CASE REPORT

Idiopathic septic arthritis of a lumbar facet joint associated with paraspinal abscess

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SUMMARY

A 48-year-old woman presented with a 1-month history of severe lower back pain on a background of 24 h of mild fever and general tiredness with an associated right-sided foot drop. Five weeks after the onset and with no improvement in symptoms in spite of analgesia and physiotherapy, the patient had a lumbar spine MRI which demonstrated a collection extending from the facet joints of L5 and L6 to the iliacus muscle on the right. A CT-guided aspiration was performed with a lengthy hospital stay for intravenous antibiotic treatment. The culture and sensitivity study of the aspirate isolated *Streptococcus pneumoniae*.

BACKGROUND

Septic arthritis of the facet joints (SAFJ) is a rare and poorly understood condition with only a few dozen reported cases in the literature. The diagnostic process can be challenging with timely imaging essential to enable prompt management.

The purpose of this case report is to highlight septic facet joint infection as an entity that should be considered as a differential diagnosis of complicated lower back pain and the role of imaging.

CASE PRESENTATION

SAFJ is a rare condition which was described initially in 1987.¹ Almost 90% of the cases affect the lumbar spine.^{2–3} Patients typically report non-specific lower back pain radiating to the legs. SAFJ is associated with neurological deficits in more than 50% of the cases. Depending on the side of the articular capsule that is affected, patients could potentially develop either a paraspinal (dorsally) or epidural (ventrally) abscess as a common complication.³ In a minority of cases, the septic arthritis could stay isolated. Early diagnosis is a critical factor in prognosis, morbidity and the duration of treatment and length of hospital stay.

The typical patient with SAFJ is above the age of 60, often immunocompromised or with comorbidities. There have been cases of iatrogenic infection after an epidural or paraspinal injection as well as acupuncture or spinal surgery.^{4–5} However, idiopathic cases like the current case are rare, with only one other case identified in the literature.⁶

A 48-year-old woman presented with a 1-month history of sudden-onset lower back pain. She had seen a chiropractor initially, but her symptoms had become worse subsequent to this and she had developed a right foot drop. Mild fever was reported but there were no suspicions of an

underlying or systemic infection. The examination revealed pain at the L4, L5 and S1 regions, radiating to the back of the right thigh, side of the right calf, and the sole of the right foot. There was also sensory loss along the L4, L5 and S1 nerve roots with loss of power (3/5) of dorsiflexion and plantar flexion of the right foot. The left leg was unaffected.

The patient was initially managed in the community with analgesia and had an urgent physiotherapy assessment. This highlighted serious concerns and she was admitted under the orthopaedics team. Despite a worsening of the back pain and significant deterioration in her mobility due to foot drop, she was discharged without any further investigations.

As a General Practitioner it was challenging to organise diagnostic imaging in the community while concurrently trying to manage a previously healthy and increasingly frustrated patient symptomatically.

INVESTIGATIONS

Blood tests revealed an elevated C reactive protein (CRP) (60 mg/l) and a slightly raised white cell count ($11.7 \times 10^9/l$). The lumbar spine X-ray was unremarkable (figure 1). An outpatient MRI demonstrated a right iliacus abscess and abnormal right L4/L5 and L5/L6 facet joints (L6 vertebra

Figure 1 Lumbar spinal X-ray—mildly exaggerated lumbar lordosis but unremarkable otherwise.

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Figure 2 CT scan (without contrast) demonstrates abscess laterally within the iliacus muscle on the right with erosive changes of the right L5/L6 facet joint noted.

segmentation anomaly present). A CT of the abdomen and pelvis confirmed these findings (figures 2 and 3), with erosive bony changes in the facet joints identified (figure 2). The spinal MRI demonstrated right apophysis joint enlargement at the levels of L4–L5 and L5–L6 (figure 4).

A CT-guided aspiration was carried out and intravenous antibiotics were started. The aspirate culture isolated *Streptococcus pneumoniae*.

