Case Report

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Hidden Culprit: Septic Arthritis Of The Costovertebral Joint Disguised As Renal Colic.

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ABSTRACT

Background: Septic arthritis of the costovertebral joint is an extremely rare condition, often misdiagnosed due to its atypical presentation. This case report describes a unique instance of septic arthritis involving the costovertebral joint presenting as renal colic, highlighting the diagnostic challenges and management strategies.

Case Presentation: A 50-year-old Caucasian man presented with a 10-day history of non-mechanical low back pain radiating to the left flank and right buttock, accompanied by fever, weight loss, and rigors. Initial investigations revealed elevated inflammatory markers and a left lower lobe consolidation on imaging, suggestive of a respiratory tract infection. Subsequent MRI identified a right-sided L5/S1 facet joint infection, and later imaging revealed a concurrent T9/10 costovertebral joint infection. The patient was managed with long-term antibiotic therapy, which resulted in the resolution of the infection. However, the delayed diagnosis underscored the complexities of this atypical presentation.

Conclusion: Septic arthritis of the costovertebral joint can present atypically, mimicking renal or intra-abdominal pathology. Early recognition, thorough imaging, and appropriate antimicrobial therapy are crucial to prevent complications and improve outcomes. This case highlights the need for awareness of unusual presentations of spinal infections to facilitate timely diagnosis and treatment.

Keywords : Septic arthritis, Costovertebral joint, Renal colic mimicry, Spinal infection, Atypical presentation.

INTRODUCTION

Septic arthritis predominantly involves large peripheral joints, with less frequent occurrences in the facet joints (SAFJ) and rare involvement of the costovertebral and costotransverse joints. SAFJ was first described in 1987 by Haplin and Gibson [1], and only a few dozen cases have since been documented in the literature. It accounts for approximately 0.2% of all reported spinal infections [2]. However, the true prevalence of SAFJ is likely underestimated due to factors such as self-limited cases evading diagnosis, misdiagnosis, and under-reporting. Studies indicate a male-to-female ratio of 1.2 among SAFJ cases, with a mean patient age of 63 years [3]. Infections specifically involving the costovertebral and costotransverse joints are exceedingly rare, with only a handful of cases reported [4-8].

Septic arthritis of the costovertebral joint and facet joints should be considered in patients presenting with fever and severe back pain that remains unresponsive to changes in activity or rest [4]. Among reported SAFJ cases, 90% of patients experience localized pain at the affected level, while 50% exhibit febrile symptoms [9]. More than half of SAFJ cases is also associated with neurological deficits [10, 11]. These deficits may stem from concurrent radiculopathy, which can obscure typical disease presentations and delay diagnosis, or from complications such as epidural collections [12].

To our knowledge, no previous cases have documented the coexistence of costovertebral, costotransverse, and thoracic facet joint infections presenting as acute abdominal pathology. This case underscores an atypical presentation of spinal infection and highlights the critical role of appropriate diagnostic investigations.

