

# Primary sternoclavicular septic arthritis in patients without predisposing risk factors

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## Abstract

**Background:** Septic arthritis (SA) of the sternoclavicular joint (SCJ) is an uncommon form of arthritis, generally described in patients with predisposing risk factors such as primary or secondary immunosuppressive disorders, systemic or localized infections and central venous catheters. More rarely the infection occurs in patients without these risk factors, thus rendering difficult an early diagnosis.

**Material and methods:** We report two cases of SA of the SCJ occurred in two patient, without known predisposing risk factors, hospitalized in our Internal Medicine Unit.

**Results:** The clinical characteristics didn't significantly differ from clinical course of the disease occurring in patients with predisposing risk factors. Imaging techniques were useful to suspect diagnosis, but only fine-needle aspiration biopsy with culture of specimens led to identify the pathogen and its antibiotic sensitivity (in both patients *Staphylococcus aureus*). One patient was treated with surgical adequate curettage, drainage and intravenous methicillin, while the other one received only medical treatment with intravenous teicoplanin and ceftazidime. The outcome was uneventful with a complete recovery in both cases.

**Conclusions:** Even if SA of SCJ is uncommon in subjects without predisposing risk factors, the clinician must have a high index of suspicion to consider this disease in differential diagnosis of arthritis also in previously healthy subjects with negative or unsettling instrumental investigations. In fact, prompt diagnosis is essential to obtain a successful outcome, avoid-

ing the prolongation of the hospitalization and the sequelae of a chronic infection.

**Key words:** sternoclavicular joint, septic arthritis, *Staphylococcus aureus*, infection.

## Introduction

Septic arthritis (SA) of the sternoclavicular joint (SCJ) is an uncommon condition, usually affecting immunocompromised patients with contiguous or distant foci of infection. As a rule, SCJ infection occurs in patients with predisposing risk factors, as intravenous drug use, hemodialysis, infected central venous line, diabetes mellitus and rheumatoid or other inflammatory arthritis [1,2]. Other reported risk factors are alcohol abuse, corticosteroid treatment, cancer, trauma, radiation therapy, chronic liver disease, surgery with median sternotomy [3]. In addition, most common noncontiguous foci of infection are pneumonia, cellulitis, endocarditis, urosepsis, septic pulmonary emboli, spontaneous bacterial peritonitis, epidural abscess, intra-abdominal abscess, gingivitis and disseminated tuberculosis [4,5].

SCJ infection is a potentially life-threatening condition because of tight anatomic connection with the most important chest vascular structures. Very rarely SCJ infection occurs in previously healthy adults. On the clinical ground a high index of suspicion is required in these subjects to establish the diagnosis early in the course of the disease [6,7].

In this article, we report two cases of primary septic arthritis of SCJ due to *Staphylococcus aureus* infection occurred in patients without predisposing risk factors.

## Case Report 1

A 58-years-old man was admitted to our Unit because of five days-lasting fever (about 38°C) with severe pain and

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serious limitation of movements right shoulder's movements. A similar symptomatology occurred a month before and the symptoms disappeared after paracetamol treatment. The patient had an history of chronic cerebrovasculopathy with two brain transient ischemic attacks, with focal blindness and arterial hypertension. During a previous admission to hospital, laboratory investigations revealed neither metabolic nor haemocoagulative alterations and the patient did not underwent central vein catheter placement.

At the admission in our Unit, clinical examination showed an aching swelling at the SCJ and at the first and at the second sternochondral joints (Fig. 1). Significant laboratory data showed erythrocyte sedimentation rate (ESR) 45 mm/1st h; white blood cell count (WBC) 13000/mm<sup>3</sup> (neutrophils); C-reactive serum protein 28 mg/dl (n.v.: <5), serum fibrinogen 817 mg/dl. Other rheumatic investigations were in the normal range. Chest and right shoulder x-rays were negative. SCJ echography and computerized tomography (CT) did not show pathologic features. Empiric pharmacologic treatment with ceftazidime and non-steroidal anti-inflammatory drugs was started, but only poor symptomatic improvement was observed. Chest magnetic resonance (MR) imaging with focal examination of SCJ and sternochondral joints showed structural alteration of SCJ with the presence of a tissue of unhomogeneous low signal in T1-weighted images, involving the first two sternochondral joints and surrounding retrosternal areas (Fig. 2). The absence of predisposing factors for local infection, physical examination, laboratory and MR investigation suggested a neoplasm, so an open biopsy was performed. Surgical exploration of anterior chest surface at SCJ level revealed copious purulent fluid with an inflammatory process defined histologically as osteomyelitis involving the joint and the clavicular bone. Strains of *Staphylococcus aureus* grew within fluid cultures. *In vitro* antibiotic sensitivity was also obtained. The patient was treated with surgical adequate curettage and drainage; intravenous methicillin was administered. A progressive improvement with resolution of symptoms was observed; as a consequence, the patient was discharged two weeks after surgical treatment. Follow-up for 8 months showed complete recovery without sequelae or relapses.

