

Primary Pyogenic Abscess in an Immunocompetent Child: An Indian Perspective

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Learning Point of the Article:

While traditionally associated with tuberculosis and immunocompromised individuals, the vague symptomatology and pathogenesis make psoas abscess a challenging clinical diagnosis in the pediatric population. A high level of clinical suspicion, timely imaging studies, and targeted treatment are essential for its management.

Abstract

Introduction: Pyogenic psoas abscess (PPA) is a rare but severe condition. Previously linked to tuberculosis, it's now seen with diverse causes. This case report details the diagnosis and management of PPA in a healthy Indian child, initially suspected of having hip issues.

Case Report: A 5-year-old girl was brought for pain in her right hip and lower back, and fever for 3 days. She was irritable and unable to walk. She was febrile (101°F), irritable, and toxic with her right lower limb flexed 30° at the hip with all its movements restricted and painful. Inguinal lymph nodes were palpable. Blood tests showed elevated white blood cell count (18,000 × 10⁹/L) and inflammatory markers, with a negative Mantoux test. Radiographs of the lumbosacral spine were normal. Magnetic resonance imaging showed a large abscess in the right psoas and iliacus muscles, measuring 6.8 × 3.3 × 3 cm. She underwent open drainage through a retroperitoneal approach, and samples were sent for bacteriological analysis. The wound was irrigated and closed over a drain.

Post-operatively, she received Linezolid being culture positive for methicillin-resistant *Staphylococcus aureus*. Her pain reduced by the 3rd day and she was discharged with oral antibiotics. She walked at 6 weeks and was symptom-free on follow-up.

Conclusion: This case highlights the crucial need to consider PPA in children showing hip pain, limping, and infection signs. Due to its subtle presentation and similarity to septic arthritis, high suspicion is essential. Timely imaging and proper treatment, such as drainage and antibiotics, can ensure positive results.

Keywords: Pediatric, pyogenic psoas abscess, immunocompetent, methicillin-resistant *Staphylococcus aureus*, hip pain, surgical drainage, antibiotic therapy.

Introduction

Pyogenic psoas abscess (PPA) is a rare but serious condition characterized by the accumulation of pus in the psoas muscle compartment. While historically associated with tuberculosis (TB), especially in regions with high TB prevalence, such as India, PPA is increasingly recognized as having varied etiologies [1,2]. In this case report, we describe the presentation, diagnosis, and management of a PPA in an immunocompetent Indian child

who was initially thought to have hip pathology.

Case Report

A 5-year-old girl was brought to the emergency room of the hospital by her mother with complaints of pain in her right hip and lower back, accompanied by fever for 3 days. The child had been irritable and reluctant to walk. There was no history of

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Author's Photo Gallery



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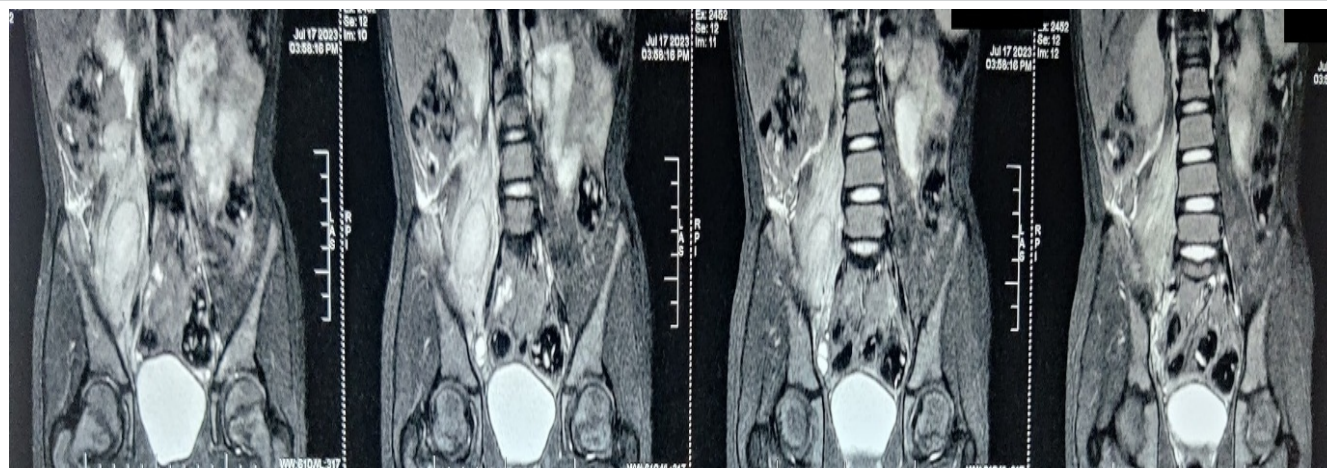