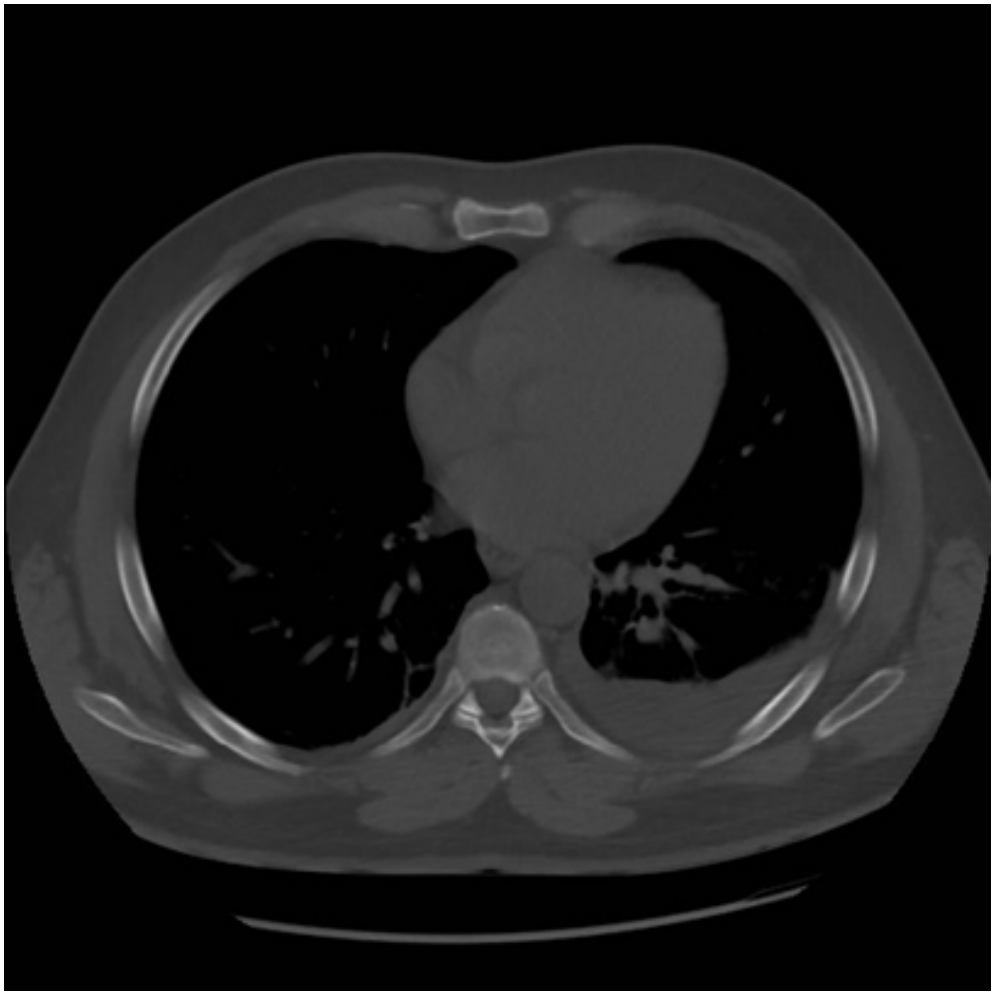
CASE REPORT

A 50-year-old Caucasian man from South Wales presented with a 10-day history of non-mechanical low back pain, which had become spasmodic, radiating to the left flank and right buttock. His symptoms were accompanied by weight loss, fever, sweats, and rigors. He had no neurological abnormalities, history of trauma, or significant past medical or family history. Initial blood tests revealed a white cell count (WCC) of 13.5 × 10^9/L and a C-reactive protein (CRP) level of 276 mg/L. A urine dipstick showed the presence of blood and protein. All other laboratory investigations, including serum amylase, liver function tests, renal profile, and blood cultures, were unremarkable.

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A chest X-ray demonstrated left lower lobe consolidation with a small associated pleural effusion, confirmed on subsequent CT imaging (**Fig. 1**). The patient was diagnosed with a lower respiratory tract infection and commenced on amoxicillin.

Figure 1. CT scan demonstrating left lower lobe consolidation and small pleural effusion.



Radiographs of the lumbar spine showed reduced disc space at the T12-L1 level with anterior osteophyte formation, consistent with age-related degenerative changes (**Fig. 2**). A CT urogram was performed to investigate for left-sided pyelonephritis, revealing normal kidney outlines, no ureteric dilation, and no evidence of hydronephrosis or renal calculi.

Despite treatment, his symptoms persisted, and serial blood tests showed ongoing elevation of inflammatory markers. An MRI of the lumbosacral spine was conducted to explore the aetiology of his back pain. This revealed a right-sided L5/S1 facet joint infection with extension into the paraspinal musculature (**Fig. 3**). No evidence of discitis was observed on the MRI (**Fig. 4**). He was started on a long course of antibiotics, including doxycycline, guided by microbiological advice. Over time, his symptoms began to improve, accompanied by a significant reduction in inflammatory markers (**Fig. 5**).

Given the persistence of symptoms and the localized findings, a repeat MRI of the thoracolumbar spine with contrast was performed two weeks after starting antibiotics. This scan, which included a larger field of view, revealed an additional focus of infection at the left T9/10 facet joint, extending to the costovertebral and costotransverse joints (**Figs. 6-7**). These findings, along with the L5/S1 facet joint involvement (**Fig. 8**), were consistent with septic arthritis, despite the absence of typical risk factors for infection. Needle aspiration was not performed due to the small size of the collection and the risk of pneumothorax. Antibiotic therapy was extended for six more weeks. The previously identified chest X-ray findings (**Fig. 1**) were thought to be secondary to the underlying infection.

At a three-month follow-up, a repeat MRI showed resolution of the infection (**Fig. 9**), and inflammatory markers returned to normal levels (**Fig. 5**). One year later, the patient reported persistent lower back pain radiating to both lower limbs, accompanied by paraesthesia. A follow-up MRI demonstrated complete resolution of the infection but revealed mild stenosis at the L4/5 level. After temporary relief with a selective nerve root block, the patient underwent successful lumbar decompression surgery, resulting in significant symptom improvement.

