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## Chest

## Primary septic arthritis of the manubriosternal joint in an immunocompetent young patient: A case report

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## ABSTRACT

The aim of this article was to illustrate a case of primary septic arthritis of the manubriosternal joint, due to *Staphylococcus aureus* infection, in an immunocompetent 28-year-old male patient. The manubriosternal joint can be rarely involved in inflammatory processes, but pyarthrosis is even more unusual in an otherwise healthy adult. Although rare, pyarthrosis could be associated with significant morbidity and mortality, first of all because of spreading to mediastinal structures. Diagnosis is generally made thanks to imaging findings after clinical suspicion in a patient with anterior chest pain and swelling, fever, and raised inflammatory markers, especially when any risk factors are known. Management is generally aggressive because intravenous antibiotics and surgical debridement are necessary.

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### Case report

The current study reports the case of a 28-year-old male patient referred to the emergency department with a two-week history of a painful anterior chest wall swelling with malaise and fever.

The patient was a smoker, working as a disc jockey; he was an amateur mixed martial arts player, but denied recent episodes of a direct chest trauma.

There was no history of intravenous drug abuse.

Examination of the chest revealed an obvious tender and fluctuant swelling at the manubriosternal region associated with an overlying skin erythema.

On admission, the temperature was 40°C; laboratory tests proved neutrophilic leukocytosis (white cell count of  $18 \times 10^9/L$ , neutrophils of  $13.9 \times 10^9/L$ ) and raised inflammatory markers (C-reactive protein level of 7.6 mg/L).

The serology for HIV infection was negative.

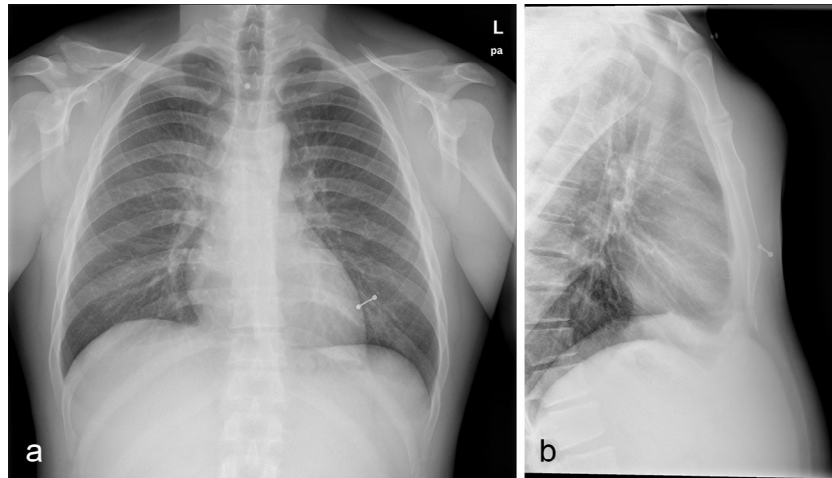
A chest roentgenogram was performed: the lateral view, with a lateral projection for the sternum, confirmed the presence

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**Fig. 1 – (A) Posterior-anterior (PA) chest roentgenogram and (b) lateral (L) view of the sternum, showing a soft-tissue swelling over the manubriosternal region; mild joint space widening and articular surfaces irregularity are noted.**

of a soft-tissue swelling; articular space widening, mild sclerosis, and irregularity on both sides of the manubriosternal joint were noted (Fig. 1).

The soft-tissue sonographic study revealed a lobulated, ill-defined, heterogeneously hypoechoic soft-tissue mass over the manubriosternal joint, appearing to communicate to the articular space. Increased vascularity in the periphery was seen on Doppler ultrasonography images (Fig. 2).

For further evaluation, a Computed Tomographic (CT) (64-row computed tomography scan, VCT; General Electric Healthcare, Waukesha, WI) chest scan was obtained before and after the intravenous administration of iodinated contrast material (Iomeron 400; Bracco SpA, Milan, Italy), showing an inhomogeneous, low-attenuation, poorly delimited 9-cm mass,



**Fig. 2 – Soft-tissue ultrasonography, longitudinal plane, demonstrating a lobulated heterogeneously hypoechoic mass (straight arrows) over the manubriosternal joint (curved arrow).**

centered on the manubriosternal joint; note was made of associated small air bubbles (Fig. 3). The lesion extended anteriorly into the chest subcutaneous tissue and posteriorly into the anterior-superior mediastinum, without any signs of involvement of the pericardium, great vessels, pleural linings, or the lungs. After an intravenous contrast media administration, peripheral enhancement was noted. The manubriosternal joint, well depicted in the sagittal plane reformatted images, appeared irregular and widened (Fig. 4). All these findings were suggestive of a suppurative process arising from the manubriosternal joint, spreading to the anterior chest wall subcutaneous tissue and to the anterior-superior mediastinum.

After a transverse incision was made over the presternal region, the entire destruction of the manubriosternal joint was demonstrated (Fig. 5).

