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Anatomical variations of the floor of the third ventricle and their surgical implications for endoscopic third ventriculostomy

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Abstract

Introduction: Infectious sacroiliitis is a rare condition that occurs when there is inflammation of the sacroiliac joint and typically presents with lower back pain that can radiate to the buttocks and lower limb. Its diagnosis is often complex due to its clinical manifestation and rarity.

Case report: We present a 55-year-old male patient who presented with lumbar pain radiating to the gluteal region. Magnetic resonance imaging (MRI) confirmed findings consistent with left sacroiliac infectious arthropathy, revealing a collection compatible with an abscess that compromised the ipsilateral iliopsoas muscle. The patient was successfully treated conservatively with antibiotic therapy, avoiding surgical drainage.

Discussion: In sacroiliitis, physical exams and medical history are crucial for suspecting the diagnosis; they help decide if imaging tests are needed and guide the right treatment to avoid risks and complications.

Conclusion: This case highlights a disease with low prevalence and emphasises the importance of proper physician examinations, medical history and advanced imaging, specifically MRI, in confirming diagnosis and guiding treatment options.

Keywords
sacroiliitis,
abscess,
low back pain

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Introduction

Sacroiliitis is defined as the painful inflammation of the sacroiliac joint. It presents a diagnostic challenge and frequently mimics lumbar pain of mechanical origin. (1) Approximately 25% of cases with lumbar pain are related to the sacroiliac joint and associated with conditions such as spondylarthrosis. (1,3) Regarding pathophysiology, it is not fully understood. Nonetheless, it has been associated with HLA-B27 gene mutations. (4) It is necessary to use diagnostic imaging to identify; simple radiography is a safe and cheap option considering the low dosage of radiation, as well as cost-effectiveness and straightforward access. Despite its positive aspects, simple radiography has limitations because it is a two-dimensional technique. (5) The use of advanced studies such as computed tomography (CT), magnetic resonance imaging (MRI), and nuclear medicine explorations such as bone scans is an alternative with a higher diagnostic performance. (5)

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Sacroiliitis can occur acutely or over the course of chronic diseases. It is commonly associated with inflammatory arthritis of the spine, so its various causes include Crohn's disease, inflammatory bowel disease, ulcerative colitis, and gout, as well as infectious diseases. (1,2,6) The objective of this case report is to highlight a pathology that is rarely recognized in the hospital setting but warrants follow-up to avoid long-term complications. Similarly, this case report illustrates the importance of diagnostic imaging in characterizing the condition.

Case report

A 55-year-old male patient with a history of left paraspinal abscess surgery and diabetes mellitus managed with insulin. He was admitted with a four-day history of multiple episodes of vomiting and polydipsia. On physical examination, he was in poor general condition, severely dehydrated, tachypneic, and tachycardic. He presented with lumbar pain radiating to the gluteal region, and after evaluation by a specialist, it was documented that he had preserved strength of 5/5 in all four limbs, normal osteotendinous reflexes, and preserved sensitivity. In addition, lumbar paravertebral spasm and bilateral sacroiliac pain were reported.

Additional tests were ordered, revealing elevated serum glucose (>500 mg/dL, normal value (NV): <100 mg/dL), a blood count with leukocytosis of 18,480 mm^3 (NV: 4,500-11,000 mm^3) and neutrophilia (84.7%) and impaired renal function, with acute kidney injury classified as AKI II (Acute Kidney Injury stage II). This classification defines stage II as a 2- to 3-fold increase in serum creatinine from baseline or a urine output of less than 0.5 mL/kg/h for more than 12 hours. (7) A glomerular filtration rate (GFR) of 16.1 (mL/min/1.73 m^2) was calculated by CKD-EPI. Furthermore, electrolyte imbalance with hyperkalemia and mild hyponatremia was also reported, as well as arterial blood gases with severe metabolic acidosis and hyperlactatemia. Additionally, an abdominal ultrasound was requested, which revealed fatty liver and right nephrolithiasis.

After analyzing the laboratory reports, they determined that the patient was suffering from acute decompensation of his underlying disease and was transferred to the intermediate care unit, where he remained for four days. During his recovery, the patient complained constantly of pain in the left lumbar region with discomfort on palpation and inflammatory changes in the glans and foreskin due to fungal balanitis, which led to antibiotic escalation to piperacillin tazobactam 4.5 mg intravenously every 6 hours and antifungal treatment with fluconazole 200 mg intravenously every 12 hours for 5 days. An ultrasound of the soft tissues in the area of pain was requested, which reported soft tissue edema with scarring changes. As the ultrasound was non-diagnostic, they proceeded with a CT scan of the lumbosacral spine, which revealed only changes compatible with spondylarthritis.