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Figure 2. Anteroposterior and lateral lumbar radiographs demonstrating normal alignment.

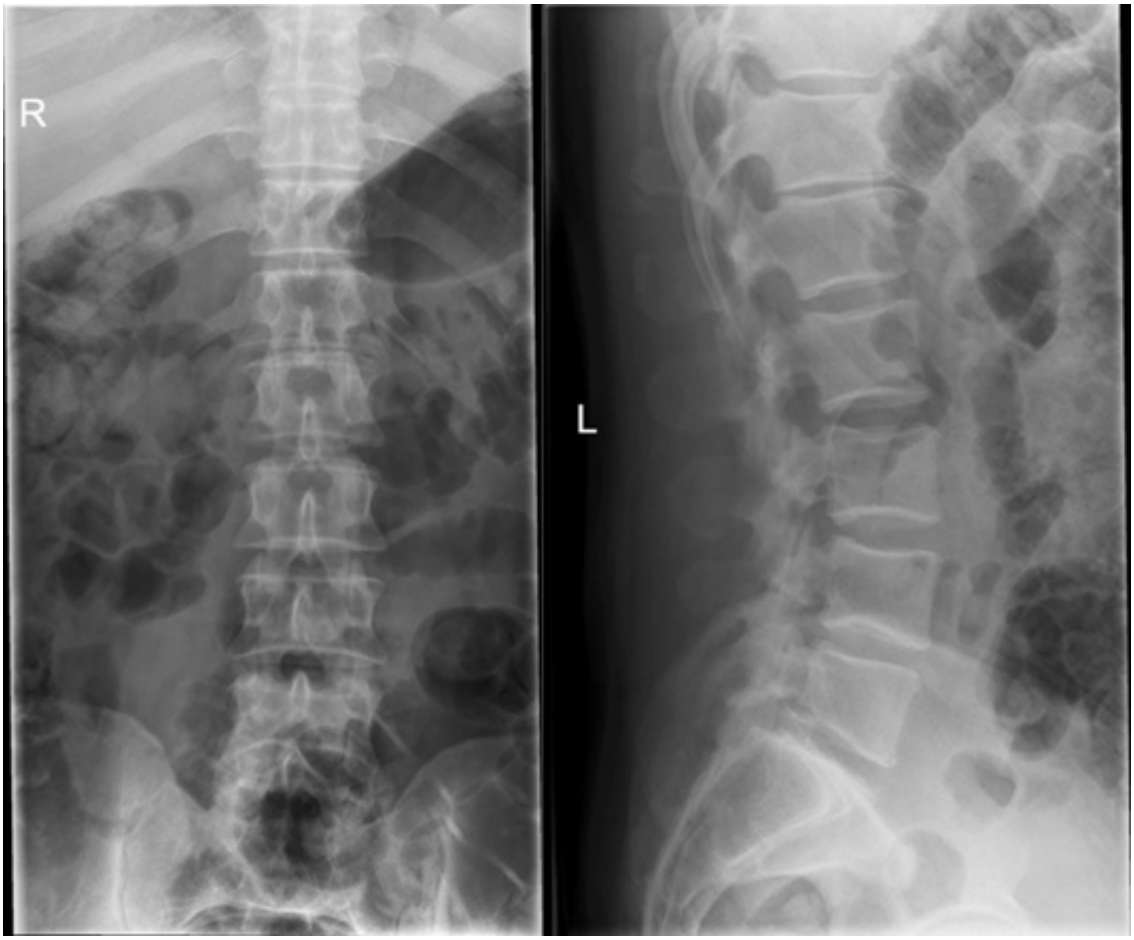
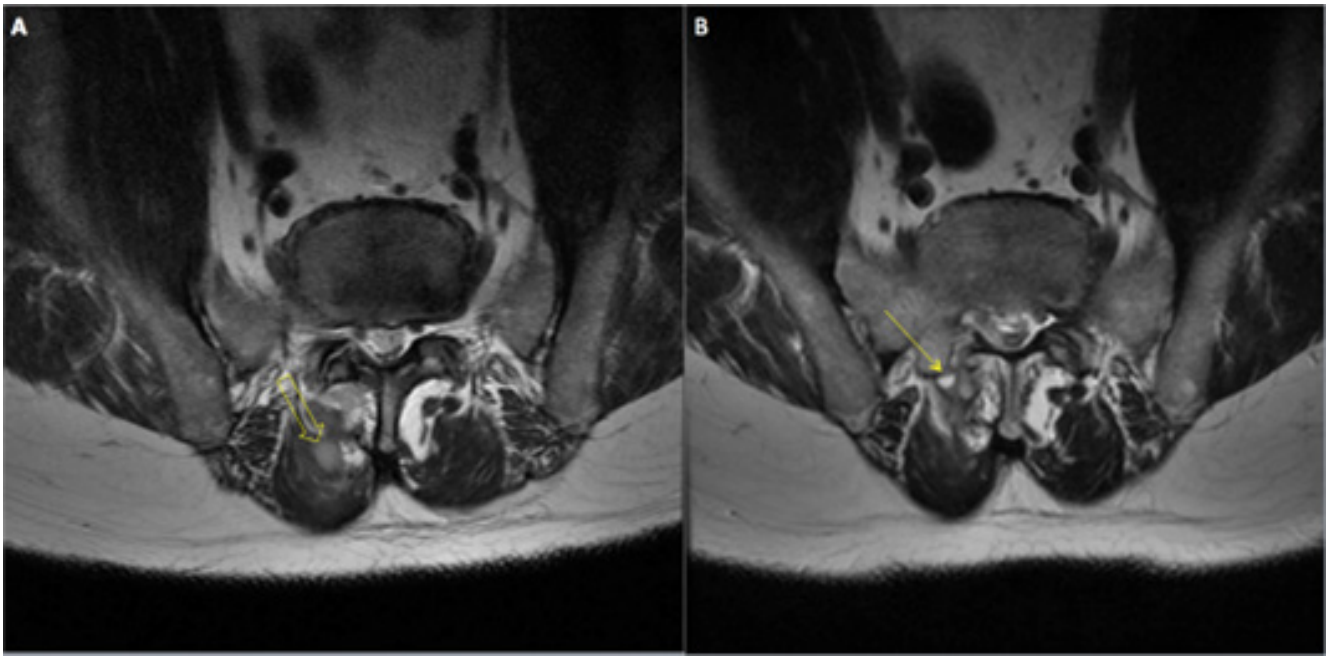


