CASE REPORT

Cervical facet joint septic arthritis: a real pain in the neck

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SUMMARY

A 64-year-old man with a complex medical history and previous cervical arthritis with discectomy presents with a 2-day history of neck and lower back pain and shortness of breath, associated with left-sided muscle weakness. He has a fever with severe sepsis causing acute renal failure. MRI spine shows evidence of left cervical facet joint septic arthritis at C6-T1. He required 6 weeks of intravenous antibiotics and intensive support with ventilation and haemofiltration. After completion of antibiotics, he made a full recovery and regained neurological function before discharge.

BACKGROUND

Septic facet joint arthritis is a rare diagnosis, and involvement of the cervical spine is even more uncommon. Patients present with fever, unilateral neck pain and in some cases concomitant focal neurological deficit. Due to its rarity, more common diagnoses such as an acute stroke and other causes of sepsis are often considered. This case highlights how this diagnosis can be difficult to elucidate and the importance of considering it when investigating patients with these presenting symptoms.

CASE PRESENTATION

A 64-year-old retired salesman presented to the emergency department with a 2-day history of non-traumatic neck and lower back pain, associated with shortness of breath and left-sided upper and lower limb weakness and impaired sensation.

He was known to the neurosurgical team for previous C3/4 anterior cervical discectomy and fusion 5 years prior to current presentation. Additionally, he had multilevel lumbar canal stenosis for which surgical management had been deemed too high risk. In addition to this, he had a complex medical history with multiple comorbidities including type 2 diabetes, hypertension, hypercholesterolaemia, cirrhosis secondary to non-alcoholic fatty liver disease with portal hypertension, gastric ulcer disease, gout, right knee replacement and right ankle fusion. He had no history of travel in the last 1 year.

The patient had a temperature of 38.2°C. On examination, he was tachycardic with a regular pulse rate of 100 with normal heart sounds. Clinically, he had dyspnoea and reduced air entry at the left lung base. Neurological examination showed decreased power of the left upper limb and left lower limb, with normal tone and all reflexes

present. Coordination was intact. Cranial nerve examination was unremarkable. Kernig and Brudzinksi signs were negative. Musculoskeletal examination showed spinal tenderness at the lumbar spine and cervical spine with associated left-sided paraspinal tenderness.

His initial laboratory tests showed raised inflammatory markers, with a C reactive protein of 260.8 mg/L, a white cell count of $11.9 \times 10^9/L$ and a blood film confirmed a mild neutrophilia with thrombocytopenia (platelet count of $88 \times 10^9/L$). Arterial blood gas showed type 1 respiratory failure, with a partial pressure of oxygen of 7.0 and a normal partial pressure of carbon dioxide and a raised lactate of 2.7.

His chest radiograph showed left lower zone consolidation with the back pain thought to be secondary to a community-acquired pneumonia. Given the presence of focal neurological deficit, there was a suspicion of an acute stroke. However, computerised tomography (CT) of his head was normal, with no evidence of haemorrhage or early infarction.

The patient was treated for sepsis secondary to an community-acquired pneumonia. He was started on intravenous co-amoxiclav and oral doxycycline, as per local hospital microbial guidelines and given aggressive fluid therapy. However, he developed worsening shortness of breath and reduced urine output.

INVESTIGATIONS

After initial antibiotic therapy, repeat blood tests 24 hours later showed an acute kidney injury, with a creatinine rise to 266 from 120 at admission. Chest radiograph showed development of pulmonary oedema, associated with new type 2 respiratory failure. These findings were consistent with severe sepsis.

Due to the worsening sepsis and persistent neck pain, 2 days after admission, he underwent an MRI of the cervical spine which confirmed features consistent with septic facet joint arthritis of C3-C5 and C6-T1. [Figure 1](#) shows fluid in the left cervical C6/7 and C7/T1 face joints, associated with oedema in the paraspinal muscles, consistent with face joint inflammation. Furthermore, signal changes in the bone marrow represents bone marrow oedema, consistent with acute inflammation. Post gadolinium magnetic resonance imaging (MRI) revealed evidence of epidural enhancement ([figure 2](#)), consistent with left-sided neurological involvement. A CT neck was performed, which showed destructive

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Figure 1 Sagittal fat suppressed MRI of cervical spine showing paraspinal oedema. Sagittal MRI imaging shows evidence of fluid in the C6/7 and C7/T1 left facet joints and oedema in the left paraspinal muscles. Signal change is present in the bone marrow, representing bone marrow oedema.

changes in the left-sided cervical facet joints at C6-T1, present 7 days after the first onset of symptoms ([figure 3](#)).

Blood cultures, sputum cultures and urine cultures all failed to show any organism growth. Pathogen screen for mycoplasma,

Figure 2 Sagittal T1 postgadolinium MRI of cervical spine showing epidural enhancement. Sagittal MRI imaging postgadolinium contrast highlighting left-sided epidural enhancement secondary to inflammatory joint changes at level of C7.

Figure 3 CT cervical spine showing bony erosions. CT of the cervical spine highlights destructive bony erosions of the left-sided C6/7 and C7/T1 facet joints (shown by arrows).

chlamydia, legionella and urinary pneumococcal antigen were all negative.

CT chest, abdomen and pelvis confirmed pulmonary oedema and consolidation, but no other foci for sepsis. Echocardiogram showed mild left ventricular hypertrophy but no evidence of infective endocarditis.

DIFFERENTIAL DIAGNOSIS

There are multiple differentials for acute inflammatory cervical arthropathy, including infective, inflammatory and malignancy.