DIFFERENTIAL DIAGNOSIS

The clinical picture of SAFJ of the lumbar spine is similar to that of spondylitis where the presenting symptom is mostly lumbar back pain with varying intensity, depending on movement.^{7 8} Often, there is a history of fever, general tiredness, nausea and stiffness.^{5 8 9} Such symptoms are non-specific, and therefore the differential diagnosis is wide, including arthritis, hip joint pathology, primary and secondary malignancies and aortic/retroperitoneal pathology.

In cases of unilateral SAFJ, the symptoms are more severe. The back pain is more significant from the onset, and it is felt more laterally.^{7 8} The lumbar pain in cases of SAFJ tends to radiate down the gluteal area, and the thigh and calf muscles, which is similar to disc prolapse presentation,^{8 9} where patients usually have neurological deficit as a result of the nerve root

compression or even cauda equina syndrome.^{9 10} The onset of the condition could vary from 2 days to 5 weeks.^{4 8 11}

TREATMENT

A CT-guided aspiration of the abscess was carried out and followed by antibiotic therapy. The aspirate culture isolated *S. pneumoniae* (figure 4). Vancomycin and Ceftriaxone were given in hospital for 30 days, followed by oral rifampicin. Owing to intolerance, rifampicin was replaced with oral amoxicillin for another 14 days.

OUTCOME AND FOLLOW-UP

A month after the completion of treatment, the patient was reviewed and had a follow-up MRI. Her back pain had nearly completely resolved, her gait was steady and the foot drop had improved with a power of 4/5. Residual hypotonia and atrophy of the muscles of the right leg were noted. The follow-up MRI demonstrated resolution of the paravertebral abscess with minimal postinflammatory changes in the facet joints (figure 5).

DISCUSSION

The role of facet joint infection as a potential cause for lumbosacral syndrome has been well known since 1911, but SAFJ has only been described relatively recently.^{1 11} According to

Figure 3 MRI axial view at the level of L5–L6. Septic arthritis of the right facet joints of L4/L5 and L5/L6 (shown). Abnormal enhancement demonstrates infection/inflammation extending from the facet joint into the residual collection between the iliacus and psoas muscles.

Figure 4 CT scan (without contrast): demonstrates the catheter during the aspiration of the pus collection in the right iliacus.

Ogura *et al*, there have been only 50 such cases described in the literature. On the other hand, Rhyu *et al* and Klekot *et al* are of the opinion that there are no more than 40 published cases.^{3 12 13} Muffoletto *et al* state that only around 4% of all cases of septic osteomyelitis affect the facet joints.¹³ Other studies have reported up to 20% involvement of the facet joints and this discrepancy in numbers could be a result of missed diagnosis and lack of understanding.^{2 7 12}

This condition affects the lumbar spine in 86–97% of the cases, with the rest affecting the cervical spine.^{3 6–9} Two possible routes for the spread of the infection have been proposed. The majority of cases (72%) spread haematologically from another source.^{6 12} There is no clear evidence of an exact pathological process. Some studies have suggested that a predisposing factor for the development of such infection is the lumbar spine's blood supply.⁷

Halpin and Gibson¹ suggest that excessive pressure at the level of the intervertebral joints could be causing microhaematomas, predisposing to the formation of an abscess. On the other hand, Ergun *et al*⁷ point out that degenerative changes in the facet joints can cause abscess formation.¹ Other possible causes for abscess formation are iatrogenic as a result of a surgical intervention, spinal injection, acupuncture or injury.^{4 5 10}

In the patient described here, there was no iatrogenic cause, and she did not have a significant medical history. No primary source of infection could be identified, with blood and urine cultures failing to grow any organisms.

Figure 5 Follow-up MRI—the right iliacus abscess is no longer visualised with mild residual postinflammatory changes at the level of the right L5-S1 joint noted.

Known risk factors for haematological SAFJ are age (above 60 years), degenerative changes in the apophysis of the intervertebral joints, rheumatoid arthritis, steroid therapy, immunosuppressive treatment, diabetes, liver cirrhosis, chronic renal failure, and other chronic haematological conditions.^{3 5 9 13} This patient did not have any of the above.

The most common microorganism (up to 70%) is *Staphylococcus aureus*.^{3 5 8 9} Other organisms such as *Staphylococcus epidermidis*, group B streptococcus, *Salmonella* and *Escherichia coli* have been described on rare occasions.^{7 12} No cases of *S. pneumonia*, which was seen in this patient, were identified in the literature search.

