An uncommon cause of severe chest pain

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arthritis, infectious; chest pain; delayed diagnosis

Case

A man of Greek descent, employed as a furniture installer, aged 38 years and generally well, presented with gradual-onset, progressive, excruciating left upper anterior chest pain with severe limitation of left shoulder movements.

He first noticed a subtle aching pain around the left upper chest region, which was exacerbated by shoulder movements. Within a few hours, the pain worsened and was accompanied by left shoulder stiffness. He presented twice to the emergency department within 2 days, but his condition was diagnosed as muscular pain following normal shoulder X-ray and electrocardiogram (ECG), and he was discharged with oral opioid analgesia. He presented a third time to the emergency department with extreme upper anterior chest pain, refractory to oral analgesia. He was otherwise systemically well and had no fever, rigor or other symptoms of infection. He denied recent trauma, new tattoos, intravenous drug use or skin lesions on the chest. He had not been sexually active for the past 1 year and had been in a monogamous heterosexual relationship for 4 years prior.

Examination revealed mild erythema in the left sternoclavicular region with no overt swelling or skin lesion. The upper anterior chest wall was tender to palpation, especially in the left medial clavicular region, and range of movement of the left shoulder was very limited. The initial diagnosis was pectoralis muscle tear and treatment included analgesia and a shoulder immobiliser sling for 2 days. However, his severe pain continued to worsen, despite non-opioid and opioid analgesia, and was disproportionate to the working diagnosis. He remained afebrile throughout his hospital stay.

Results of laboratory tests performed on day 3 of admission showed a white cell count (WCC) of 11.6 x 10^9/L (normal range 4.5–13.5 x 10^9/L) and C-reactive protein (CRP) of 119 mg/L (normal range <5 mg/L). Weight-bearing X-rays of his left shoulder and acromioclavicular joint were unremarkable. Computerised tomography (CT) chest angiography revealed no cause for chest pain, particularly no aortic dissection. Magnetic resonance imaging (MRI, *Figure 1*) showed severe oedema involving the upper chest wall, predominantly centred around the left sternoclavicular joint, and surrounding oedema within the pectoralis major muscle superficial to the joint, as well as deep to the joint and the sternum. No frank bony destruction was noted.

Question 1

What is the diagnosis?

Question 2

Why is prompt diagnosis important?

Question 3

How do we diagnose this condition? What are the main clinical manifestations of this condition?

Question 4

What are the laboratory and imaging modalities needed for diagnosis?

Question 5

What are the treatment options available?

Question 6

What is the prognosis of this condition?

Answer 1

The diagnosis is left sternoclavicular joint septic arthritis. This infection accounts for 1% of all bone and joint infections in the general population.[1,2] It occurs mostly in patients with predisposing risk factors, such as intravenous drug use, penetrating injury, infected central venous line, non-contiguous site of infection, haemodialysis, diabetes mellitus, chronic liver disease, immunodeficiency, rheumatoid arthritis and other inflammatory arthritis.[2–5] However, it can occur uncommonly in previously healthy individuals with no known risk factors, such as the case described above. An analysis of 180 cases (170 cases reported in the literature in 1970–2004 and 10 cases from one institution) of sternoclavicular infectious arthritis found 23% of the patients have no risk factors.[2]

Answer 2

Sternoclavicular joint infection can be life-threatening because of the anatomical position of the joint close to important vascular structures of the thoracic inlet such as the subclavian artery and vein, and superior vena cava. Its variable presenting features can make diagnosis difficult.[4] It can lead to serious local complications such as osteomyelitis, locoregional abscess and fistula formation, mediastinitis, sepsis, superior vena cava syndrome and thrombosis of the subclavian vein.[1–4]

Answer 3

The difficulty lies in identifying and diagnosing this rare infection, as the presentations can be quite diverse. Bodker et al[6] quoted a delay of up to 11.5 weeks from patients' presentation to confirmation of the diagnosis. Thus, it is important for clinicians to have a high index of suspicion for this condition.[6] Patients can present in an acute or subacute fashion; duration of symptoms ranges from 2 days to 3 months.[1] Patients with slowly progressive infections or indolent infections, such as tuberculosis and brucellosis, may present with months or years of insidious symptoms.[2] Most common symptoms are atraumatic pain of varying severity in the shoulder, neck or chest, localised sternoclavicular joint tenderness and limited shoulder range of motion, similar to the case presented.[1–3,5] Palpation and isolated movements of the glenohumeral joint are not usually painful on careful examination.[3] Fever was present in 65–75% of patients and 61% had localised swelling. Other manifestations include painless localised swelling and systemic symptoms.[2,6]

