

## Early Detection of Pyogenic Sacroiliitis by MRI: A Case Report

Den Yamagata<sup>1</sup>, Takashi Kashimura<sup>2</sup> and Takeshi Asano<sup>1</sup>

<sup>1</sup>Department of Pediatrics, Nippon Medical School Chiba Hokusoh Hospital, Chiba, Japan

<sup>2</sup>Department of Radiology, Nippon Medical School Chiba Hokusoh Hospital, Chiba, Japan

Pyogenic sacroiliitis is rare and difficult to diagnose because of its deep location and the absence of definitive clinical signs. Delayed diagnosis can result in complications such as abscess or sequestration formation, prolonged sepsis, and chronic joint deformity. MRI is a well-known, noninvasive imaging technique with a high sensitivity and specificity for osteomyelitis diagnosis. Here, we present the MRI findings for pyogenic sacroiliitis, 3 days after symptom onset, in an 11-year-old girl and confirm its value in early diagnosis of pediatric pyogenic sacroiliitis. (J Nippon Med Sch 2024; 91: 499–501)

**Key words:** pyogenic sacroiliitis, MRI, early detection

### Introduction

Pediatric pyogenic sacroiliitis is rare, accounting for only 1-2% of all cases of osteoarticular infections in children<sup>1</sup>. Diagnosis is difficult because of its deep location and the absence of definitive clinical signs. Delayed diagnosis may result in complications such as abscess or sequestration formation, prolonged sepsis, and chronic joint deformity<sup>2</sup>. MRI is a well-known, noninvasive imaging technique with a high sensitivity and specificity for osteomyelitis diagnosis. MRI findings of periarticular bone marrow edema and extracapsular edema are observed in most cases, and erosion, capsule bulge, and soft tissue abscess were also reported<sup>3</sup>.

Recent reports found that the average interval from symptom onset to diagnosis by MRI always exceeded 5 days, specifically, 7.7 days<sup>3</sup>, 7.4 days<sup>4</sup>, and 5.9 days<sup>5</sup>. Although Cohen et al.<sup>3</sup> reported a pediatric case diagnosed by MRI within 2 days of the onset of symptoms, there are few reports of pediatric pyogenic sacroiliitis diagnosed by MRI within 3 days of symptom onset. Grippi et al.<sup>6</sup> reported negative MRI results on days 3, 4, 5, and 6 of illness. Thus, controversy remains regarding early MRI diagnosis.

Here, we present MRI findings of pyogenic sacroiliitis in an 11-year-old girl, 3 days after symptom onset, and confirm the value of MRI for early diagnosis of pediatric pyogenic sacroiliitis.

### Case Presentation

An 11-year-old girl was admitted to our hospital with a 3-day history of fever (39°C), left-side posterior hip joint pain, and difficulty walking. The girl suffered abrasions on both knees 2 days before the onset of these symptoms. At home, the abrasions were observed, without specific treatment such as antibiotics use.

At admission, her body temperature was 37.8°C, her height was 147.0 cm, and her weight was 47.0 kg. Physical examination showed no pharyngeal erythema or cervical or axillary lymphadenopathy, and auscultation of the heart and lungs was normal. The abdomen was soft and non-tender and bowel sounds were present. Abrasions were present on both knees, but there was no trauma or subcutaneous bleeding in other areas. The left lower limb was painful even without body movement, and spontaneous movement was difficult. The pain appeared to be posterior to the hip, but there was no erythema or swelling in or around this area. There was no increase in pain on palpation of the posterior left hip. Laboratory examination showed Na<sup>+</sup> 133 mEq/L, K<sup>+</sup> 3.9 mEq/L, Cl<sup>-</sup> 97 mEq/L, Ca<sup>2+</sup> 9.4 mEq/L, CRP 25.85 mg/dL, WBC 13,710/μL, RBC 427×10<sup>4</sup>/μL, Hb 11.7 g/dL, Ht 34.2%, platelet 28.4×10<sup>4</sup>/μL, and FDP 7.6 mg/mL. An x-ray of the left hip showed no obvious fractures or abnormalities. Inflammatory disease of the pelvis was suspected and an urgent MRI was performed.

