

## CLINICAL VIGNETTE

# Osteomyelitis Leading to Pyogenic Sacroiliitis in a Young Woman

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### Background

Pyogenic infections of the sacroiliac (SI) joint are rare, and historically have accounted for about 1-2% of all reported cases of septic arthritis.<sup>1</sup> The pathophysiology of sacroiliitis is presumed to be due to hematogenous spread of bacteria from a distant source, which seeds the SI joint.<sup>2</sup> In adults, these infections are commonly preceded by a recent episode of IV drug use or respiratory, skin, or genitourinary infections.<sup>2</sup> Typically, the diagnosis is challenging due to nonspecific presenting symptoms and vague physical exam findings.<sup>1</sup> We report a case of a young woman with no known risk factors, who presented with an infection of the sacroiliac joint.

### Case Presentation

A 23-year-old female with a past medical history significant only for mild intermittent asthma presented to the emergency department with a 12-day history of persistent fevers (Tmax 103F), nausea, and acute-onset right gluteal pain. Surgical history was negative and the patient denied any medication use. She was in her usual state of health until several days prior to her presentation when she was evaluated at another emergency department with complaints of gluteal pain. There she was afebrile and hypotensive with a blood pressure 80/55. An x-ray performed at that time was unremarkable. She was diagnosed with a right-sided muscle sprain and was given IV fluids and fentanyl for pain control; she was discharged home.

Subsequent to her initial discharge from the ED, the patient was evaluated by a pain specialist. An MRI obtained by the specialist was also found to be consistent with muscle strain. However, upon a second review of these MRI images, there was concern for a potential abscess near the SI joint (Figure 1) and patient was advised to return to the emergency department.

At her second presentation to the ED, the patient was febrile to 102 F, tachycardic, and hypotensive with a blood pressure of 69/46. Significant findings on exam included the absence of cutaneous lesions, and only mild tenderness around the right ischial tuberosity with no overlying fluctuance, edema, or erythema. Laboratory examination, including white blood cell count (WBC) of 9,000, was within normal range.

A right hip x-ray was obtained and appeared normal (Figure 2). MRI performed on admission was concerning for multiple abscesses adjacent and posterior to the right SI joint and possible osteomyelitis involving the right sacral ala and right iliac bone (Figure 3).

During her evaluation, she denied any pertinent risk factors including history of injury to the joint, recent exposure to needles, dental procedures, or heart conditions. She was started on IV vancomycin and cefepime and was admitted for severe sepsis likely second to right peri-SI joint abscesses and possible osteomyelitis.

During her admission, the largest of the abscesses measuring 2.0 x 1.4 cm was drained via CT-guided placement of a right iliopsoas drain. The two smaller abscesses located in the right multifundus and in the right piriformis were managed expectantly with antibiotics. Blood cultures and cultures from drainage site grew pan-sensitive *E.Coli*. Urine cultures were negative.

Translocation of gut bacteria was believed to be the most likely source of infection given the absence of other risk factors. An abdominal MRI performed during admission did not show evidence of inflammatory bowel disease, however its utility for evaluating the bowel was limited. TTE also performed during this hospitalization did not reveal any cardiac valvular abnormalities. The patient was continued on antibiotics until discharge on hospital day 8. At discharge, the drain was removed, and the patient was started on a 6-week course of oral ciprofloxacin. At her follow-up appointment, the patient's ESR and CRP had improved. She complained of some mild residual pain at the site of the previous abscess, but overall her pain, and subsequently her ability to ambulate, had significantly improved.