Figure 3. T2 axial MRI identifying inflammatory changes around the right L5/S1 facet joint with a small superficial collection in the posterior para-spinal muscles (A-hollow arrow) and associated marrow oedema and fluid in the facet joint (B-straight line arrow).

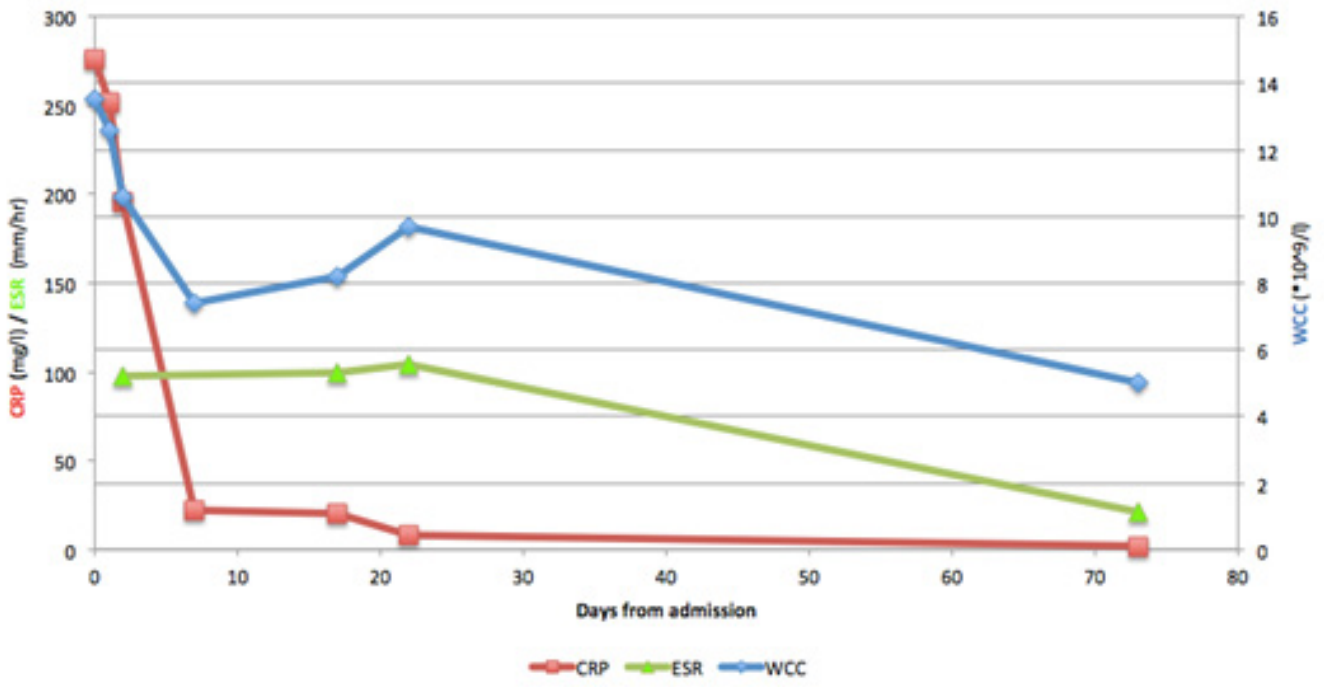


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Figure 4. T2 Sagittal Mri Showing No Evidence Of Lumbar Discitis.



Figure 5. Graph showing progression of inflammatory blood markers of the patient.



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Figure 6. T1 parasagittal MRI (A) and STIR imaging (B) demonstrating the infection at T9/10.