Correspondence to Takeshi Asano, Department of Pediatrics, Nippon Medical School Chiba Hokusoh Hospital, 1715 Kamagari, Inzai, Chiba 270-1694, Japan

E-mail: july1364@nms.ac.jp

[https://doi.org/10.1272/jnms.JNMS.2024\\_91-502](https://doi.org/10.1272/jnms.JNMS.2024_91-502)

Journal Website (<https://www.nms.ac.jp/sh/jnms/>)

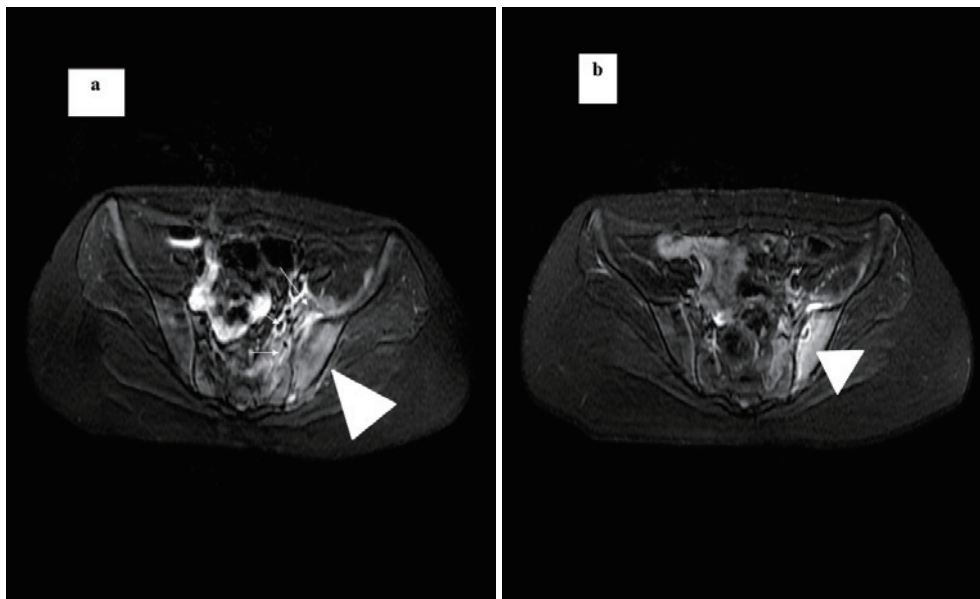


Fig. 1

a. Findings of fat-suppressed T2-weighted MRI on admission

Hyperintensity was observed around the left sacroiliac joint, which was thought to be sacroiliac arthritis (arrowhead). Signals were also elevated in the ilium and sacrum. Interstitial edematous changes observed on the medial side of the left ilium (arrows) later mostly resolved (Fig. 1b).

b. MRI findings on the 12th day of hospitalization

Inflammation decreased in the sacroiliac joint (arrowhead) and surrounding muscle layer. Interstitial edematous changes observed in Figure 1 a almost completely resolved.

### MRI Findings

Fat-suppressed T2-weighted (fat-sat T2WI) MRI of the pelvis on the day of admission (3 days after symptom onset) revealed high-intensity areas in the sacroiliac joint and surrounding muscle layer, suggesting inflammation (Fig. 1a). The main area of inflammation appeared to be the sacroiliac joint on axial fat-sat T2WI. On diffusion-weighted images (DWI), the same area appeared hyperintense because of T2 shine-through. There were no findings suggestive of an abscess, such as fluid collection with increased signal intensity, on DWI.

### Clinical Course after Admission

After admission, gram-positive cocci were detected in blood smears, and methicillin-sensitive *Staphylococcus aureus* grew in blood cultures. Antibiotic treatment, including vancomycin hydrochloride and panipenem/betamipron, was started. On day 2 of hospitalization, pain in the posterior left foot began to improve. MRI on the 12th day of hospitalization showed a decrease in inflammation of the sacroiliac joint and the surrounding muscular layer (Fig. 1b). A blood test on day 19 of hospitalization was negative for an inflammatory reaction, and rehabilitation was started on day 21 of hospitalization. Motion and load training for the left hip joint were performed. Intravenous antibiotic administration was com-

pleted on day 22 of hospitalization, and the patient was discharged on day 28.

The patient provided oral consent for publication.

### Discussion

Pyogenic sacroiliitis is rare in children. Diagnosis is difficult because of its location and may be delayed by the poor specificity of clinical signs and symptoms. Inadequate treatment may provoke abscess formation or chronic sequestration and increase the risks of short- and long-term sequelae.

MRI may be the imaging technique with the highest sensitivity and specificity for the diagnosis of pyogenic sacroiliitis, and visualization of the complicated sacroiliac joint anatomy is excellent<sup>7</sup>. However, the average interval from symptom onset to diagnosis by MRI was greater than 5 days—7.4 days<sup>4</sup>, 7.7 days<sup>3</sup>, and 5.9 days<sup>5</sup>—even in recent reports. Although one case study reported MRI findings for early pyogenic sacroiliitis, namely, anterior and/or posterior subperiosteal infiltration, periarticular bone marrow edema, and infiltration of the pericapsular muscle layers<sup>8</sup>, which were similar to the present MRI findings, Grippi and colleagues reported negative findings for MRI studies on days 3, 4, 5, and 6<sup>6</sup>. They did not state the reason for the discrepancy.

