Radiologic Diagnosis / *Radyolojik Tanı*

DOI: 10.5578/ced.20229912 • *J Pediatr Inf 2022;16(1):e60-e62*

Bölüm Editörü: Prof. Dr. Mithat Haliloğlu

What is Your Radiologic Diagnosis?

Radyolojik Tanınız Nedir?

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Cite this article as: Atak F, Yıldız AE. What is your radiologic diagnosis? J Pediatr Inf 2022;16(1):e60-e62.

Septic sacroiliitis is septic arthritis of the sacroiliac joints and is extremely rare. Since its clinical picture is not specific, imaging is integral to diagnosis. Magnetic resonance imaging is the most sensitive method, and various findings such as bone marrow edema, increased fluid within the joint, capsulitis, large bone erosions, and soft tissue abscesses have been described. We present a 16-year-old male patient, referred to our hospital with the preliminary diagnosis of multisystem inflammatory syndrome in children (MIS-C) linked to COVID-19, who was discharged after supportive and oral antibiotic treatment. Magnetic resonance imaging performed during follow-up due to persistent left leg pain suggested septic sacroiliitis. Sacroiliac joint fluid sampling was unsuccessful. However, symptomatic relief was achieved and intramuscular abscesses regressed after intravenous antibiotics, supporting the septic sacroiliitis diagnosis due to the rapid response to treatment. Inflammatory sacroiliitis is the primary diagnostic problem due to the similarity of clinical picture and imaging findings. Intraarticular/periarticular abscess and periarticular muscle edema crossing anatomical barriers should suggest septic sacroiliitis. Unfortunately, it is not possible to distinguish the causes of septic sacroiliitis with imaging. Sampling from sacroiliac joint fluid and identifying the pathogen are important for accurate diagnosis and initiation of the proper treatment. Treatment is intravenous antibiotics.

Radiological Diagnosis

A 16-year-old male patient with no known disease was referred to our hospital with the diagnosis of multisystem inflammatory syndrome (MIS-C) associated with COVID-19. It was discovered that the patient had gone to another medical center two days before the MIS-C diagnosis with complaints of left leg pain and limping, where he underwent hip joint aspiration but no sample could be collected. The patient, who had dyspnea and chest pain at the time of admission, had a body temperature of 39.2°C, showed bilateral subpleural multifocal ground-glass opacities in the thoracic CT performed in an external center, and findings consistent with perimyocarditis in cardiac magnetic resonance imaging (MRI) performed in our hospital.

Following the diagnosis of MIS-C, vancomycin, ceftriaxone, clarithromycin, anakinra, steroid, and IVIG were administered for seven days. The patient, who was discharged a week after symptomatic recovery, presented to the outpatient clinic with left hip pain that worsened with movement. Tenderness over the left sacroiliac joint and increased discomfort with internal rotation of the left hip joint were detected during the physical examination of the patient who had no history of trauma. Laboratory tests showed elevated C-reactive protein and erythrocyte sedimentation rates [CRP= 24.3 mg/dL (N, 0-0.5), ESR= 41 mm/hour (N, 0-20)]. The hip joint

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Received: 20.01.2022 **Accepted:** 25.02.2022 **Available Online Date:** 09.06.2022

Figure 1. The fat-saturated T2-weighted **(A)**, pre-contrast enhanced **(B)** and post-contrast enhanced **(C)** T1-weighted images in the oblique coronal plane revealed erosion on the sacroiliac joint surfaces (arrowhead), extensive subcortical bone marrow inflammation on the iliac and sacral sides (asterix), capsulitis on the superior joint (curved arrow) and abscesses surrounded by inflammation in the soft tissues around the joint (arrows).

MRI of the patient performed in an external center when the symptoms first started, showed nothing specific other than minor edematous changes in the left iliopsoas and piriformis muscles. A contrast-enhanced MRI of the left hip and sacroiliac joints performed in our hospital to determine the cause of left hip and leg pain that the patient had experienced for about two weeks, revealed erosion on the left sacroiliac joint surfaces and inflammation in the subcortical bone marrow, capsulitis, and abscesses surrounded by inflammation in the soft tissues around the joint (Figure 1). The sacroiliac synovial fluid and the size of the abscesses were deemed insufficient for sample collection by interventional radiology. Based on the MRI findings of the sacroiliac joints, what is your diagnosis?

Diagnosis: Septic Sacroiliitis

Brief Discussion

Septic sacroiliitis is the septic arthritis of the sacroiliac joint (1). It is also referred to as pyogenic sacroiliitis in the literature. Only 1-2% of septic arthritis cases are localized in the sacroiliac joint and they are very rare (2). Septic sacroiliitis is rarely seen in childhood and constitutes approximately 1.5-4.3% of osteoarticular infections in pediatric patients (3). It has been reported most frequently among adolescents and young adults. Some publications reported that it may be common even under the age of two and there is a bimodal age distribution (4).

Its clinical picture is nonspecific but includes fever, hip or low back pain, antalgic gait, and elevated acute phase reactants. Non-specific clinical findings that can be confused with pathologies affecting the surrounding sites (urolithiasis, acute appendicitis, sciatica, septic arthritis of the hip joint, etc.), the difficulty of sacroiliac joint examination, inadequacy of radiology as a diagnostic tool, and the fact that it is a very rare pathology may hinder proper diagnosis and treatment, resulting in permanent joint damage. Early childhood clinical symptoms are reportedly milder, which could be linked to different causative pathogens (4).

