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Case report

# Epidural phlegmon and iliopsoas abscess caused by *Salmonella enterica* bacteremia: A case report☆,☆☆

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ABSTRACT

*Introduction and importance:* Iliopsoas abscesses (IPA) are rare and typically present with a non-specific triad of fever, back pain, and antalgic gait. *Staphylococcus aureus* is the organism responsible for nearly 90 % of IPA cases. We present a case of primary IPA with progression to osteomyelitis and discitis due to *Salmonella enterica* bacteremia, an exceedingly rare etiology occurring in an otherwise healthy individual.

*Case presentation:* This patient presented with fever, back pain, and hip pain. Initial imaging and laboratory workup did not reveal any source of infection. He became septic within 72 h of admission, and blood cultures were confirmed as *Salmonella enterica*. However, the etiology of the infection remained unclear. Computed Tomography (CT) imaging revealed a right-sided psoas abscess measuring 7 mm × 7 mm and an epidural phlegmon. He was discharged home with intravenous ceftriaxone and levofloxacin. However, the patient was readmitted due to L2-L3 osteomyelitis and discitis with an eccentric disc bulge causing compression of the right L3 nerve root and neutropenia.

*Clinical discussion:* This case in unique in the fact that this occurred in a healthy patient with no significant risk factors or exposure to this bacteria. Additionally, this case highlights the rapid progression of IPA and the spread to adjacent spinal structures with the potential to cause nerve compression with successful medical management.

*Conclusion: Salmonella enterica* is rare cause of iliopsoas abscess. This case emphasizes the importance of including iliopsoas abscesses as a differential diagnosis in patients with a high index of clinical suspicion.

## 1. Introduction

Iliopsoas abscesses (IPA) are a rare occurrence, with an incidence of 12 cases per year worldwide [1]. The etiology of IPA is continuing to change. IPA was a complication of *Mycobacterium tuberculosis* [1]. However, with improvements in treating *Mycobacterium tuberculosis* and subsequent decline in incidence, there has been a shift to *Staphylococcus aureus* being the predominant organism [2,3]. Other organisms that have been known to cause IPA to include Streptococcus spp., *E. coli, Pasteurella multocida*, and Bacteroides spp. [3]. Most cases of IPA are caused by a single organism; however, abscesses arising from gastrointestinal or urinary origin may be polymicrobial [4]. IPA can be classified as primary if no other sources of infection are present while secondary arises directly from an adjacent structure or superimposed etiology [5]. Primary abscess formation results from hematogenous spread, while secondary disease can originate from instrumented hardware, surgical procedures, or other chronic diseases [3]. Primary versus secondary IPA is likely dependent on the geographical region, with over 90 % of cases in Africa and Asia being primary in origin [6]. In comparison, 18.7 % of cases in Europe were primary [6].

The complications of IPA are severe, with septic shock occurring in up to 20 % of cases and a mortality rate ranging from 5 to 25 % [7]. In immunocompromised populations, the mortality rate can reach 100 % [7]. Given the severe nature of this disease, prompt treatment is critical. The common presentation of IPA is described as a triad of symptoms – fever, back pain, and antalgic gait. However, this has been reported to only occur in 30 % of patients, making this condition often challenging to diagnose and easily overlooked [3].

We present one case of iliopsoas abscess in a healthy, male patient with progression to osteomyelitis and discitis due to *Salmonella enterica* bacteremia. There is a scant amount of research regarding the pathogenesis and microbial profile of iliopsoas abscess, as current literature is limited to case reports. This case report reflects the importance of maintaining iliopsoas abscess as a potential concomitant complication of

☆ An institutional review board approved this study.☆☆ A copy of the patient consent is available upon request.

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bacteremia from causative organisms along a broad microbial spectrum.

