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Case Report

Anatomy Meets Inflammation: An Imaging Case of Bertolotti Syndrome and Sacroiliitis

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Abstract: This case presents a unique anatomical and inflammatory interplay interplay between Bertolotti's syndrome and axial spondyloarthritis in a young adult with chronic back pain. MRI revealed a Type IIa lumbosacral transitional vertebra with pseudo articulation-related marrow oedema, alongside sacroiliitis with active inflammatory features. This radiological "double act" underscores the complexity of distinguishing mechanical anomalies from inflammatory pathology in the spine. By fusing clinical insight with high-resolution imaging, this case illustrates how modern diagnostics can decode overlapping pain generators—ensuring that treatment targets both structure and inflammation in a personalized, precision-driven approach to back pain.

Keywords: Bertolotti's syndrome, lumbosacral transitional vertebra, sacroiliitis, axial spondyloarthritis, bone marrow oedema, MRI, back pain.

INTRODUCTION

Lower back pain in young adults can stem from a complex interplay of anatomical and inflammatory factors. Bertolotti's syndrome, resulting from a lumbosacral transitional vertebra (LSTV), is a congenital anomaly that may contribute to localized pain through pseudoarticulation and mechanical stress. Concurrently, sacroiliitis is a hallmark of axial spondyloarthritis (axSpA), an inflammatory condition often diagnosed through characteristic imaging features. Differentiating between these two entities is critical, as their management pathways differ significantly. This study presents a case that illustrates the co-occurrence of a Type IIa LSTV and bilateral sacroiliitis, emphasizing the role of MRI in distinguishing anatomical anomalies from inflammatory pathology in patients with persistent lower back pain.

CASE PRESENTATION

Clinical History

A 34-year-old male presented with complaints of lower back pain which is exacerbated by forward bending. It is seen radiating into bilateral lower limbs. The patient tested positive for HLA-B27.

Imaging Findings

In the lumbosacral spine (Fig.1), there is a transitional vertebra with an enlarged, dysplastic left transverse process of the L5 vertebra, articulating with the left sacral ala with localised bone marrow edema. (Fig.2)

MRI of the SI Joint was performed on 1.5 T MRI scanner (Achieva, Philips Medical Systems). The sacroiliac joints show bilateral narrowing of the joint space, with subarticular changes such as cortical irregularity and erosions on left side appearing T1 hypointense (Fig.3). Signal characteristics indicate fatty

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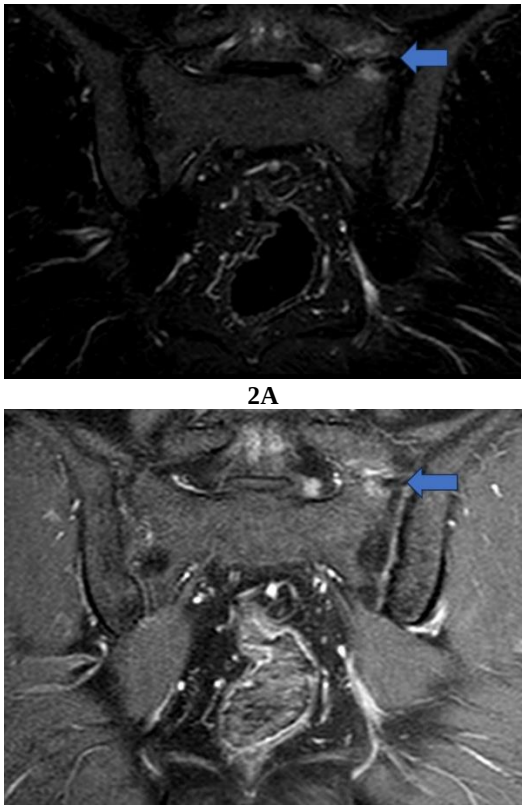
metaplasia, which is hyperintense on T1/T2 and hypointense on STIR. (Fig.4)

There is bone marrow edema in the right sacroiliac joint, which appears hyperintense on T2/STIR and hypointense on T1 with mild post-contrast enhancement. (Fig.5). These findings are suggestive of bilateral sacroiliitis, typically seen in spondyloarthritis.

No joint effusion is present, and the visualized muscles appear normal in both bulk and signal intensity.