Gram-positive cocci are responsible for more than 80% of cases. *Staphylococcus aureus* is the most prevalent causative pathogen, with *Staphylococcus aureus* being isolated in 78 percent of cases. Cases of *Pseudomonas aeroginosa* have been documented in immunocompromised individuals or intravenous drug users, while cases of *E. coli*-associated septic sacroiliitis have been reported in patients with urinary tract infections (5).

Diagnostic accuracy of direct radiography is very low, and findings such as widening of the sacroiliac joint space, increased periarticular sclerosis, and cortical irregularity on the iliac side can be observed. However, it has been reported that the described findings can only be observed within 2-6 weeks of the onset of symptoms and that positive findings can only be detected in one-third of the initial radiographs (3). MRI is very sensitive in early diagnosis, and imaging findings include increased fluid in the sacroiliac joint, bone marrow edema, large bone erosions, thickening of the joint capsule (capsulitis), extracapsular edema and collections (3,6). CT can show abnormalities in bone and soft tissue, however, it is not as sensitive as MRI in the early period. CT is mostly useful for the aspiration of joint fluid or abscess for diagnostic purposes (5). Bone scintigraphy is a sensitive but non-specific diagnostic tool that works within 24-48 hours after the onset of symptoms. Unilaterally increased involvement is observed in septic sacroiliitis. Since the clinical picture is not specific, especially in children at an early age, this can help determine the location of the pain (7).

Unilateral sacroiliitis is an uncommon pathology and its etiology may include neoplasia, degeneration, trauma, paraplegia, infection, and inflammation. Among these, infection and inflammation have a significant role. In clinical practice, it is very important to distinguish between the two pathologies for the patient to receive the correct treatment. It should be noted that differential diagnosis may be challenging since

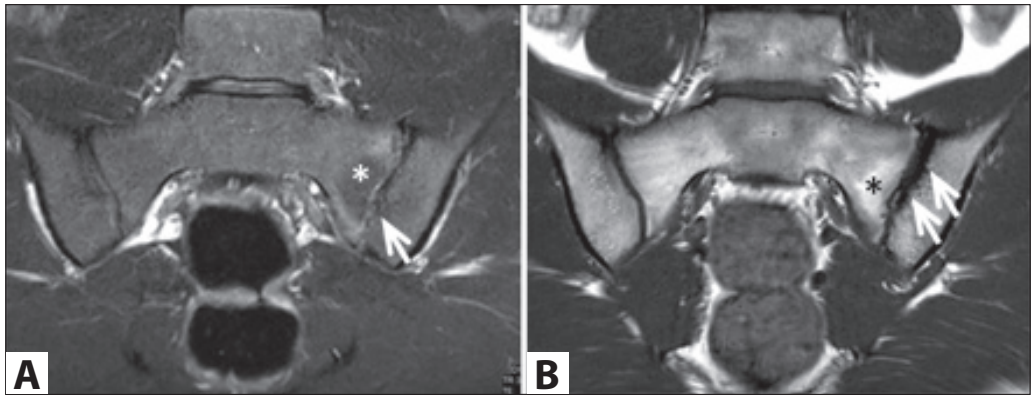

Figure 2. The follow-up MRI a year: oblique coronal fat-saturated T2-weighted **(A)**, non-contrast T1-weighted **(B)** images show resolution of abscesses and soft-tissue inflammation. On the other hand, chronic sacroiliitis findings, which are characterized by millimetric erosive changes (arrows) on the joint surfaces and fat metaplasia (asterixes) in the subcortical bone marrow on the sacral side, are consistent with the residuel sequelae changes..

cases of inflammatory sacroiliitis are unilateral and may be accompanied by periarticular soft tissue inflammation (6).

Infectious sacroiliitis may develop due to pyogenic infections, tuberculosis, or brucella. It is not possible to distinguish the causes of infectious sacroiliitis via imaging (6). Findings that cross anatomical barriers such as intraarticular/periarticular abscess and periarticular muscle edema are generally indicative of infectious sacroiliitis. In addition, Kang et al. reported that infection should be considered first in cases with large bone erosion (>1 cm) and capsulitis, and without iliac-dominant bone marrow edema (8). In a more recent study, however, the distribution pattern of bone marrow edema was not demonstrated to be useful in diagnosis (6). Our case was diagnosed with MRI showing periarticular abscesses as well as other structural damage and inflammatory findings.

If blood culture is negative in suspected septic sacroiliitis, sampling of the sacroiliac joint fluid is required for a definitive diagnosis, pathogen identification, and initiation of correct treatment. However, positivity can be detected only in 50-88% of the sacroiliac joint fluid cultures taken percutaneously or surgically (5). Intravenous antibiotics are preferred for treatment. Surgery may be attempted if antibiotic therapy fails. In the presence of a periarticular abscess, percutaneous drainage or surgery may be considered. Following the eradication of the infection, surgical arthrodesis of the sacroiliac joint can be performed in patients with persistent pain (5). In terms of treatment efficacy, there is no consensus on the frequency and duration of radiological follow-up based on a standard imaging algorithm.

In our case, three weeks of intravenous ampicillin + sulbactam and vancomycin treatment resulted in gradual clinical, laboratory, and radiological improvement. Limping resolved and acute phase reactants regressed. A near-total regression of bone marrow inflammation and complete regression of soft tissue inflammation and soft tissue abscesses was observed in follow-up MRI at month 1. The patient was discharged and followed up on an outpatient basis. The first-year follow-up MRI revealed chronic sacroiliitis findings, including millimetric erosive changes on the joint surfaces and fat metaplasia in the subcortical bone marrow on the sacral side, but the soft tissue inflammation and abscesses had entirely resolved (Figure 2). Physical examination revealed persistent left sacroiliac joint tenderness.

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