## 2. Case presentation

A 50 year-old male presented to our hospital with symptoms of fever, back pain, and right hip pain. He has no medical history. He sustained a fall onto his right side earlier in the day due to severe, sharp right-sided lower back pain. Prior to admission, he was diaphoretic with associated chills and fever up to 101.2 °F (38.3 °C). Upon presentation, he was afebrile with normal vital signs, and physical exam revealed ecchymosis along the back due to the fall. He did not exhibit any focal neurological deficits or tenderness along the back. A computed tomography (CT) scan of the abdomen, pelvis, and right hip revealed no abnormalities. Complete blood count, urinalysis, respiratory, and hepatitis panels were negative for any source of infection. However, the C-reactive protein and procalcitonin levels were elevated at 25.2 mg/dL and 11.11 ng/mL, respectively. The patient was admitted for systemic inflammatory response syndrome. Peripheral blood cultures and an MRI of the thoracic and lumbar spine were ordered.

The MRI revealed moderate-to-severe stenosis at L5-S1 bilaterally with no acute abnormality. The blood cultures returned positive for gram-negative bacteria. He then developed pancytopenia and infectious disease was consulted. He was started on meropenem 1 g every 8 h and cefepime 2 g every 8 h for dual gram-negative coverage. However, he remained febrile with chills, emesis, and severe right-sided low back pain. He began experiencing rigors with tachycardia in the 150 s while resting in bed. On hospital day-3, the gram-negative bacteremia was confirmed as *Salmonella enterica*.

Antibiotics were changed to ceftriaxone 2 g daily and levofloxacin 750 mg daily. The pancytopenia improved and was likely secondary to severe septicemia from *Salmonella enterica*. Despite this, he continued to experience right hip and low back pain with weakness. The pain remained at an 8–9/10 at its worst, although he was able to ambulate while hospitalized with minimal complaints of soreness.

An MRI of the right hip was obtained which demonstrated a tear of the anterior labrum and osteoarthritis (Fig. 1). Orthopedic surgery was consulted to evaluate the patient and delineate the etiology of his pain. Although labral tears can present with pain, the acute onset in nature and comorbid sepsis likely pointed to a different pathological process.

An MRI of the pelvis demonstrated edema in the right psoas muscle and the right paraspinous muscle tissue, which extended beyond the level of the imaging window (Fig. 2). An MRI of the lumbar spine was ordered to determine the extent of the edema. This demonstrated an epidural phlegmon at the level of L3 and a right-sided psoas abscess measuring 7 mm × 7 mm (Figs. 3 & 4). These findings were not present in the imaging studies performed when the patient initially presented to the hospital.

