medical condition was found in 23% of patients(4). In healthy adults, the presumed mechanism of SCJ infection is hematogenic bacterial dissemination(5). The patient had cellulitis in the hallux related to a local callosity due to past trauma; this presumably was the origin of the infection.

SCJ septic arthritis may be caused by Gram-positive or negative bacteria, tuberculosis and brucellosis. In general, *Staphylococcus aureus* is the most common etiologic agent; *Pseudomonas aeruginosa* predominates in intravenous drug users. Other organisms include *Escherichia coli*, *Haemophilus influenzae* and *Streptococcus pneumoniae*. *Neisseria gonorrhoea*, *Streptococcus pyogenes* and *Candida albicans* were reported in HIV patients(5). A review of 180 cases revealed that *Staphylococcus aureus* was responsible for 49% of cases, *Pseudomonas aeroginosa* for 10%, *Brucella melitensis* for 7%, and *Escherichia coli* for 5% of cases(3).

In this patient, methicillin-sensitive *Staphylococcus aureus* was isolated from the blood culture, but there was no fever or leukocytosis. In a review of 180 cases, serum leukocytosis was present in only 56% of patients, bacteremia was demonstrated in 62% of patients, and in 24 of the 180 patients (13%) blood cultures were the only positive microbiological result(6). Although aspiration of the joint fluid with a positive identification of a pathogen is the mainstay diagnosis for septic arthritis, obtaining fluid from the sternoclavicular joint is technically difficult(6).

Plain chest roentgenograms are not sensitive for detecting bone changes in the SCJ. CT has been advocated as a superior method for providing an anatomic image of the sternoclavicular joint(6). CT was done in 95 patients, demonstrating at least one abnormality, including osteomyelitis, chest wall abscess or phlegmon, joint space widening or fluid, mediastinitis, and extrapleural abscesses(6). Advances in imaging technology have led to higher frequency of serious complications(6). A CT chest scan is recommended as the initial imaging study, since it identifies bone destruction and defines the spread of retrosternal infection(6).

Initial conservative treatment with intravenous antibiotics appears to be the treatment of choice if image studies show limited disease with the infection contained within the joint capsule(1). Empiric antibiotic coverage should include an active drug against *Staphylococcus aureus*, such as oxacillin or cefazolin. If the patient has risk factors for methicillin-resistant *Staphylococcus aureus* (MRSA), such as intravenous drug use, hemodialysis, central venous access, or recent hospitalization, or if the local prevalence of MRSA is high, vancomycin should be administered instead(6).

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**Table 1. Clinically significant laboratory results**

<table>
<thead>
<tr>
<th>Data</th>
<th>On admission</th>
<th>Hospital day 2</th>
<th>Hospital day 7</th>
<th>Treatment day 21</th>
<th>Treatment day 42</th>
<th>Reference range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hemoglobin (g/dl)</td>
<td>12.8</td>
<td>13.6</td>
<td>14.9</td>
<td>13.7</td>
<td>15.5</td>
<td>13.5-17.5</td>
</tr>
<tr>
<td>Hematocrit (%)</td>
<td>36.6</td>
<td>38.6</td>
<td>42.5</td>
<td>42.6</td>
<td>47.8</td>
<td>39-50</td>
</tr>
<tr>
<td>White-cell count (mm³)</td>
<td>13.250</td>
<td>9.060</td>
<td>10.960</td>
<td>6.600</td>
<td>6.400</td>
<td>3.500-10.500</td>
</tr>
<tr>
<td>CRP (mg/dl)</td>
<td>3</td>
<td>2.52</td>
<td>0.96</td>
<td>0.35</td>
<td>0.29</td>
<td>0-0.5</td>
</tr>
<tr>
<td>ESR (mm/min)</td>
<td>62</td>
<td>48</td>
<td>47</td>
<td>7</td>
<td>2</td>
<td>0-8</td>
</tr>
<tr>
<td>Urea nitrogen (mg/dl)</td>
<td>47</td>
<td>45</td>
<td>57</td>
<td>44</td>
<td>-</td>
<td>10-50</td>
</tr>
<tr>
<td>Creatinine (mg/dl)</td>
<td>0.92</td>
<td>1.13</td>
<td>1.12</td>
<td>1.1</td>
<td>-</td>
<td>0.7-1.30</td>
</tr>
</tbody>
</table>

ESR = erythrocyte sedimentation rate; CRP = C – reactive protein
There is no clear distinction between sternoclavicular septic arthritis and osteomyelitis, since concurrent septic arthritis and osteomyelitis was found in over 50% of patients, as demonstrated by image exams and/or during surgery (2). Some SCJ infections; however, present at more advanced stages. This occurs when the infection spreads beyond the boundaries of the joint itself, sometimes invading mediastinal structures. Conservative measures tend to fail in these instances (1). If extensive bone destruction, chest wall phlegmon or abscess, retrosternal abscess, mediastinitis, or pleural extensions are observed, joint resection is indicated (1). A review of 180 cases showed that surgery was undertaken in 102 of 174 patients (58%). In 48 of these 102 patients, limited debridement of necrotic bone and soft tissue was sufficient. In 54 of 102 patients, more extensive debridement was required, with en bloc resection of the sternoclavicular joint, removal of up to half of the manubrium, and the medial third of the clavicle (4). Removal of the SCJ has been reported to have minimal functional effect on upper limb and shoulder mobility (1). There is no clear distinction between sternoclavicular septic arthritis and osteomyelitis; over half of the patients were found to have simultaneous septic arthritis and osteomyelitis, discovered by image exams and/or surgery (2). Our patient was treated during six weeks with antibiotics, 21 days of intravenous vancomycin and 21 days of oral cephalexin. Although *staphylococci* in this case were methicillin-sensitive, treatment with vancomycin was maintained since it had been effective since the onset, and could be administered twice a day, which facilitated in-home patient care.

In summary, SCJ septic arthritis can affect healthy adults with no predisposing factors such as chronic diseases or intravenous drug abuse. Initially, referred pain to distant sites may suggest other diseases, and may be a confounding factor in the investigation. Diagnosis depends on advanced radiological studies targeted at the SCJ.

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**REFERENCES**