Figure 1: Magnetic resonance imaging (MRI): Coronal section of abdomen and pelvis. A plain MRI of the Abdomen and pelvis was taken 1 week before surgery. The following is a coronal section showing a large abscess of size 6.8×3.3 cm in the body of the psoas muscle at the level of L4-L5 vertebrae. The MRI scan is essential for the diagnosis and surgical planning of the patient.

trauma, surgery, or prior illnesses. She had not been exposed to anyone with TB, nor did she experience evening fevers or night sweats. Her vaccinations were all up to date.

On examination, she presented with her right lower limb flexed at the hip and knee, demonstrating reluctance to bear weight and walking with a limp. Active extension of the limb was not possible, and attempts to passively extend the hip caused significant pain. No visible swellings or tenderness were noted over the hip, abdomen, or lower back. All movements at the hip joint were restricted and painful, with a fixed flexion deformity of 30° . Palpable inguinal lymph nodes were observed. The child was febrile with a temperature of 101°F and appeared irritable and toxic.

Hematological tests revealed an elevated white blood cell (WBC) count of 18,000, with increased polymorphonuclear leukocytes. Inflammatory markers such as erythrocyte

sedimentation rate (ESR) and C-reactive protein (CRP) were also significantly elevated. A Mantoux test yielded a negative result. Radiographs of the lumbosacral spine and both hips did not reveal any fractures, soft tissue abnormalities, or signs of spinal TB. Following an urgent magnetic resonance imaging (MRI) of the pelvis and lumbar spine, a large abscess was found in the right psoas and iliacus muscles, extending along the iliopsoas tendon insertion into the lesser trochanter. The abscess measured approximately $6.8 \times 3.3 \times 3$ cm (Fig. 1 and 2).

The patient underwent open drainage through a retroperitoneal approach. During the procedure, purulent fluid mixed with blood was drained, and samples were sent for bacteriological analysis. The wound was thoroughly irrigated, and a negative suction drain was placed (Fig. 3).

Post-operatively, the patient received empirical antibiotics (Ceftriaxone), which were later adjusted based on culture

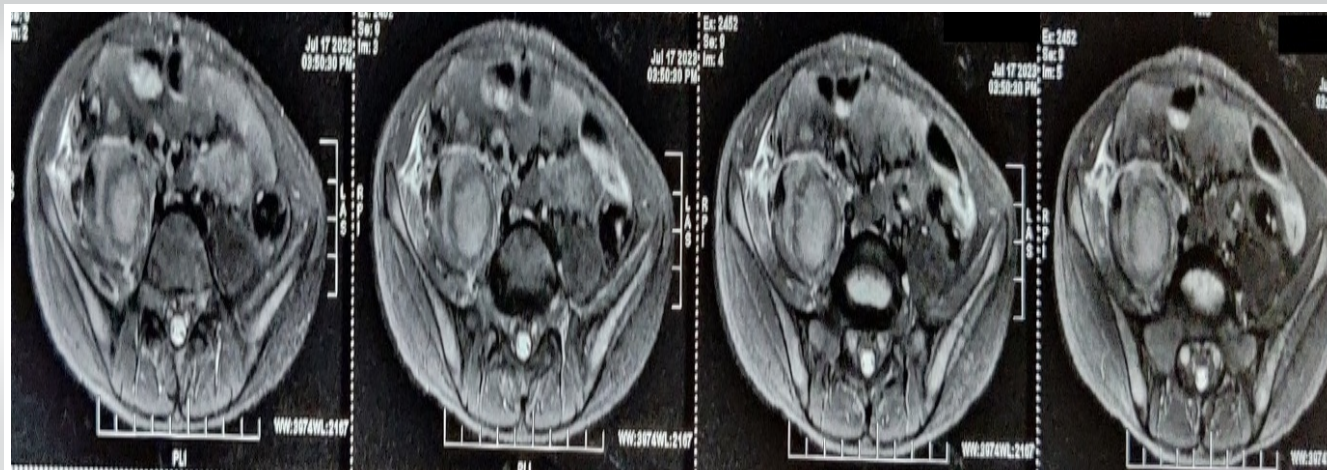


Figure 2: Magnetic resonance imaging (MRI): Axial section of abdomen and pelvis. Plain MRI of the abdomen and pelvis was taken 1 week before surgery. The following is a coronal section showing a large abscess of size 3.3×3 cm in the body of the psoas muscle.