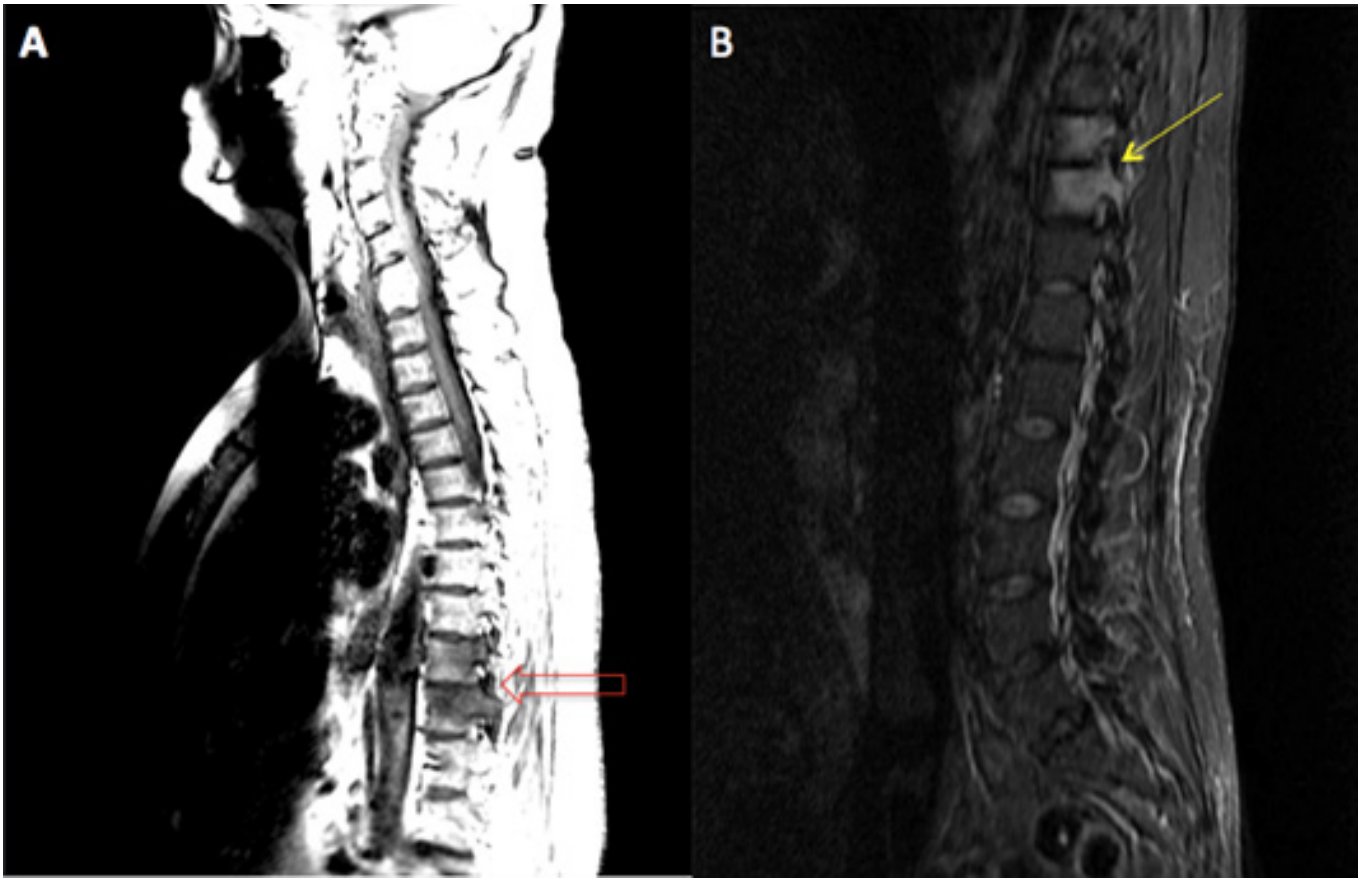
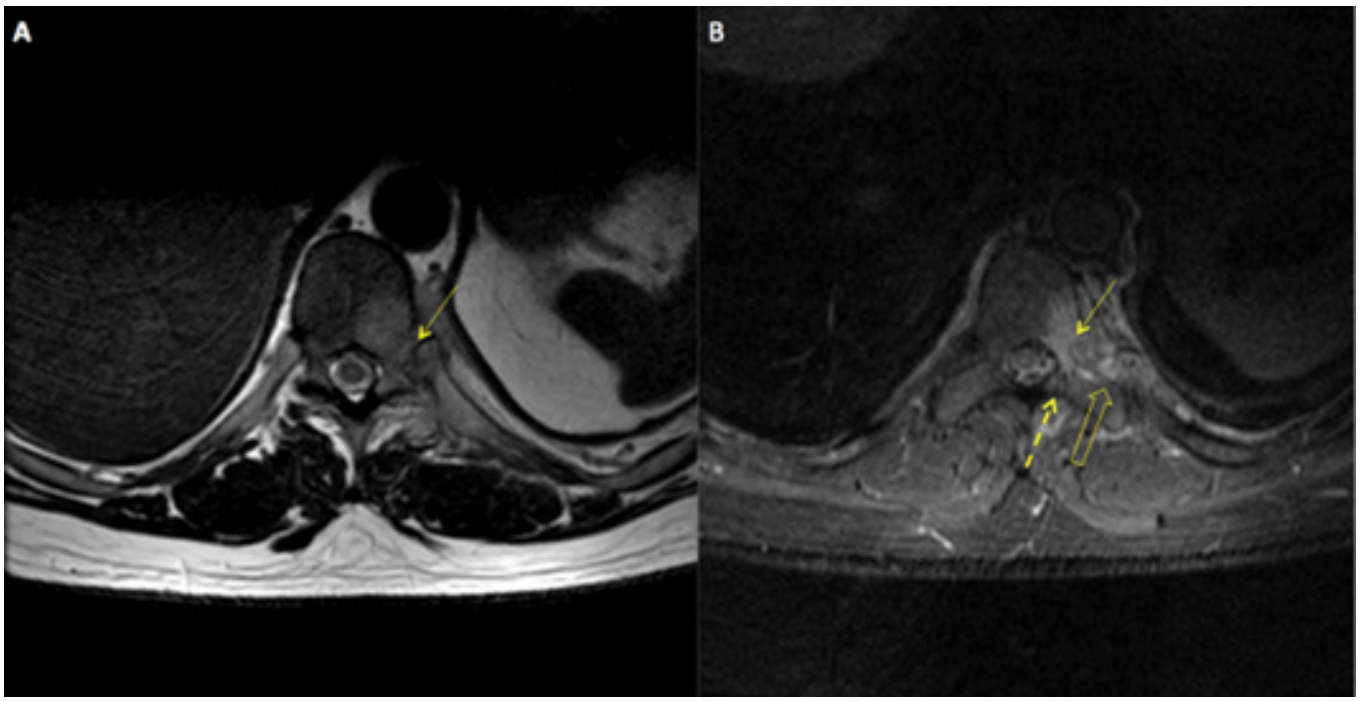