Given the persistence of diagnostic uncertainty, they decided to perform a lumbar spine MRI without contrast, which showed a collection in the left iliopsoas muscle with posterior pararenal extension (Figure 1). Relevant medical history was investigated again, and the patient reported a history of surgery for drainage of a left paraspinal abscess approximately four months earlier. The patient completed nine days of antibiotic treatment and was asked to have a blood culture taken, which reported negative for aerobic bacteria on the fifth day of incubation. However, the symptoms persisted. At that point, the need for drainage of the collection was evaluated, and considering its size, it was decided that surgical intervention would not be beneficial. Therefore, the antibiotic regimen was changed to cefepime 2 grams intravenously every 8 hours and linezolid 600 mg intravenously every 12 hours. Linezolid was preferred over vancomycin due to a history of acute renal failure.

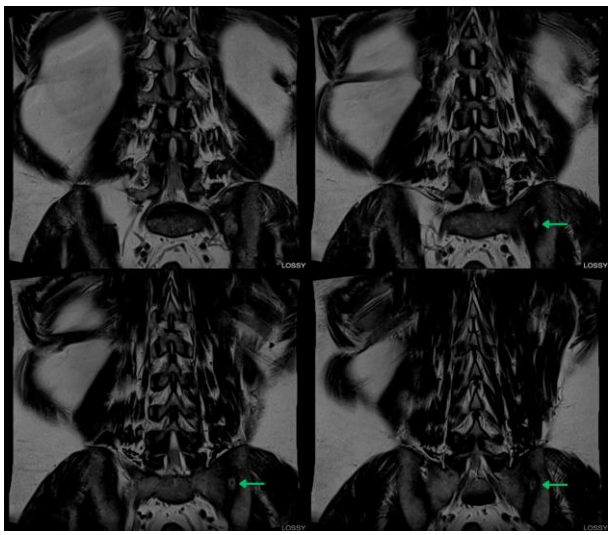

Figure 1. Coronal MRI slices of the lumbar spine without contrast: in the T2 sequence, an oblong collection measuring

approximately 88x21x26 mm is observed in the left psoas iliacus muscle (green arrows), with a hyperintense signal characteristic of an abscess and extension into the posterior pararenal fat space.

After two days of treatment, a contrast-enhanced sacroiliac MRI was requested, which revealed findings consistent with infectious sacroiliac arthropathy on the left side, including a collection suggestive of an abscess that compromises the ipsilateral iliopsoas muscle and is associated with paraspinal myositis (Figure 2). A considerable reduction in the size of the abscess was confirmed, so antibiotic treatment was continued. The patient remained in the hospital for eight more days, with follow-up laboratory tests showing normalization of the white blood cell count (8,050 mm³), responding adequately to the treatment administered. He was therefore discharged from the hospital with an outpatient antibiotic treatment plan that included ciprofloxacin 500 mg orally every 12 hours for 14 days and clindamycin 300 mg orally every 8 hours for 10 days, along with outpatient monitoring by a specialist.

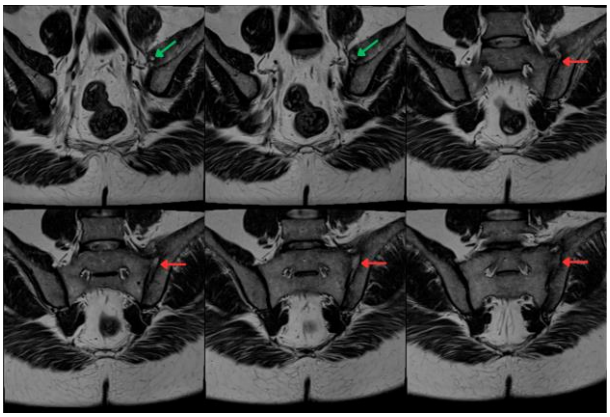

Figure 2. Coronal MRI slices of sacroiliac joints with gadolinium: T2 sequence showing findings of infectious sacroiliac arthropathy on the left (red arrows) with a collection suggestive of an abscess involving the ipsilateral iliopsoas muscle (green arrows).

Discussion

The pathophysiology of sacroiliitis can be complex and involve internal, environmental, immunological, and genetic factors. Mechanically, it may be the result of an imbalance in load transfer between the lumbar spine, lower extremities, and the support provided to the upper body. (2,8) Systemically, sacroiliitis may be secondary to rheumatic diseases such as psoriatic arthritis, Behçet's disease, or reactive arthritis. (5) Autoimmune diseases, such as inflammatory bowel disease, may also cause sacroiliitis; in these cases, the sacroiliac joint is typically affected on only one side, (5) as observed in the current patient. In the natural course of the disease, as inflammation persists, it damages the joint and causes changes similar to those seen in osteoarthritis, (2) as identified in this case with involvement of the ipsilateral iliopsoas associated with paraspinal myositis.

