Unilateral Acute Sacroiliitis - Think Infection, No Injection!

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Learning objectives

To help recognise the MR imaging features of acute septic unilateral sacroiliitis affecting either the synovial or ligamentous portions of the sacroiliac joint ; (Marrow oedema, joint effusion, juxta-articular soft tissue oedema+/- collections).

To demonstrate ultrasound and CT guided aspiration techniques which are essential in the diagnostic work-up and management.

To increase awareness of uncommon causative organisms (Gram +ve cocci, Mycobacterium tuberculosis and Brucella) and the utility of serological testing in addition to appropriate clinical history.

To avoid the pitfall of injudicious use of intra-articular steroid injections for symptomatic relief with potential of causing patient harm and serious complications.
**Background**

Imaging of the sacroiliac joints is a unifying diagnostic tool for seronegative spondyloarthritis which includes plain radiographs as well as MR imaging.

The ASAS (Assessment of Spondyloarthritis International Society) diagnostic criteria for MR features of sacroiliitis is defined as focal high bone marrow signal intensity on the STIR / fat-suppressed T2-weighted images or contrast enhancement on the fat-suppressed T1-weighted images.

The bone marrow edema is typically symmetrical in ankylosing spondylitis within the subchondral/peri-articular bone and most commonly affects the lower and posterior thirds of the joints, usually commencing on the iliac side of the joint; with or without erosions. However, psoriatic and reactive spondyloarthritides can present with asymmetrical involvement or occasionally with only unilateral sacroiliitis. However when the marrow oedema is unilateral, an infectious sacroiliitis should be excluded.

The inflammatory sacroiliitis usually remains confined to the anatomic borders and joint spaces. However involvement of the ligamentous portion as well as presence of adjacent soft tissue inflammatory oedema or communicating juxta-articular fluid collections are important imaging features that should raise suspicion for an underlying infective cause.

Like septic arthritis in the appendicular skeleton, supporting clinical features of pyrexia, systemic upsets, acute or insidious onset and increased inflammatory markers (ESR, CRP) with leukocytosis will further support an infectious aetiology. Further management will be dictated by image-guided aspiration of the joint fluid or juxta-articular collection to start targeted anti-microbial therapy.

The commonest organism causing pyogenic septic arthritis of the sacroiliac joints is Staphlococcus aureus however atypical organisms like Streptococcus, Salmonella, E.coli and Mycobacterium tuberculosis have been described in literature.

The other important infectious cause of spondylodiscitis as well as sacroiliitis in endemic areas is brucellosis with a pertinent history of consumption of unpasteurised cattle milk. In addition to suspicious imaging findings serological testing is mandatory to help in early diagnosis of this zoonosis and avoidance of parenteral or intra-articular cortico-steroids.
Findings and procedure details

We present a case-series of four patients who presented to our hospitals (3 in Romford, UK and one in Abu Dhabi, UAE) as worsening lower back /RIGHT hip pain with rapid deterioration of mobility:

Case 1: A 13 year old girl presented with right sided unilateral sacroiliitis with effusion and a small anterior subiliacus collection on the MRI study with restricted diffusion. An ultrasound guided aspiration was performed yielding 10 mL of thick purulent material. The microbiology culture grew Staphylococcus aureus and patient was treated with penicillins for 3 months making an unremarkable recovery.

Case 2: A 35 year old lady presented with right sided sacroiliitis and a large subiliacus collection. CT-guided fluid aspiration was performed yielding a growth of Staph. aureus treated accordingly.

Case 3: A 30 year old man had a noncontrast CT KUB for suspected right renal colic. Osteomyelitis of the posterior ileum(with sequestrum) was demonstrated on the CT study confirmed on subsequent MRI with associated septic arthritis of the ligamentous portion of the SI joint. An image guided biopsy was advised but patient was lost to follow-up for six weeks; representing with a large gluteal intamuscular abscess. A diagnosis of tuberculous septic arthritis was made and an US guided aspiration yielded 80 mL of purulent material. Patient was started emperically on anti-tuberculous therapy with a positive growth of Mycobacterium tuberculosis confirmed at six weeks.