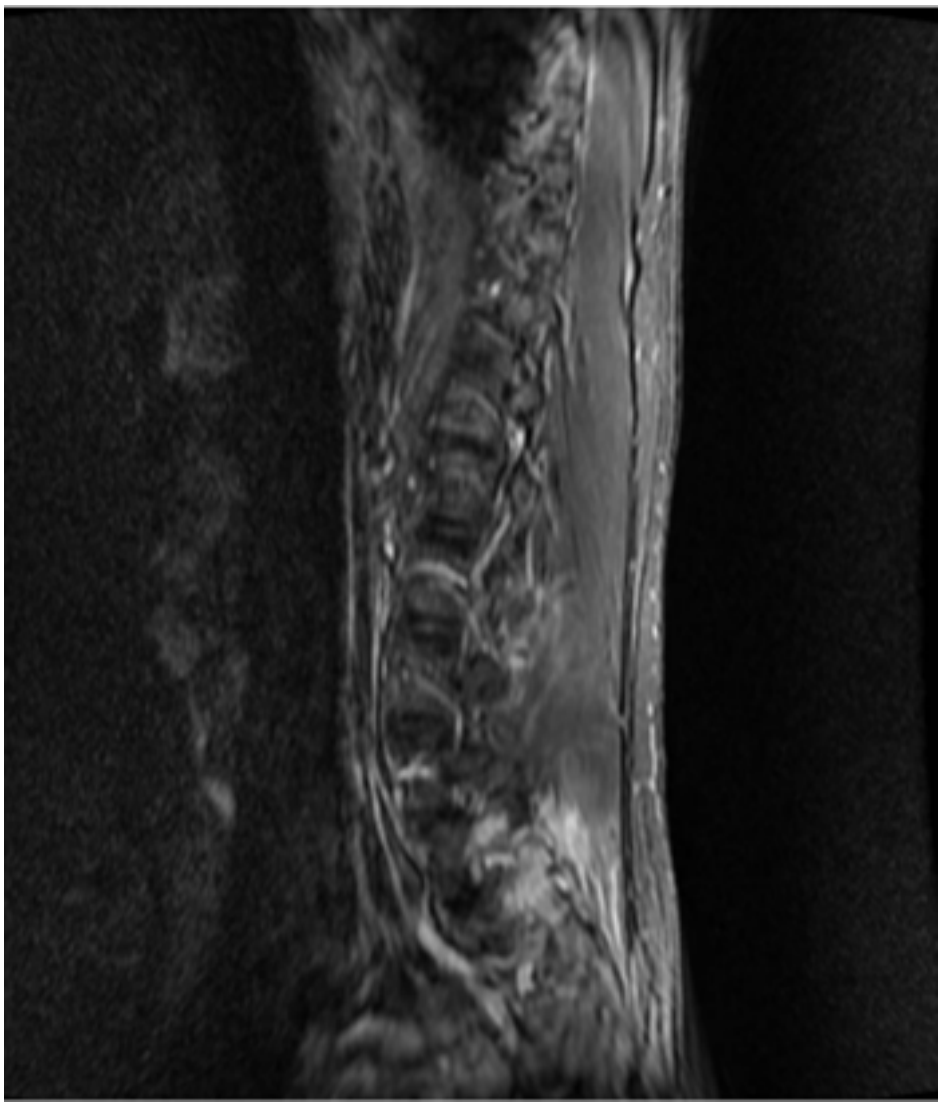