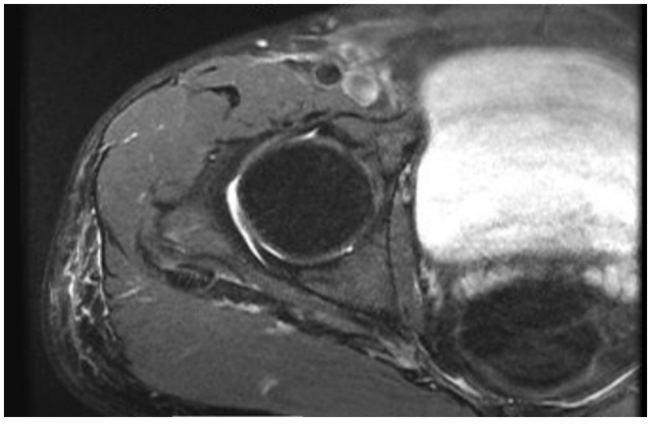


**Fig. 1.** An MRI of the right hip showing a tear of the anterior labrum and osteoarthritis of the hip joint.

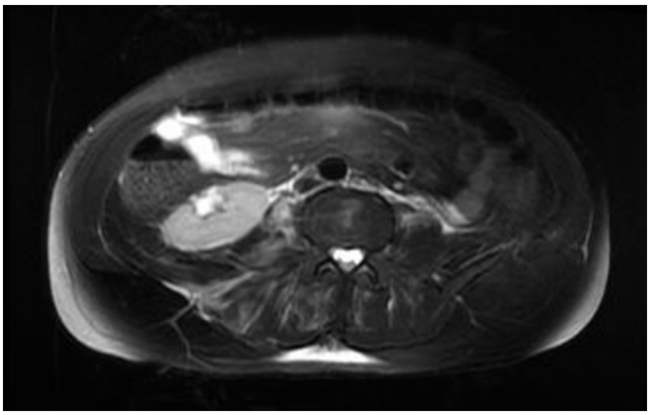
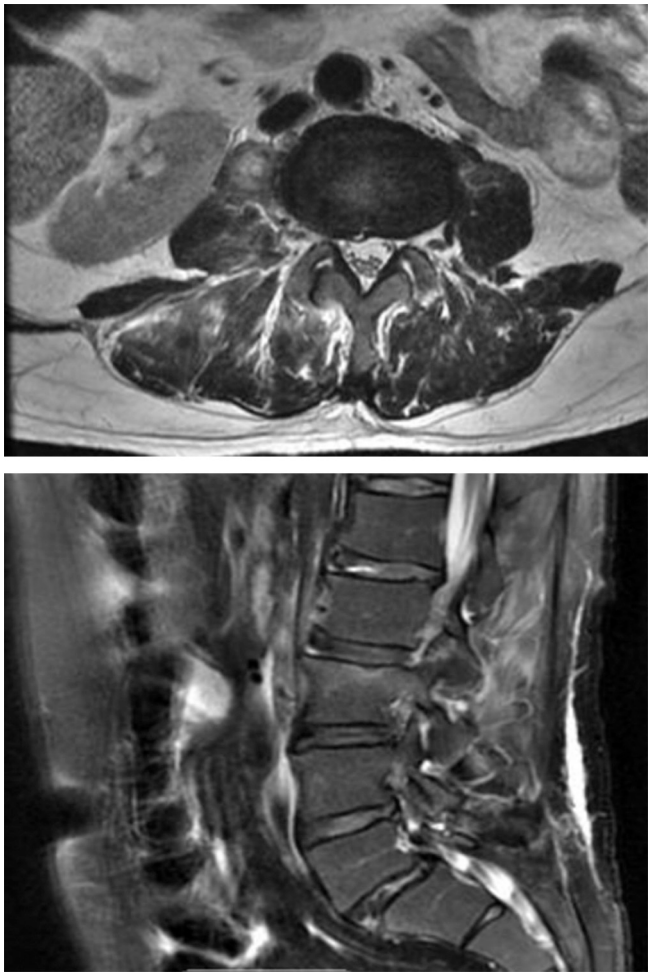


**Fig. 2.** An MRI of the pelvis without contrast showing edema in the right psoas muscle and the right-sided paraspinous muscle tissue, extending beyond the level of the imaging window.



**Figs. 3 and 4.** MRI of the lumbar spine showing an epidural phlegmon at the level of L3 and a right-sided psoas abscess measuring 7 mm × 7 mm.

A 2-dimensional transesophageal echocardiogram was performed, which did not show any valvular vegetations or any evidence of endocarditis. A peripherally inserted central catheter was placed in anticipation of long-term administration of antibiotics. The patient was discharged home on hospital day-7 with ceftriaxone 2 g daily for 6 weeks and oral levofloxacin 250 mg daily for 6 weeks.

Approximately 2 weeks after discharge, he was readmitted due to

worsening pain. An MRI showed L2-L3 osteomyelitis and discitis with an eccentric disc bulge causing compression of the traversing right L3 nerve root (Fig. 5). Repeat blood cultures were negative for any growth. The patient underwent CT-guided aspiration of the psoas muscle abscess and an L2-L3 vertebral body biopsy which yielded no drainage. The biopsy was sent for culture, which was negative for any bacterial or fungal infection source. The patient was subsequently discharged home with ceftriaxone 2 g every 12 h. After two weeks from this discharge his back pain improved and he was progressing with ambulation. However, he had neutropenia of 1380mm$^3$, which was likely drug-induced. The ceftriaxone was discontinued, and levofloxacin 750 mg daily was restarted which resolved the neutropenia.

## 3. Discussion

Our case report adds to the small number of reports that discuss iliopsoas abscesses cause by *Salmonella enterica.* It demonstrates the numerous complications that can arise from this bacterial cause such as severe sepsis and pancytopenia. This case in unique in the fact that this occurred in a healthy patient with no significant risk factors or exposure to this bacteria. Additionally, this case highlights the rapid progression of IPA and the spread to adjacent spinal structures with the potential to cause nerve compression. We have demonstrated that these serious complications can be successfully managed with medical treatment and appropriate workup.