Answer 4

An analysis of 180 patients with this condition showed only 56% have leukocytosis and 62% have bacteraemia.[2] Plain radiography and ultrasonography have little use in diagnosing sternoclavicular joint infection.[1,2,5–7] CT and MRI remain mainstay diagnostic modalities for this condition as they provide the exact site of infection, the extent of bony destruction and presence of complications such as mediatinitis.[2,4] Thus, a patient with suspected sternoclavicular septic arthritis in a primary health service should be referred to centres with CT or MRI availability as soon as possible. A study of 10 patients with sternoclavicular joint infection suggested that MRI is superior to CT for obtaining an immediate diagnosis: patients are diagnosed in <1 week with MRI, compared with a median diagnostic delay of 1.5 weeks when CT is used as the primary imaging modality.[6]

Culture of the joint fluid or tissue makes the final diagnosis. In most cases, this is accomplished by exploratory surgery with aspiration or biopsy because of the difficulty in fine needle aspiration of the sternoclavicular joint, given its small size and the presence of an intra-articular disc.[2,4] *Staphylococcus aureus* is the most common organism cultured.[1,2,5–7]

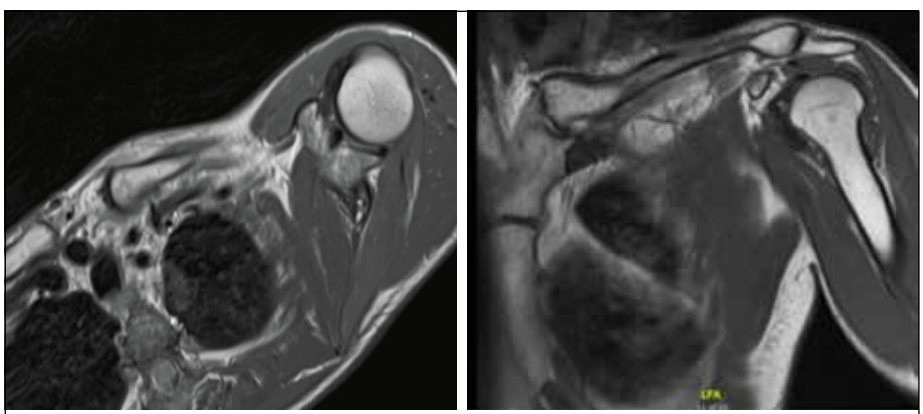

Figure 1. T2 weighted images (transverse and coronal) show severe oedema involving the upper left chest wall, predominantly around the left sternoclavicular joint. Oedema is present within the pectoralis major muscle superficial to the joint as well as the mediastinum deep to the joint and the sternum.

Answer 5

The condition can be managed medically and surgically. All patients should be started on an antibiotic with empirical Staphylococcal cover, given the prevalence of this organism.[3] For limited disease, medical therapy is usually adequate.[2,4] Therapeutic percutaneous drainage can be used to improve symptomology.[4] Surgical management is considered in patients with extensive disease or failed medical therapy. Diagnostic and therapeutic open surgical exploration with drainage and debridement is commonly performed. Joint resection is indicated in some cases with extensive bone destruction, chest wall or retrosternal abscess, mediastinitis or pleural extension.[2,4,5,7]

Answer 6

The prognosis of this condition is good, with little mortality and morbidity, according to published case studies and reviews.[1,3–5]

Case continued

An ultrasound-guided aspiration of the left sternoclavicular joint was performed and the patient was empirically treated with intravenous cephazolin. Fluid culture revealed moderate growth of *Haemophilus parainfluenza*. The patient accordingly received intravenous ceftriaxone for 4 weeks then oral amoxicillin for a further 2 weeks. His clinical symptoms and inflammatory markers improved dramatically following therapy. He was symptom-free after 2 months and returned to work.

Conclusion

Prompt diagnosis of sternoclavicular joint infection is imperative to avoid serious complications. Our case highlights the difficulty in diagnosing sternoclavicular septic arthritis, especially in patients with no known risk factors. It stresses the importance of reconsidering a diagnosis when patients' symptomology is not consistent with the working diagnosis. In hindsight, earlier consideration of this condition as a differential diagnosis and earlier investigations especially laboratory inflammatory markers would have expedited further investigations and treatment in this case. Thus, this condition should be one of the important differential diagnoses to be excluded in patients with severe chest pain.

Key points

- Sternoclavicular joint septic arthritis is a rare condition that accounts for 1% of all bone and joint infections in the general population. It can occur in healthy individuals with no known risk factors.
- Diagnosis is difficult owing to the diversity of presentations.
- The most common symptom is atraumatic pain in the shoulder, neck or chest, and localised sternoclavicular joint tenderness and limited shoulder range of motion. Fever and localised swelling may also be present.
- CT and MRI are the most sensitive diagnostic imaging modalities.
- Culture of the joint fluid or tissue is necessary for confirmation of the diagnosis and determination of appropriate antibiotic treatment.
- *Staphylococcus aureus* is the most common organism cultured; thus, patients should be initially treated empirically with an appropriate intravenous antibiotic.
- Surgical management may be necessary for failed medical therapy or in the presence of complications.

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