Pyogenic spondylodiscitis (infection of the intervertebral disc and vertebrae) often presents with spinal pain and fever, with varying degrees of neurological involvement. However in contrast to facet joint arthritis, symptoms are bilateral, with disc space involvement also seen on MRI.¹ Tuberculosis of the spine, also known as Pott's disease, can also present with spinal pain, fever and focal neurology, in addition to typical constitutional symptoms of tuberculosis such as malaise and night sweats. The onset of Pott's disease is insidious, over the course of weeks and months, and is associated with distinct MRI changes seen across multiple vertebral levels, such as vertebral endpoint lesions, vertebral body collapse and extensive interosseous and paraspinal abscesses.²

Crystalline arthropathies of the spine is rare, but have been reported, affecting the cervical, lumbar and sacroiliac joints.³ Malignancy is also associated with destructive bony change, leading to spinal pain but typically does not involve inflammatory changes which were seen on MRI imaging.

Given the presence of fever, unilateral neck pain and unilateral focal neurology, with corresponding unilateral inflammatory changes seen on MRI, septic facet joint arthritis is the most likely differential diagnosis.

TREATMENT

The patient was transferred to the intensive care unit (ICU) after 24 hours, due to anuria and was intubated and ventilated, receiving ionotropic support. Following microbiologist advice, his antibiotic therapy was changed to meropenem and vancomycin. He required haemofiltration for acute kidney injury. The patient was not for neurosurgical intervention and was treated medically with meropenem and vancomycin for 6 weeks.

OUTCOME AND FOLLOW-UP

The patient remained on the ICU for 25 days, requiring ventilator support and haemofiltration. On discharge his renal function normalised, and he regained left-sided power, with ongoing community rehabilitation. He completed his intravenous antibiotic therapy in the community for 6 weeks via a peripherally inserted central catheter.

DISCUSSION

Cervical facet joint septic arthritis is a rare and potentially fatal presentation of neck pain. Spinal facet joint septic arthritis is uncommon, with the majority of cases affecting the lumbar spine due to high prevalence of lumbar arthritis. Cervical facet joint arthritis is even rarer, with only a small number of reported cases worldwide. There are 10 previous cases of septic arthritis affecting the cervical spine, involving the atlanto-axial facet joints (five cases)⁴ and the subaxial cervical facet joints (five cases).^{5–8} Here, we present a near fatal case of subaxial cervical facet joint septic arthritis.

Septic facet joint arthritis presents with spinal and paraspinal pain and tenderness. However in contrast to the more commonly seen spondylodiscitis, facet joint arthritis is often unilateral. Additional symptoms are dependent on the degree of nerve involvement, with inflammation of the nerve roots and cord presenting with mixed upper and lower motor neuron symptoms.

Risk factors for facet joint arthritis include immunocompromise, such as diabetes mellitus and immunosuppressive therapy. The presence of previous spinal disease and arthritis is a risk factor for infection, and often septic joint arthritis is associated with haematogenous spread from another foci of infection.

In our case study, the patient presented with left-sided neck and back pain, associated with left-sided weakness in the upper and lower limbs. Due to the rarity of cervical joint arthritis, initially more common differentials of acute stroke and chest sepsis were considered. However, this case illustrates how potentially fatal this diagnosis is, with the patient experiencing severe sepsis and requiring respiratory and renal support. Previous cases of cervical septic arthritis report a more insidious course, with symptoms of neck pain progressing over months before requiring intervention.⁴ In contrast, in this case the patient only experienced symptoms for 2 days, with rapid progression to septic shock and multiorgan failure.

Our patient had impaired immunity due to diabetes mellitus and cirrhotic liver disease. Furthermore, he had significant cervical spine arthritis, with previous C3/C4 discectomy and presence of degenerative changes such as osteophytes and facet joint hypertrophy. The presence of a bacteraemia secondary to pneumonia is likely to have led to the bacteria seeding into the damaged joint. This patient had no history of travel in the last year prior to admission. He denied any recent travel to Australia and Southeast Asia or soil exposure. This is relevant as soil exposure in these regions can lead to melioidosis, secondary to the bacteria *Burkholderia pseudomallei*, which can present with pneumonia and septic arthritis, as seen in this presentation.

MRI is the mainstay of diagnosis of septic facet joint arthritis, associated with a high sensitivity and specificity in the early stages of the disease,⁹ with soft tissue changes visible within 2 days of

presentation. MRI imaging allows for full characterisation of epidural, neurological and paraspinal muscle involvement. CT spine also aided in highlighting bony destruction secondary to infection. Imaging-guided joint aspiration can be attempted in cases with negative blood cultures to aid diagnoses and antibiotic therapy. However due to the patient's multiple comorbidities, previous cervical spine surgery and intensive care support (intubation and haemodialysis), it was not attempted. The diagnosis and treatment was guided by the clinical and radiological findings.

This case highlights how this potentially rare diagnosis can lead to significant morbidity and mortality, and that all clinicians should consider facet joint septic arthritis in patients presenting with fever and unilateral neck pain with focal neurological deficit.

Learning points

- ▶ Cervical septic facet joint arthritis is a rare potentially fatal diagnosis.
- ▶ The diagnosis should be considered in patients presenting with fever and unilateral neck tenderness associated with unilateral focal neurological deficit.
- ▶ MRI spine is the diagnostic imaging modality to visualise joint inflammatory changes and nerve involvement.
- ▶ Long term antibiotic therapy for at least 6 weeks is the mainstay of treatment, with surgical drainage reserved for acute severe neurological involvement.

Contributors SS and MKV both saw the patient in the acute setting and looked after them. The both wrote the case report and conducted the literature review for the topic.

Competing interests None declared.

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