In infectious sacroiliitis, local inflammation irritates adjacent neural structures, especially the fifth lumbar nerve root (L5) and the first and second sacral nerve roots (S1 and S2), which can mimic the radicular pain of a herniated disc. (9) Therefore, clinical suspicion is essential to guide the diagnosis. The medical literature lists other possible conditions to consider, including ankylosing spondylitis, tendinitis, piriformis syndrome, trochanteric bursitis, hip osteoarthritis, kidney stones, pyelonephritis, a hip fracture, typical sciatic pain, facet pain, or pyramidal syndrome. (2)

Sacroiliitis poses a diagnostic challenge due to its nonspecific manifestations. However, once the diagnosis is suspected, imaging studies can be used to differentiate it from the aforementioned differential diagnoses. (9,10) Simple radiography is still used as the first choice for imaging sacroiliac joints. However, the irregular contour and obliquity of these joints make a complete evaluation difficult. (11) More advanced imaging techniques like CT and MRI have overcome this limitation. Furthermore, as was clearly identified in this case, ultrasound is not particularly useful for evaluating the sacroiliac joints, as it only allows the anterior and posterior margins to be seen. (5) CT is excellent for detecting erosion, bone sclerosis, and ankylosis, as well as for guiding interventional procedures. (4) However, in our particular case, it was not very useful in reaching a diagnosis for the patient, demonstrating that MRI is superior for detecting bone marrow edema as an indicator of inflammation in the sacroiliac joint. (12) MRI is the preferred imaging modality for characterizing sacroiliac joint disease and assessing its severity and activity. (12)

Definitive support for diagnosis is microbiological isolation, primarily through blood cultures. The most frequently isolated microorganism is *Staphylococcus aureus*, found in 45%–83.3% of cases, followed by

coagulase-negative Staphylococcus and group B *Streptococcus*. However, negative cultures can be recorded in up to 40% of cases. (2) In our case, no isolation of the causative pathogen was reported. Hermet M et al., in a multicenter study involving 39 adults, reported isolation of pathogens in 33 cases, corresponding to 84.6% of cases. Isolation was reported mainly through joint puncture (n = 16), followed by blood cultures (n = 14), cytological examination of urine (n = 2), and psoas puncture (n = 1). (11) In this case, joint puncture was not performed, considering the adequate clinical response to pharmacological management and the patient's renal status secondary to decompensation of the underlying disease, which limited the use of contrast.

There are three distinctive features of infectious sacroiliitis that help differentiate it from inflammatory sacroiliitis. First, bone marrow edema is usually more severe in cases of infectious sacroiliitis, accompanied by a significant increase in joint fluid. Second, the inflammation tends to spread to nearby soft tissues, particularly affecting the iliac and gluteal muscles. Third, the formation of periarticular fluid or the appearance of an abscess is an almost definitive sign of infectious sacroiliitis. (12)

Pharmacological treatment includes the use of anti-inflammatory drugs, such as corticosteroids and non-steroidal anti-inflammatory drugs (NSAIDs), (2,13) and intravenous antibiotics covering the most commonly reported microorganisms, i.e., coverage for gram-positive bacteria. (2) The duration of treatment depends on clinical progress, imaging findings, and blood culture results that guide targeted antibiotic therapy; these factors also determine the need for minimally invasive interventional treatment. Early initiation of a joint rehabilitation regimen through physical therapies is also useful, as these can help stabilize and strengthen the sacroiliac joint and the lumbar-pelvic muscles. (13) If the above treatments do not alleviate the pain, radiofrequency ablation may be considered and, finally, surgery as a last resort. (4)

Conclusion

Low back pain is one of the most common reasons for visits to the emergency department. Sacroiliitis should be included in the differential diagnosis after a thorough physical examination and medical history. Once the suspected diagnosis has been identified, imaging studies should be used to make early decisions, avoiding complications and sequelae.

List of abbreviations

AKI: Acute Kidney Injury
CKD-EPI: Chronic Kidney Disease Epidemiology Collaboration
CT: Computed Tomography
GFR: Glomerular Filtration Rate
HLA: Human Leukocyte Antigen
L5: Fifth lumbar nerve root
MRI: Magnetic Resonance Imaging
NSAIDs: Non-steroidal anti-inflammatory drugs
NV: Normal value
S1: First sacral nerve root
S2: Second sacral nerve root

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