### Discussion

Osteomyelitis, or infection of the bone, is caused by pathogenic bacteria infiltrating into joint spaces and subsequently into bone cortex.<sup>3</sup> In adults, polymicrobial infections, including *S. aureus* and *MRSA*, are the most common pathogens. Other bacteria commonly include *S. epidermitis*, *Psuedomonas aeruginosa*, *Serratia marcescens*, and *E.coli*.<sup>3</sup> Bacteria are usually introduced via direct inoculation (e.g., from existing prostheses) or by contiguous spread (e.g., from surrounding cellulitis or from trauma).<sup>4</sup> In children, hematogenous spread of bacteria is the most common cause of osteomyelitis, and the infection is most commonly monomicrobial. In these cases *S.aureus* is the most common isolate, with *Group A streptococcus* and *S. pneumoniae* the next most common bacterial isolates.<sup>5</sup>

The young adult in this case presents an interesting demographic, where commonly encountered microbial etiologies blur as pediatric patients transition into adulthood. Overall, osteomyelitis leading to pyogenic sacroiliitis is extremely rare. Hermet et al<sup>6</sup> in 2012 performed the most complete study of 39 cases of infectious sacroiliitis and demonstrated that infectious sacroiliitis most commonly has a female predominance and involves the left SI joint, often unilaterally. The low prevalence of infectious sacroiliitis in children is presumed to be due to the poor vascularization of the SI joint, which consequently reduces the risk of hematogenous dissemination. As children transition into adulthood, however, the increased incidence of hematogenous dissemination of bacteria to the pelvic joints is due, in part, to the increased vascularization of the joints from the pelvic and paravertebral venous plexus of Batson, which peaks in the second decade of life.<sup>7</sup>

Initial signs and symptoms in most cases of pyogenic SI include gluteal pain, often misinterpreted as sciatica, spondylodiscitis, or muscular strain. Anatomically, the SI joint is bordered by the psoas muscle anteriorly, and the gluteal and piriformis muscles posteriorly. It is this posterior involvement that leads to gluteal pain via involvement of the S1 and S2 nerve roots. This is further compounded by the extension of inflammation and infection into the surrounding musculature, which often results in abscess formation. Fevers are only present in 30-40% of initial presentations, and consequently the diagnosis of pyogenic SI can be delayed an average of 40 days, until the infection presents with more critical signs including sepsis. Inflammatory markers such as ESR can be elevated in up to 60% of patients.<sup>8</sup>

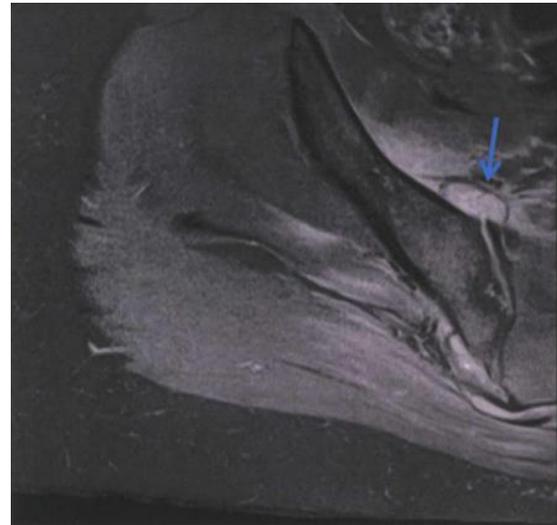
The etiology of pyogenic sacroiliitis varies greatly, which is partially attributable to the paucity of cases documented. Immune-mediated arthritis, hematogenous spread, and direct inoculation are the most commonly reported etiologies.<sup>7,9</sup> Prior cases have also implicated inflammatory bowel diseases such as Crohn's disease in the pathogenesis of SI as the involvement of the terminal ileum compounded by fistula formation leads to inoculation of contiguous bone such as the ilium.<sup>9,10</sup> In this case, the patient's presumed etiology was most likely the gastrointestinal translocation of *E.coli*, which lead to hematogenous dissemination into the SI joint. While the patient in our case denied preceding diarrhea or other GI symptoms, the frequency of obvious preceding infection varies in cases of hematogenous dissemination<sup>11</sup> and a definitive diagnosis was not possible due to imaging constraints.