## Case Report 2

A previously healthy 40 years-old male without predisposing risk factors for SA of SCJ was admitted to the hospital because of a SCJ severe pain that appeared about 20 days before. Few days before admission pain became associated with fever and aching swelling. Administration of ciprofloxacin and non-steroidal anti-inflammatory drugs did not reach significant improvement of symptoms.

At the admission, the patient presented fever (38.2°C) and pain of SCJ and right sternochondral joints. Examination was unremarkable except for erythema, swelling and tenderness over the right SCJ, without limitation of right shoulder movement. Laboratory data showed an increase of ESR (67 mm/1st h) and WBC (13400/mm<sup>3</sup>). C-reactive serum protein was 177.3 mg/L. Routine blood chemistries and urinaly-

**Figure 1.** The aching swelling at the sternoclavicular joint and at the first and the second sternochondral joints

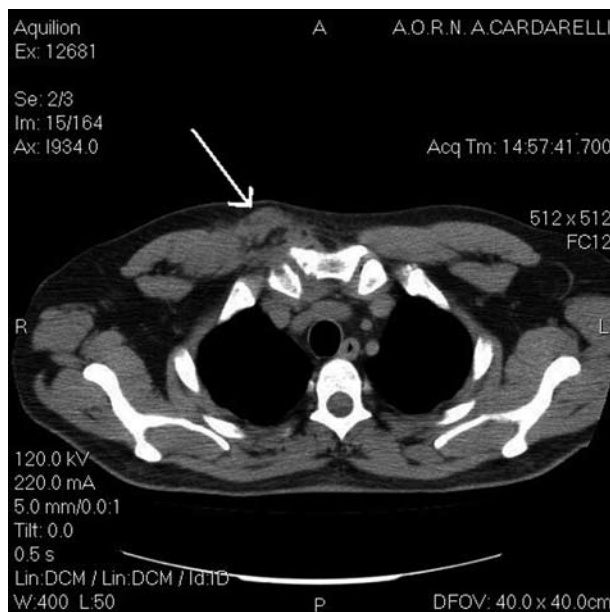


**Figure 2.** Chest magnetic resonance: structural alteration of sternoclavicular joint with the presence of a tissue of unhomogeneous low signal in T1-weighted images, involving the first two sternochondral joints and surrounding retrosternal areas



sis were normal and numerous blood cultures were negative. Only urinalysis yielded growth of *Escherichia coli*. Plain radiographs of the chest with focal examination of right SCJ and clavicle were normal. 99 mTc radionuclide scintigraphy disclosed increased uptake in the SC and costochondral joints; CT scan showed right clavicular cortical and subcortical irregularity near the SCJ with soft tissue swelling, documenting the presence of osteoarthritis (Fig. 3). The patient was submitted to MR of sternum and SCJ that showed the presence of solid tissue with structural abnormalities of SCJ. This tissue (7 x 4 x 6 cm) wrapped the sternoclavicular joint and surrounded retrosternal areas. Fine-needle aspiration biopsy (FNAB) was performed and exploration of the right SCJ revealed purulent fluid and an inflammatory process. Cultures from fluid aspi-

**Figure 3. Chest computerized tomography: right clavicular cortical and subcortical irregularity near the sternoclavicular joint with soft tissue swelling, documenting the presence of osteoarthritis**



rated from the joint yielded growth of strains of *Staphylococcus aureus*. In order to exclude predisposing factors or underlying conditions, determination of serum immunoglobulins, cancer serum markers and sonographic evaluation of the heart and the abdomen were performed and all resulted negative or within the normal limits. Intravenous therapy with teicoplanin and ceftazidime was initiated and continued for a month; the patient progressively improved becoming afebrile in a few days. After discharge (3 months later), normal functioning of the affected joint was observed with CT-scan feature, compatible with a resolving flogistic lesion. Six months follow-up did not show additional sequelae or relapses.