Figure 7. T2 axial MRI (A) and STIR (B) showing inflammatory changes around the left T9/10 facet joint (dashed arrow), costovertebral (straight line arrow) and costotransverse (hollow arrow) joints.



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Figure 8. Parasagittal STIR image demonstrating inflammatory changes at L5/S1.



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Figure 9. Sagittal T2 image demonstrating resolution of the infection 3 months after treatment.



DISCUSSION

To our knowledge, this is the first documented case of septic arthritis of the costovertebral joint presenting as renal colic. Although there are few reports of infected costovertebral and costotransverse joints in the literature, causative organisms like Mycobacterium tuberculosis, Brucella species, Staphylococcus aureus, and Pseudomonas aeruginosa have been identified, often associated with predictable symptom patterns [4–8]. Spinal septic arthritis more commonly localizes to the facet joints (SAFJ), predominantly in the lumbosacral region. Narvaez reported that 86% of SAFJ cases affected the lumbar spine (14% at L5/S1), compared to 9.5% and 4.5% in the cervical and thoracic regions, respectively [13]. Only one case in the literature describes septic arthritis of the lumbar facet joint mimicking acute intra-abdominal pathology [14]. However, the case we present is distinct, as the symptomatology stems from concurrent costovertebral joint infection.

Differentiating septic arthritis of the costovertebral and facet joints from spondylodiscitis can be challenging due to overlapping presentations and similar at-risk populations [4]. While SAFJ often presents unilaterally with pain radiating to the flank, buttock, or thigh and may involve muscular spasm, spondylodiscitis pain is typically midline. SAFJ tends to manifest more acutely and severely, likely due to the smaller joint size and dense innervation. In our case, the flank pain and muscle spasms led to an initial misdiagnosis of renal colic, emphasizing the diagnostic challenge [10, 15, 16]. Diagnosis often requires MRI, as delayed recognition is common, with symptoms lasting an average of four weeks before diagnosis [11].

Risk factors for spinal septic arthritis include age >60 years, immunosuppressive therapy, diabetes mellitus, rheumatoid arthritis, steroid use, intravenous drug use, liver cirrhosis, chronic renal failure, and hematologic disorders [10, 17]. Differential diagnoses include malignancy, inflammatory arthritis, osteoarthritis, and tuberculosis [17]. It is crucial to exclude these

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conditions when managing the non-specific symptoms associated with septic arthritis, such as fever, fatigue, nausea, and weight loss [4, 10].