In this case, *Salmonella enterica* was isolated as the colonizing organism of this patient's abscess, a rare cause of this condition given that other predominant species have been reported in the literature. Hirai et al. reported that 3 of 11 published cases of spinal epidural abscess caused by non-typhoidal *Salmonella* progressed to osteomyelitis and psoas abscess [8]. Heyd et al. demonstrated that over 11 years, 1.7 % of 120 patients admitted with *Salmonella* bacteremia developed psoas abscess [10]. Individuals with comorbidities such as diabetes, cancer, HIV infection, and other conditions resulting in suppressed immunity are at increased risk for non-typhoidal *Salmonella* infections. Acute gastroenteritis is the most common presentation of salmonellosis, representing up to 75 % of cases [9,10]. *Salmonella enterica* is known to generally cause self-limiting gastroenteritis; however, our patient did not complain of any history of gastrointestinal symptoms [8]. In addition, this patient did not have any known comorbidities. How this individual developed Salmonella bacteremia is unclear. However, given that the iliopsoas is directly related to abdominal and retroperitoneal structures, the definitive prior intra-abdominal disease cannot be ruled out. Although studies note spondylodiscitis, sacroiliac, or hip infections as the possible origins of abscesses, multi-modal imaging studies in this patient revealed no evidence of such pathology.

The iliopsoas abscess likely contributed to the osteomyelitis and discitis seen in this case. This progression is due to areas of slower blood flow in vertebral bodies due to the presence of long bone metaphyseal equivalents located near the anterior longitudinal ligament, supplied by end arteriolar arcades [5]. These areas are more susceptible to bacterial seeding, increasing the risk of osteomyelitis [5,9]. It is pertinent to identify signs and symptoms of iliopsoas abscesses for early treatment. Current guidelines recommend percutaneous drainage and intravenous antibiotics. In this case, drainage yielded no aspirate, yet the patient improved over time via long-term intravenous antibiotics. His vertebral biopsies were negative for infectious etiologies as well.

This case highlights the importance of including iliopsoas abscesses as a differential diagnosis. Broadening the scope of potential organisms may prevent delays in care and further morbidity.

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request. There was no funding for this study. The SCARE checklist was used as a guide to complete this case report [11].

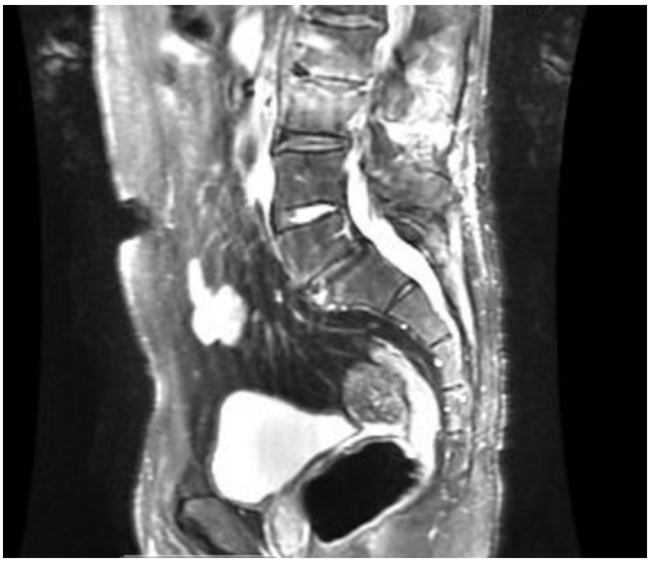


**Fig. 5.** MRI showing L2-L3 osteomyelitis and discitis with an eccentric disc bulge causing compression of the traversing right L3 nerve root.

### Provenance and peer review

Not commissioned, externally peer-reviewed.

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None.

### Ethical approval

A case report determination form was submitted and approved by our institution's IRB.

### Consent

All possible identifying information has been removed to protect anonymity. Informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the consent is available for review by the Editor-in-Chief of this journal on request.

### Author contribution

Michael Mousselli, DO: writing, reviewing and editing.
Emerald Chiang: writing, reviewing and editing.
Petros Frousiakis, DO: writing, reviewing and editing.

### Registration of research studies

N/A.

### Guarantor

Michael Mousselli.

### Declaration of competing interest

None.

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