### Conclusion

The diagnosis of sacroiliitis may initially be challenging in the setting of non-specific presenting symptoms. However, initial complaints of musculoskeletal pain, fever and elevated inflammatory factors may help to confirm the diagnosis. Definitive treatment of SI requires source control via aspiration and drainage of associated abscesses. The organisms isolated should trigger a search for preceding genitourinary or gastrointestinal infections, in addition to identifying risk factors such as IVDU, sexual intercourse, preceding trauma, or prior surgical interventions.

### Figures

**Figure 1.** Abscess Near SI Joint



**Figure 2.** Right hip x-ray



**Figure 3.** MRI of Right Leg showing persistent osteomyelitic changes with resultant hyperintensity



## REFERENCES

1. **Srinivasan S, Miller C, Akhras N, Blackwood AR.** Pediatric pyogenic sacroiliitis and osteomyelitis. *Infect Dis Rep.* 2012 Mar 14;4(1):e18. doi:10.4081/idr.2012.e18. eCollection 2012 Mar 14. PubMed PMID: 24470925; PubMed Central PMCID: PMC3892644.
2. **Zimmermann B 3rd, Mikolich DJ, Lally EV.** Septic sacroiliitis. *Semin Arthritis Rheum.* 1996 Dec;26(3):592-604. Review. PubMed PMID: 8989804.
3. **Aragón-Sánchez J, Lázaro-Martínez JL, Quintana-Marrero Y, Hernández-Herrero MJ, García-Morales E, Cabrera-Galván JJ, Beneit-Montesinos JV.** Are diabetic foot ulcers complicated by MRSA osteomyelitis associated with worse prognosis? Outcomes of a surgical series. *Diabet Med.* 2009 May;26(5):552-5. doi:10.1111/j.1464-5491.2009.02714.x. PubMed PMID: 19646197.
4. **Lalani T** (2017). Overview of osteomyelitis in adults. UpToDate. Retrieved March 19, 2017 from <https://www.uptodate.com/contents/overview-of-osteomyelitis-in-adults>
5. **Kaplan SL.** Osteomyelitis in children. *Infect Dis Clin North Am.* 2005 Dec;19(4):787-97, vii. Review. PubMed PMID: 16297732.
6. **Hermet M, Minichiello E, Flipo RM, Dubost JJ, Allanore Y, Ziza JM, Gaudin P, Thomas T, Dernis E, Glace B, Regnier A, Soubrier M.** Infectious sacroiliitis: a retrospective, multicentre study of 39 adults. *BMC Infect Dis.* 2012 Nov 15;12:305. doi: 10.1186/1471-2334-12-305. PubMed PMID: 23153120; PubMed Central PMCID: PMC3519695.
7. **Morsi A, Sallam A, Saoud A.** Infectious Sacro-Iliitis. *World Spinal Column Journal.* 2015; 1(6): 27-35.
8. **Cohn SM, Schoetz DJ Jr.** Pyogenic sacroiliitis: another imitator of the acute abdomen. *Surgery.* 1986 Jul;100(1):95-8. PubMed PMID: 3726768.
9. **Schwartz CM, Demos TC, Wehner JM.** Osteomyelitis of the sacrum as the initial manifestation of Crohn's disease. *Clin Orthop Relat Res.* 1987 Sep;(222):181-5. PubMed PMID: 3621718.
10. **Freeman HJ, Kwan WC.** Brief report: non-corticosteroid-associated osteonecrosis of the femoral heads in two patients with inflammatory bowel disease. *N Engl J Med.* 1993 Oct 28;329(18):1314-6. PubMed PMID: 8413411.
11. **Doita M, Yoshiya S, Nabeshima Y, Tanase Y, Nishida K, Miyamoto H, Watanabe Y, Kurosaka M.** Acute pyogenic sacroiliitis without predisposing conditions. *Spine (Phila Pa 1976).* 2003 Sep 15;28(18):E384-9. PubMed PMID: 14501940.