Fig. 1: 34-year-old male with HLA B 27 positive who presented with lower back pain Radiograph Lumbosacral spine PA view showing enlarged left transverse process of L5 vertebra articulating with left sacral ala



2A

2B

Fig.2: 34-year-old male with HLA B 27 positive who presented with lower back pain Coronal STIR image (A) showing hyperintense signal around pseudoarthrosis formed between pseudoarticulation of enlarged left transverse process of L5 vertebra and left sacral ala. Post contrast coronal image (B) showing post contrast enhancement at the same level – s/o lumbosacral transitional vertebra with localized bone marrow edema

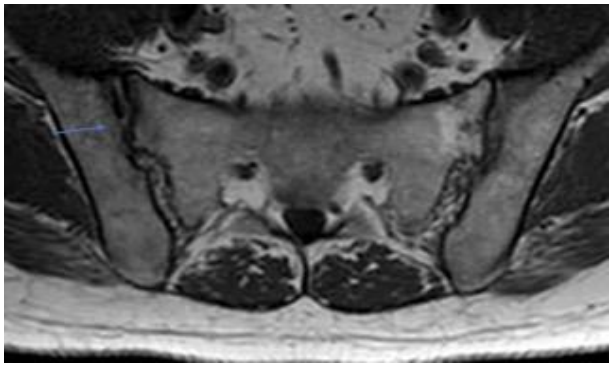
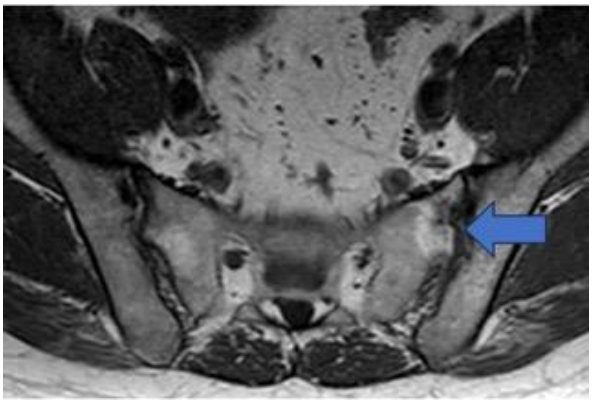
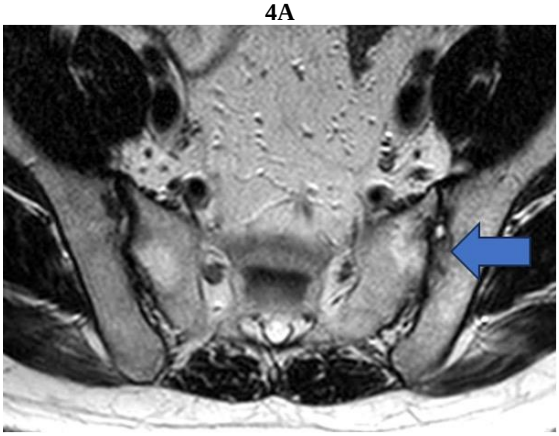


Fig.3: 34-year-old male with HLA B 27 positive who presented with lower back pain Axial T1 images showing loss of cortical bone s/o erosions (blue arrows) involving right sacroiliac joint



4A



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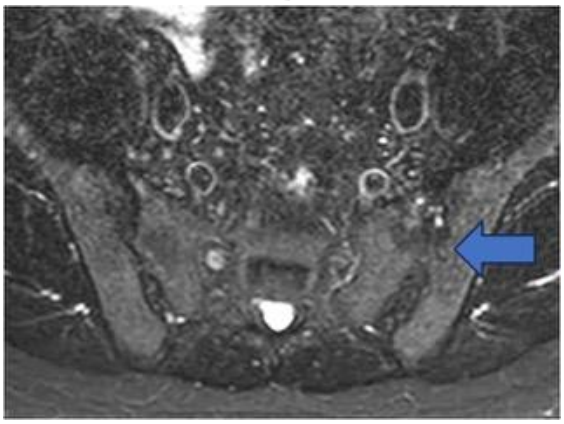
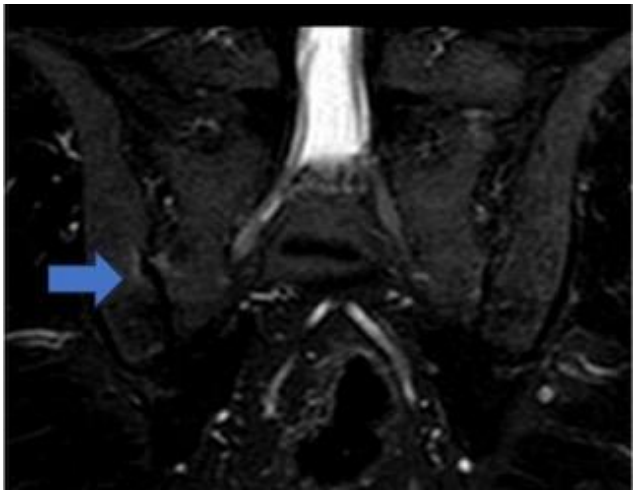
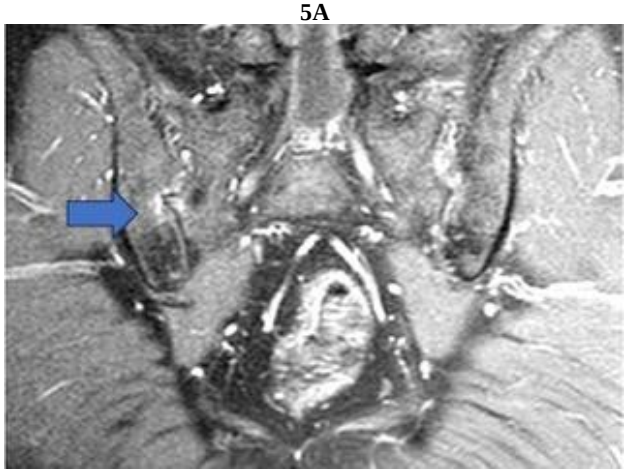