The diagnosis of SAFJ hinges on inflammatory markers and imaging studies. Muffoletto et al. [11] reported consistently elevated CRP and ESR levels in SAFJ cases, though leucocytosis was present in only 47%. Radiographs often miss early cases, as radiographic changes appear only after 6–12 weeks. However, radiographs can reveal erosive arthritis in later stages [10]. Computed tomography provides a better evaluation of facet joints through multiplanar reconstructions [12]. Technetium-99m MDP bone scans are highly sensitive for early detection, identifying facet joint infections as soon as three days after symptom onset, but their low specificity limits diagnostic utility [11]. MRI remains the gold standard due to its sensitivity and specificity, enabling early detection of joint erosion, paraspinal muscle oedema, and abscess formation as early as two days after symptom onset. Gadolinium-enhanced MRI provides additional insights, including epidural granulation tissue or abscesses [10, 11, 17, 18].

Treatment strategies for SAFJ are often modelled after spondylodiscitis management. Sur et al. recommend a six-week course of intravenous antibiotics followed by six weeks of oral therapy [19, 20]. No standardized protocol exists for costovertebral joint infections, given their rarity. Monitoring treatment involves clinical assessment, serial inflammatory markers, and MRI. Notably, soft tissue enhancement can persist on MRI after infection resolution [17].

Most septic arthritis cases are thought to arise from hematogenous spread, accounting for 72% of reported cases [22]. Alternative aetiologies include excessive pressure on intervertebral joints or degenerative changes, which predispose to abscess formation [1, 10, 23]. Iatrogenic causes, such as facet joint injections, epidural catheterization, acupuncture, and spinal surgery, as well as local spread from adjacent infections, have also been implicated [17, 24–27].

Staphylococcus aureus is the most common causative organism (70%) in SAFJ, followed by Streptococcus species (16%) and Gram-negative bacteria (7%) [16]. Rarely, fungal or mycobacterial pathogens are involved [16]. While blood cultures were negative in this case, the patient's adequate response to antibiotic therapy precluded needle aspiration, which is generally reserved for uncertain diagnoses. André et al. found blood cultures identified causative organisms in 8 of 11 cases, while CT-guided needle aspiration provided additional diagnostic clarity [13, 28].

Complications of SAFJ include epidural or paraspinal extension in approximately 81% of cases [11, 13, 21]. Although rare, epidural abscesses may cause neurological deficits, necessitating emergency surgical intervention to prevent devastating outcomes like spinal instability or nerve compression [21, 30]. Other complications include sepsis, chronic pain, joint destruction, pyomyositis, spondylodiscitis, endocarditis, meningitis, septic emboli, and, in rare cases, death [17].

The prognosis of SAFJ is favourable, with a reported mortality rate of 2% [13]. Most patients recover fully or with minor residual pain or neurological deficits [17]. In some cases, joint destruction may lead to persistent lumbar radicular symptoms [10].

CONCLUSION

Early diagnosis and prompt intervention are critical in managing spinal septic arthritis due to its potentially severe complications. Clinicians must maintain a high index of suspicion in patients presenting with non-mechanical back pain accompanied by fever. Careful examination of imaging studies is essential to avoid missed diagnoses. Awareness of atypical presentations, such as SAFJ and costovertebral/costotransverse joint infections mimicking renal colic with flank radiation and muscular spasms, is vital for timely and accurate treatment.

Key Points

-Early Recognition: Severe back pain with fever and/or neurological deficits should raise suspicion for spinal septic arthritis, a rare but potentially devastating condition.

-Atypical Presentations: Costovertebral and costotransverse joint infections can mimic renal colic with flank pain and muscle spasms, requiring careful differential diagnosis.

-Role of Imaging: MRI with contrast is critical for early and accurate diagnosis, especially in atypical or overlooked cases.

-Collaborative Care: Effective management requires multidisciplinary input and long-term antibiotic therapy guided by clinical and microbiological findings.

-Clinical Awareness: Heightened awareness of these rare presentations can prevent delays in diagnosis and improve outcomes.

Conflict of interest

The authors declare that they have no conflict of interest.

Acknowledgement

We sincerely acknowledge Eleanor Catherine O'Connell Taylor and Ahmed Sherif for their significant contributions to the study of rare presentations of septic arthritis, particularly their work on costovertebral joint involvement mimicking renal colic, which has enhanced clinical understanding and diagnostic precision.

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