Common complications of SAFJ are epidural and paraspinal abscess. According to Muffoletto *et al*, epidural abscess can be seen in up to 25% of the cases of SAFJ, while paraspinal abscess is more frequent in up to 38% of the cases. It is suspected that such complications develop early in the illness as a result of the shared blood supply.⁸

Laboratory investigations are non-specific, similar to spondylodiscitis. The leucocytes could be raised in 50% of the cases, as well as erythrocyte sedimentation rate and CRP.^{7 9 12} The aspiration of the abscess helps to determine the causative organism while the culture and sensitivity help in deciding on the appropriate antibiotic therapy.⁵

Imaging plays an important role in the early diagnosis of SAFJ. The spinal X-ray is rarely useful in the diagnosis as it is usually normal.^{5 8} However, plain radiographs can provide additional information regarding progression as it demonstrates bony changes within the joint space, irregularities of the facet joints, and osteolytic and osteosclerotic abnormalities, particularly between 3 weeks and 3 months from the initial presentation.^{7 8 11} Scintigraphy with technetium 99 m is another early diagnostic method which is particularly useful in cases of capsulated pus-retaining lesions, as early as 3 days from onset. It has to be said that the findings are not pathognomonic for SAFJ.⁸

CT imaging helps early diagnosis from 2 weeks onwards and provides precise information about the localisation and bone detail.^{7 9} CT with contrast helps to better delineate relationships to the surrounding tissues.⁷

MRI is the investigation of choice due to its high sensitivity and specificity and its ability to identify abnormalities earlier.⁸ It provides information about the involvement of soft tissues and epidural space.^{7 9} It also adds valuable information about the spinal cord, subarachnoid space, spinal canal and paravertebral structures.⁵

The management of SAFJ consists primarily of antibiotic therapy, intravenous in the first 2 weeks, followed by 6–7 weeks of oral treatment.¹¹ According to Klekot *et al*, such a regimen is successful in 71% of the cases.¹ Recently, therapeutic regimens have included percutaneous aspiration of the abscess and intra-articular application of antibiotics, with an up to 85% success rate.⁸ When patients are found to have epidural abscess, significant neurological deficit or evidence of cauda equina, surgical intervention may be necessary in order to evacuate the content of the capsulated abscess and decompress the neurological structures.¹¹

Despite increasing knowledge of the condition and modern diagnostic imaging investigations, the management of SAFJ is still a challenge due to the resistant microorganisms causing septicæmia and consequent mortality.^{2 14}

CONCLUSION

SAFJ must be considered as a potential differential diagnosis in cases of atypical, complicated lumboradicular back pain

Learning points

- ▶ SAFJ is commonly but not always due to iatrogenic infection and a primary focus is not always identified.
- ▶ Patients with septic arthritis of the facet joints (SAFJ) typically have a history of febrile syndrome as well as atypical lumboradicular pain, which does not improve with analgesia.
- ▶ MRI and CT scan are the diagnostic investigations of choice.
- ▶ CT-guided aspiration of the affected intervertebral joint and/or any associated abscess followed by adequate antibiotic therapy provides successful recovery in most cases.
- ▶ More complicated cases with significant neurological deficit or cauda equina syndrome might require surgical intervention for evacuation of the abscess and decompression of the neurological structures.

associated with fever. In the majority of cases, the infection could be iatrogenic. The described case proves to be different as it lacks a predisposing factor. CT-guided aspiration of the collection, identifying the causative microorganism followed by adequate antibiotic therapy, provides satisfactory recovery in most cases.

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Contributors All the authors have made substantial contributions to the conception and design of the study. BDK has prepared the literature review and contributed in interpretation of data and in the basic drafting. MBK-J participated in the acquisition of data, its analysis and translation as well as in further drafting. FTS has provided information about the diagnostic imaging as well as about the analysis and expertise. He has worked on the critical revision of the draft. AA-A has

contributed to the editing and critical revision of the manuscript. MBK-J and AA-A were the main clinicians involved in the patient's care.

Competing interests None declared.

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