CASE REPORT

Sternoclavicular septic arthritis due to methicillin-resistant *Staphylococcus aureus* in a patient with a suprapubic catheter

Nadine Monteiro, Filipa Moleiro, Graça Lérias, Alberto Mello Silva

Department of Internal Medicine, Centro Hospitalar Lisboa Ocidental, EPE – Hospital Egas Moniz, Lisboa, Portugal

Correspondence to

Nadine Monteiro,
nadine_rodrigues@hotmail.com

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SUMMARY

We report a case of a 74-year-old man who presented to the emergency department with a 1-week history of fever. He had a meatal stenosis and had a suprapubic catheter for 10 months, and had a recent hospitalisation for urosepsis with bacteraemia due to methicillin-resistant *Staphylococcus aureus* after manipulation of the catheter. Clinical examinations were performed in the emergency department and the patient was hospitalised with the diagnosis of recurrent urinary tract infection. The following day, we noticed the development of a mass in the left sternoclavicular joint with inflammatory signs and excruciating pain. Ultrasonographic findings led to the diagnosis of left sternoclavicular synovitis, and methicillin-resistant *S. aureus* grew in blood cultures leading to the diagnosis of sternoclavicular septic arthritis. Treatment with vancomycin and gentamicin was started and maintained for 4 weeks with complete resolution of symptoms and no complications or sequelae.

BACKGROUND

Septic arthritis (SA) is a rare medical emergency associated with high rates of morbidity and mortality, especially when the diagnosis is delayed or the treatment is suboptimal.¹ It is known that the most important factor for prompt diagnosis is clinical insight. This is particularly difficult in the case of an unusual localisation. We have, of late, been treating an increasing number of incidences of SA due to methicillin-resistant *Staphylococcus aureus* (MRSA). The authors describe one such case highlighting the difficulty of clinical diagnosis and investigation.

CASE PRESENTATION

We present a case of a 74-year-old man admitted in the emergency department (ED) with a 1-week history of fever. Known comorbidities included arterial hypertension, poorly controlled insulin-dependent type 2 diabetes mellitus, chronic renal failure, heart failure and peripheral artery disease. The patient also had a history of meatal stenosis and had a suprapubic catheter for 10 months. Two days after manipulation of the catheter the patient developed pyelonephritis with sepsis and was hospitalised. Cultural examinations revealed MRSA sensitive to vancomycin and *Escherichia coli* in urine and MRSA in blood cultures. A simultaneous 2-week therapy with linezolid and ciprofloxacin was completed and the patient was discharged.

One week later the patient returned to the ED because of non-remitting fever.

He had a temperature of 38°C and an otherwise unremarkable physical examination. Blood tests revealed white cell count of $14.7 \times 10^9/L$ (normal value $4-10 \times 10^9/L$), C reactive protein 28 mg/dL (normal value <0.5 mg/dL) and urine analysis with leukocyturia. Other sites of infection were excluded. Assuming urinary tract infection, the patient was started on intravenous ceftriaxone empirically, and was hospitalised.

One day after admission, the patient developed a palpable mass with evident inflammatory signs in the left sternoclavicular joint with severe pain. Plain radiography was normal. Ultrasonography revealed capsular distension and intra-articular liquid with power Doppler signal suggestive of synovitis. Blood cultures yielded growth of strains of MRSA prompting diagnosis of SA, and treatment with combined intravenous vancomycin and gentamicin was started. Transthoracic echocardiogram was negative for vegetative lesions. During the first hour, the patient maintained persistent inflammatory signs and increased mass with fluctuation. An urgent CT scan without contrast was performed revealing a slightly irregular articular surface and soft tissue involvement without clear image of abscess (figure 1). No purulent material or intra-articular liquid was obtained, and a strategy of conservative treatment was maintained.

The patient completed a 4-week treatment course leading to complete resolution of the clinical symptoms and with negative follow-up blood cultures from day 11 of therapy.

On day 10 of hospitalisation, the patient developed renal failure and decompensated heart failure with an episode of cardiogenic pulmonary oedema, requiring orotracheal intubation and mechanical ventilation. The patient was transferred to an intensive care unit where he remained for 22 days. He was submitted to dialytic technique for 48 h and developed ventilator acquired pneumonia (isolation of MRSA and *Acinetobacter baumannii*) but responded well to therapy.

OUTCOME AND FOLLOW-UP

The patient was discharged asymptomatic with complete recovery without sequelae or relapses.

The patient was submitted to a urethroplasty with meatoplasty, the suprapubic catheter was removed and substituted with a urethral catheter, and in under a month the patient was decatheterised.

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Figure 1 CT scan revealing irregular left sternoclavicular articular line and soft tissue involvement.