4C

Fig. 4: 34-year-old male with HLA B 27 positive who presented with lower back pain Axial T1 (A), Axial T2 (B) and Axial STIR(C) images showing T1/T2 hyperintense signal in bilateral sacroiliac joint with suppression on STIR image s/o fatty metaplasia of sacroiliac joint



5A



5B

Fig. 5: 34-year-old male with HLA B 27 positive who presented with lower back pain Coronal STIR (A) image showing hyperintensity at right sacroiliac joint and on Coronal T1 post contrast image (B) showing mild post contrast enhancement at same level- s/o bone marrow edema at right sacroiliac joint

OUTCOME

The management plan involves starting NSAIDs to address pain and inflammation from sacroiliitis, with physical therapy recommended to enhance spinal mobility and strength. If symptoms persist or are severe, DMARDs or biologics may be considered.

For transitional vertebrae, begin with physical therapy and analgesics. If pain persists despite conservative measures, surgical options such as transverse process resection may be considered [3].

DISCUSSION

Background

In 1917, Bertolotti was the first to report a link between lumbosacral transitional vertebrae and the experience of low back pain.

Bertolotti's syndrome, frequently overlooked as a source of back pain, is caused by lumbosacral transitional vertebrae (LSTV). This congenital condition usually remains asymptomatic until a person reaches their late twenties or early thirties. This case underscores the importance of distinguishing between inflammatory and anatomical factors in diagnosing lower back pain with radicular symptoms in young patients.

It highlights how imaging can reveal active inflammatory changes in the sacroiliac joints indicative of axial spondyloarthopathy, while a Type IIa LSTV is an anatomical feature that complicates, but does not primarily cause, the inflammation.

Clinical and Imaging Perspective

In 1984, Castellvi *et al.,* [1] introduced a classification system for imaging findings related to lumbar and sacral transitions as follows: Type I (enlarged L5 transverse process), Type II (incomplete lumbarization/sacralization with joint formation), Type III (complete bony fusion), and Type IV (mixed Type II and III).

SPondyloArthritis Caught Early (SPACE) cohort study by de Bruin F *et al.*, found that LSTV are present in about 25% of patients with suspected axial spondyloarthritis (axSpA), but they do not significantly affect the diagnosis or clinical presentation of axSpA.

Bone marrow edema (BME) was localized to the pseudoarticulation site of LSTV and did not mimic the typical BME patterns of axSpA. Additionally, there were no significant differences in pain, spinal mobility, or other clinical parameters between patients with or without LSTV, indicating it does not impact the clinical assessment of axSpA [2].

CONCLUSION

Type IIa LSTV can cause localized discomfort and bone marrow edema at the pseudoarticulation site, potentially contributing to back pain. However, it does not explain sacroiliac joint inflammation or alter the diagnosis of sacroiliitis.

The combination of bilateral sacroiliitis and LSTV helps in understanding the patient's condition and guides targeted treatment. Accurate diagnosis requires a blend of imaging techniques to differentiate between Bertolotti's Syndrome and axial Spondyloarthopathy, and ongoing clinical evaluation is crucial for effective management.

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