## Discussion

In a recent review of 180 cases of SCJ infection (4), pathogens more frequently isolated were *Staphylococcus aureus*, *Pseudomonas aeruginosa*, *Brucella Melitensis*, *Escherichia coli*, Group B streptococcus, *Mycobacterium tuberculosis*, *Streptococcus pneumoniae*, *Brucella* spp, *Hemophilus influenzae*, *Salmonella* spp, *Serratia marcescens* and *Candida albicans*. *Staphylococcus aureus* represents the most common cause of bacterial SC septic arthritis in adults (49% in the above-cited series [4]), particularly when the disease originates from infected central venous line. The pathogenesis of SCJ infection is not well understood but it appears to result from either haematogenous or contiguous spread from an infected central venous line [8]. In almost all cases, the disease is unilateral. In selected cases it may result difficult to identify the primary site of infection and also in the two cases we described there is the high probability of primitive joint involvement. The differential diagnosis of a swollen sternoclavicular joint includes primary

or metastatic tumor of the SCJ area or non-infectious inflammatory processes, as rheumatoid arthritis, osteoarthritis, rheumatic fever, gout and Tietze's syndrome (TS) [9]. This last one is a rare condition, occurring with recurrent episodes of chondral inflammation causing pain and swelling of rib cartilages. For a correct identification of TS, some clinical features can help the clinician: in fact, TS rarely affects SCJ and presents a favorable outcome; in addition, fever is uncommon and there aren't laboratory and radiological alterations typical of septic arthritis. The SCJ infection usually presents with an insidious onset and the diagnosis may be missed until a complication occurs, as osteomyelitis with joint destruction, sepsis, fistula formation, mediastinitis and superior vena cava syndrome. Also cutaneous, mediastinal or chest wall abscess may develop [10,11]. These complications are very serious: particularly, mediastinitis presents a high percentage of mortality both in immunocompromised patients both in ones with normal immunoresponse [12].

The diagnosis is especially difficult in patients without predisposing risk factors or previous/recent central venous access [13,14]. It is indispensable a high index of suspicion in investigators to establish the correct diagnosis early in the course of the disease, because there are frequent false negative observations and non-conclusive results from standard radiology and CT [15].

MR may be more useful even if the exact kind of the lump involving the SCJ is difficult to identify when the course has already been going on for many days or weeks, causing a diffuse inflammation and a fibrotic reaction [16]. In fact, in the majority of cases, SCJ is diagnosed only after exploratory surgery with aspiration and biopsy. Percutaneous blind fine-needle aspiration of the SCJ may prove difficult and often unsuccessful due to the small size of the joint and the presence of intra-articular disc. Echography and CT scan-guided aspiration procedure can realize an easier approach to SCJ and it is recommended in presence of a well identifiable area (hypoechoic area at ultrasonography, hypodense area at CT). The culture of specimens obtained from fine-needle aspiration biopsy permits to identify the pathogen and its antibiotic sensitivity [17].

SCJ infection is treated both medically and surgically. Antibiotic treatment should be started as soon as possible and continued for at least 4 weeks. Conservative treatment represents the first therapeutic option and medical therapy alone may be successful in a lot of patients. Percutaneous drainage may be carried out with excellent results in selected cases. Surgical exploration is usually performed when the diagnosis is late or uncertain. Open exploration of the joint with drainage and debridement with adequate curettage is the most frequent surgical procedure, while joint resection is indicated only in some selected cases such as extensive bone destruction, chest wall phlegmon or abscess, retro-sternal abscess, mediastinitis or pleural extension [18].

## Conclusions

The two cases reported suggest that SA of SCJ should be considered also in patients without known predisposing risk factors and with negative or unsettling instrumental investiga-

tions. Prompt diagnosis is essential to obtain a successful outcome, avoiding the prolongation of the hospitalization and the sequelae of a chronic infection.

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