Case 4: An 18 year old young man presented with worsening lower back and muscle pain with raised serum creatine kinase levels and normal inflammatory markers. MR features of very mild inferior right sacroiliitis and bilateral nonspecific focal muscle oedema in the gluteus medius muscles. An initial diagnosis of myositis and inflammatory sacroiliitis was made. Open muscle biopsy was negative. IV hydration and oral steroid were started with transient symptomatic improvement. A CT-guide Intra-articular steroid injection was contemplated. The unilaterality of sacroiliitis showed some progression on the repeat MR study at two weeks; raising concern for an underlying infective aetiology.

There was a history of consumption of unpasteurised camel milk and therefore Brucella sacroiliitis was suspected. The subsequent serology was strongly positive (1:640) for both B. militensis and B. abortus. No intra-articular steroid injection was given and patient was
commenced on appropriate antimicrobial therapy. Patient was completely asymptomatic on the subsequent follow-up's at 6 and 12 weeks.
Images for this section:

**Fig. 1:** Case 1: Axial Pelvis STIR and DWI images: Elliptical right sub-iliacus collection communicating with the right sacroiliac joint and demonstrating restricted diffusion suggestive of an abscess.

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**Fig. 2:** Case 1: Coronal Pelvis STIR and T1W images: Right sub-iliacus collection with muscle oedema

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Fig. 3: Case 1: Transverse Ultrasound image before aspiration demonstrates the biconvex sub-iliacus collection with iliacus hyper-echogenicity; . (Performed by Dr Shah).

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**Fig. 7:** Case 3: Axial Bone window CT image from the Non-contrast CT KUB (patient in prone position) shows a lytic focus in the right posterior ilium with a small sequestrum and likely communication with the ligamentous portion of the right SI joint; suggestive of focal osteomyelitis.

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**Fig. 8:** Case 3: Contiguous Axial STIR, Cor STIR and Axial T1-weighted images showing focal Brodie’s abscess within the posterior ilium and fluid within the right sacroiliac joint and associated soft tissue oedema; features consistent with osteomyelitis and septic arthritis.

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**Fig. 9:** Case 3: Contiguous Axial STIR and T1-weighted images at 6 weeks from previous study showing a large posterior tracking intramuscular gluteal collection arising from the posterior right SI joint. Interval oedema on the sacral side.

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Fig. 10: Case 3: Transverse posterior US image showing the large hypo-echoic intramuscular collection within the right gluteus maximus muscle. Following aspiration retrieved 80mL of thick yellowish creamy fluid. (Performed by Dr Shah).

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**Fig. 11:** Case 4: Coronal Pelvis T1 weighted image showing mild unilateral subchondral oedema on both the sacral and iliac sides of the right SI joint

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**Fig. 12:** Case 4: Coronal Pelvis Fat-suppressed T2 weighted image showing mild unilateral subchondral oedema on both the sacral and iliac sides of the right SI joint

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Fig. 4: Case 2: Axial & Coronal STIR (top row) with Axial T2W Spine and T1W SI joint images (bottom row) showing a small right SI joint effusion tracking into a small sub-iliacus collection with associated muscle oedema consistent with pyogenic sacroiliitis.

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**Fig. 5:** Case 2: Coronal reformat and Axial planning CT slice demonstrating the low-attenuation right subiliacus collection (purple arrow) with iliacus muscle swelling.

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**Fig. 6:** Case 2: CT-guided aspiration of the right sub-iliacus collection via anterior approach. Aspirate grew Staph. aureus (Procedure performed by Dr Nagraj).

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**Fig. 13:** Case 4: Top Left: LFOV Coronal Pelvis STIR image showing bilateral gluteus medius focal muscle oedema suspicious for myositis. Incisional biopsy of the left muscle showed muscle necrosis with no myositic features. Top Right: Axial Pelvis STIR image showing mild marrow oedema of the right posterior ilium. Bottom row: Separate Coronal STIR images of the SI joints showing subchondral oedema, tiny inferior effusion and mild adjacent soft tissue oedema; features suspicious for an infective rather than inflammatory aetiology. (Case courtesy Dr Abdullah).

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Conclusion

Acute unilateral sacroiliitis should always raise suspicious for the possibility of septic arthritis particularly solitary involvement of the ligamentous portion as well as in the presence of adjacent soft tissue oedema or juxta-articular collections.

Radiological suspicion should dictate further management with image-guided aspiration or serological testing (in cases of tuberculosis or brucellosis).

Any corticosteroid intra-articular injection should be avoided until this suspicion is clearly refuted.
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References