Diagnosis of pyogenic sacroiliitis requires an awareness of 1) clinical symptoms, such as severe unilateral back pain with ipsilateral radiation to the buttock and/or leg<sup>9</sup>, and 2) typical MRI findings of pyogenic sacroiliitis, such as reduced signal intensity on T1-weighted images and elevated signal intensity on T2-weighted/STIR (short TI inversion recovery) images of the joint space, periarticular muscle tissue, and anterior and/or posterior subperiosteal infiltrations<sup>7</sup>. Antibiotics are the usual choice for treatment, but attention should be paid to MRI findings, as signal changes during follow-up sometimes persist after treatment<sup>8</sup>.

In conclusion, MRI findings yielded a diagnosis of pyogenic sacroiliitis in an 11-year-old girl only 3 days after symptom onset. Early detection and treatment resulted in a positive outcome.

**Conflict of Interest:** The authors declare no conflict of interest.

# References

1. Molinos Quintana A, Morillo Gutierrez B, Camacho Lovillo MS, Neth O, Obando Santaella I. Pyogenic sacroiliitis in children-a diagnostic challenge. *Clin Rheumatol* [Internet]. 2011 Jan;30(1):107–13. Available from: <https://pubmed.ncbi.nlm.nih.gov/20706753>
2. Schaad UB, McCracken GH Jr, Nelson JD. Pyogenic arthritis of the sacroiliac joint in pediatric patients. *Pediatrics* [Internet]. 1980 Sep;66(3):375–9. Available from: <http://pubmed.ncbi.nlm.nih.gov/7422427>
3. Cohen SA, Biko DM, Kaplan SL, Barrera CA, Russo ME, Nguyen JC. MRI findings of infectious sacroiliitis in children: are there age-dependent differences? *AJR Am J Roentgenol* [Internet]. 2020 Apr;214(4):923–9. Available from: <https://pubmed.ncbi.nlm.nih.gov/32045310>

4. Donzelli A, Samara E, Spyropoulou V, Juchler C, Ceroni D. Pediatric sacroiliitis: clinical and microbiologic differences between infants and children-adolescents. *Pediatr Infect Dis J* [Internet]. 2017 Jul;36(7):631–4. Available from: <https://pubmed.ncbi.nlm.nih.gov/28002357>
5. Vardi Y, Levy I, Ashkenazi-Hoffnung L, et al. Pediatric infectious sacroiliitis: characterization and differentiation from noninfectious etiologies. *Pediatr Infect Dis J* [Internet]. 2019 Jul;38(7):e134–7. Available from: <https://pubmed.ncbi.nlm.nih.gov/30985512>
6. Grippi M, Zions LE, Ahlmann ER, Forrester DM, Patzakis MJ. The early diagnosis of sacroiliac joint infections in children. *J Pediatr Orthop* [Internet]. 2006 Sep-Oct;26(5):589–93. Available from: <https://pubmed.ncbi.nlm.nih.gov/16932096>
7. Kucera T, Brtkova J, Sponer P, et al. Pyogenic sacroiliitis: diagnosis, management and clinical outcome. *Skeletal Radiol* [Internet]. 2015 Jan;44(1):63–71. Available from: <http://pubmed.ncbi.nlm.nih.gov/25231169>
8. Sturzenbecher A, Braun J, Paris S, Biedermann T, Hamm B, Bollow M. MR imaging of septic sacroiliitis. *Skeletal Radiol* [Internet]. 2000 Aug;29(8):439–46. Available from: <https://pubmed.ncbi.nlm.nih.gov/11026711>
9. Sandrasegaran K, Saifuddin A, Coral A, Butt WP. Magnetic resonance imaging of septic sacroiliitis. *Skeletal Radiol* [Internet]. 1994 May;23(4):289–92. Available from: <https://pubmed.ncbi.nlm.nih.gov/8059255>

(Received, January 18, 2023)

(Accepted, May 1, 2023)

Journal of Nippon Medical School has adopted the Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License (<https://creativecommons.org/licenses/by-nc-nd/4.0/>) for this article. The Medical Association of Nippon Medical School remains the copyright holder of all articles. Anyone may download, reuse, copy, reprint, or distribute articles for non-profit purposes under this license, on condition that the authors of the articles are properly credited.