DISCUSSION

SA is a rare condition and the involvement of the sternoclavicular joint is even rarer. This fact, associated with its poorly distensible nature and the insidious evolution in most cases, can delay the diagnosis and create complications.² In the reported case, the patient presented in the ED with a history of fever. The retrospective analysis for the probability of SA was relevant: this patient presented with pain, swollen joint and fever (the only three clinical findings present in more than 50% of cases in a systematic review of 643 patients).³ In addition, he was an elderly patient, had diabetes mellitus and chronic renal failure. In the hospitalisation for urosepsis no central venous catheter was placed, so no other risk factors were considered. Other predisposing conditions for SA are pre-existing underlying inflammatory disease, use of immunosuppressive therapy, previous intra-articular corticosteroid injection, prosthetic joint, intravenous drug misuse and skin infection.^{1 2 4-7} Fever and leukocytosis are not invariably present.²

The most likely source of the infection in this patient was haematogenous spread during bacteraemia, as is the case in the majority of patients.⁵ In this case, pyelonephritis was the infectious foci. The absence of limiting basement membrane in the synovial tissue allows microorganisms to enter the synovial fluid.^{3 5} Other possible mechanisms of infection are: infected contiguous foci, neighbouring soft tissue infection and direct inoculation due to trauma or iatrogenic event.^{3 5 8}

The absence of pathological findings on imaging studies does not exclude SA. Plain radiographs may seem normal in the first day. Ultrasonography can detect early changes and can be used to guide initial joint aspiration and drainage procedures. CT, MRI and radionuclide scans, although not always required, can be used to study the extent of bone and soft tissue infections.⁴

Once the diagnosis is suspected, an attempt to aspirate synovial fluid from the affected joint is mandatory. This allows a microscopic analysis, to know initial Gram stain (which has a sensitivity of 29–50%)³ and to establish the definitive microbial aetiology. Blood cultures should also be collected before initial treatment, and are reported to be positive in 50–70% of cases.⁸

In the presented case, the attempt to aspirate joint fluid was unsuccessful, probably because of the paucity of fluid in this small joint.^{9 10} MRSA was isolated in peripheral blood cultures and assumed to be the offending agent.

The pathogenic agent isolated in the majority of cases is the *S. aureus*. In the past 20 years, we have been treating an increasing number of MRSA SA, healthcare as well as community acquired, even in patients who do not have traditional risk

factors for MRSA acquisition.^{7 11} Therefore, some authors recommend initial antibiotic treatment with coverage for MRSA in patients at risk or where the local incidence of community-associated infection is greater than 10%.^{1 2} Evidence to guide the choice and duration of antibiotic treatment is scarce. Treatment includes repeated synovial fluid aspirations and/or surgical debridement, along with antimicrobial therapy. Some authors propose an empiric antibiotic regime based on clinical presentation, host risk factors, Gram stain results and knowledge of local prevalence of drug-resistant pathogens.^{7 8 12} A schema of 2–4 weeks of parental therapy is also suggested for *S. aureus* joint infection depending on the expert group.^{7 13} In the case of this patient, a 2-week treatment course with vancomycin and gentamicin was performed with no recurrence.

Local complications of sternoclavicular SA occur as a consequence of its close relationship with the mediastinum, pleural cavity and brachiocephalic structures. Examples of complications include osteomyelitis (which occurs in 50% of cases), myositis, formation of a local abscess in 21% of cases, which can infect the surrounding soft tissues, fistula formation, mediastinitis in less than 15% of cases and superior vena cava syndrome.^{10 14} These complications are more common among immunocompromised patients and patients with diabetes and users of intravenous drugs.

The initial management for uncomplicated sternoclavicular joint SA is based on parental antibiotics. In the presence of complications or immunosuppression, surgical management is indicated.^{9 10} There is a variety of possible interventions, including needle aspiration, arthroscopy and arthrotomy. No controlled studies have evaluated these procedures; although there are some generally proposed guidelines.^{4 12}

Functional outcome in sternoclavicular SA is usually good.^{2 15} To reduce the risk of permanent loss of joint function, some of the measures proposed are early initiation of antimicrobial therapy, physical therapy and mobilisation.⁴ Mortality varies in different studies, but it seems to be as high as 20% and has not changed significantly over the past 40 years. Poor prognosis is associated with delayed diagnosis, advanced age, more than one joint affected, underlying joint diseases, presence of synthetic material within the joint and the presence of comorbidities such as diabetes.^{4 6 8}

The reported case highlights that prompt diagnosis of SA and early initiation of therapy are essential for a successful outcome.

Learning points

- ▶ Septic arthritis is a medical emergency that requires immediate therapy to prevent significant morbidity and mortality.
- ▶ High index of suspicion and judicious use of laboratory and radiological evaluation can help strengthen the diagnosis.
- ▶ The only clinical findings presented in more than 50% of cases are local pain, swollen joint and fever.
- ▶ Conservative treatment with long-term parenteral antibiotics is the treatment of choice for non-complicated sternoclavicular septic arthritis. Surgery may be necessary, mainly if complications occur.

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