The patient underwent a video-assisted minithoracotomic approach to evacuate the mediastinal inflammatory collection: a large volume of purulent fluid and necrotic tissue were



**Fig. 3 – Enhanced computed tomography axial image of the mass; note is made of the presence of small air bubbles related to suppurative soft-tissue involvement (arrows).**



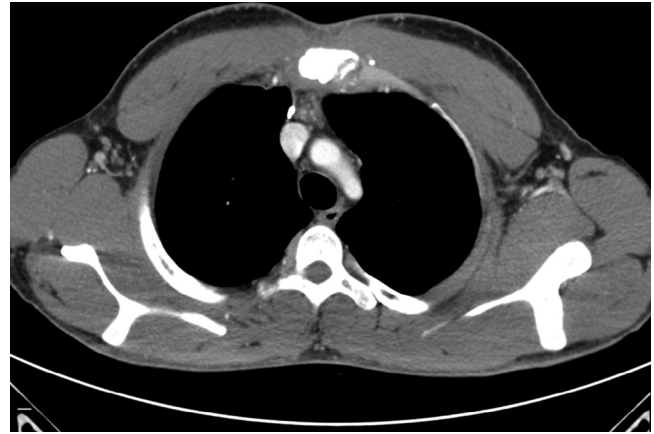
**Fig. 4 – CT sagittal reformatted image, bone window, at the level of the sternum, well depicting bone changes.**

found through the destroyed joint. Necrotic tissue was debrided, and the surgical wound over the manubriosternal area was left open and was packed with an iodoform gauze to promote healing.

Blood cultures, with the aim to identify a potential bloodstream infection, returned positive for *Staphylococcus aureus*.

During surgical intervention, indeed, samples were collected for histologic, cytologic, and microbiological assessments: laboratory results from the drained abscess proved an *S. aureus* infection and an absence of alcohol-acid resistant bacilli; tissue histopathology failed to present evidence of underlying malignancies.

The patient received a 6-week intravenous antibiotic therapy with vancomycin, clindamycin, and piperacillin-tazobactam, converted to vancomycin and piperacillin-tazobactam. At the two-month follow-up, surgical wound was completely healed through secondary intention (Fig. 6).



**Fig. 6 – Axial CT image obtained 8 weeks after surgical intervention, showing a resolution of the previously seen soft-tissue lesion.**

## Discussion

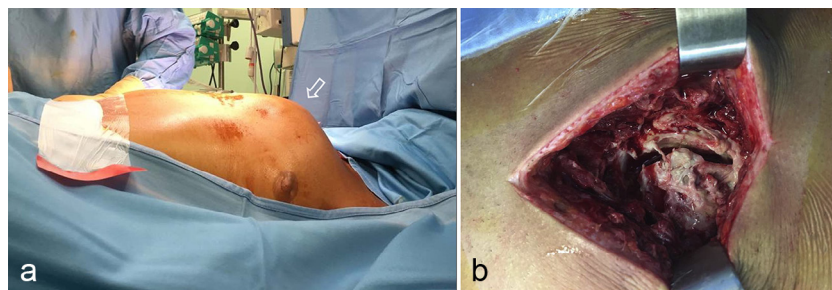
The manubriosternal joint lies between the manubrium and the sternal body; it is usually a symphysis, with fibrocartilage covering the bone ends and eventually ossifying later in life, but may be synovial, synchondrotic, or synostotic.

Arthritides that may affect this joint include osteoarthritis, rheumatoid arthritis, ankylosing spondylitis, psoriasis, gout, calcium pyrophosphate deposition disease, and septic arthritis [1].

The latter is rarely encountered as a primary process, and this occurrence in an otherwise healthy adult is even more unusual [2].

Because of the rarity of this condition, little is known about its pathogenesis.

According to the literature, manubriosternal joint pyarthrosis is more common in male patients, with predisposing factors seen in almost one-half of the cases, including immunodeficiency (notably with human immunodeficiency virus), intravenous drug abuse, underlying inflammatory joint alterations, and spreading from a source of infection elsewhere.



**Fig. 5 – (A) Obvious soft-tissue swelling (arrow) of the anterior chest wall, before surgical intervention. The patient lies faced up on the surgery table (head on the right side of the picture, lateral view). (B) Transverse incision demonstrating a disruption of the manubriosternal joint.**

The most common one is intravenous drug abuse, this being possibly related to upper limb injection, subclavian phlebitis, neck injection, or even needle penetration into the joint itself.

Manubriosternal septic arthritis can present with a acute or a subacute clinical course, developing over weeks or months [3].

Anterior chest wall pain, as a result of suppurative soft-tissue involvement, is a typical presentation but may be confused with other more common causes, such as Tietze syndrome.

Signs of inflammation are usually reported, fever in particular or elevation of inflammatory markers, but may be attenuated by a concomitant immunosuppressive therapy.

Coagulase-positive *S. aureus* is the causative agent in 60% of the cases [2].

Posterior-anterior chest roentgenogram is usually unremarkable; however, a lateral roentgenogram of the joint is more sensitive: subcutaneous tissue swelling, osseous changes as periosteal elevation, cortical erosion of the bony ends, and widened articular space are usually noted, but in early stages, radiographs are often normal.

The computed tomography scan is more likely to be positive at an advanced stage: the findings include inflammatory fluid collection, soft-tissue infiltration, and bone destruction.

Excellent visualization of soft tissues and bone could be obtained by magnetic resonance imaging, but in our case, the

presence of a mediastinal abscess imposed urgent treatment after diagnosis.

Although some authors may advocate medical management alone, intravenous antibiotic therapy can suffice at the early stage, and the majority of patients described in the literature have been treated with a combination of drug therapy and surgical debridement [4].

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