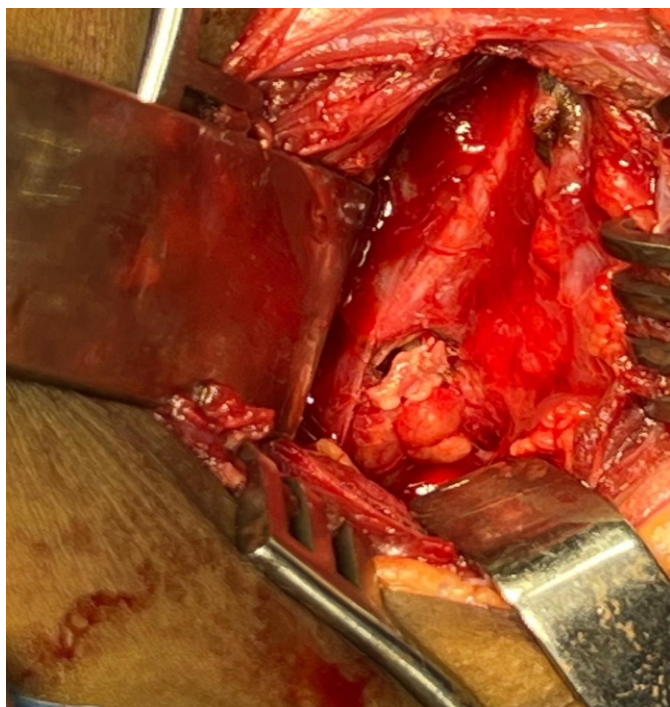


Figure 3: Intraoperative picture of the psoas abscess and its contents. The patient was managed with open drainage through a retroperitoneal approach. During the procedure, a mixture of pus and blood was drained, and samples were sent for bacteriological testing. The wound was then irrigated thoroughly and closed, with a negative suction drain left in place.

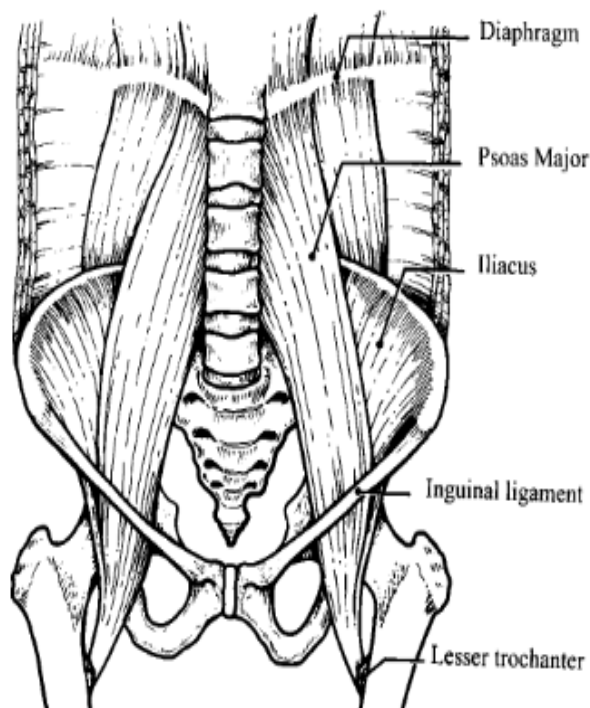


Figure 4: Anatomy of the iliopsoas muscle. The figure shows the iliacus and the psoas muscles. The psoas muscle originates from the transverse processes and lateral borders of the T12-L5 vertebrae. It courses down across the pelvic brim and is joined by the iliac muscle to insert on the lesser trochanter of the femur [5].

results showing Methicillin-Resistant *Staphylococcus aureus* (MRSA), requiring intravenous linezolid for 2 weeks, followed by oral antibiotics for 4 weeks. The patient's condition improved steadily, with reduced pain by the third post-operative day, and she regained hip mobility in the subsequent weeks. Hematological markers of inflammation also receded in the post-operative period. Domiciliary rehabilitation was initiated, and the patient regained her ambulatory status within 6 weeks. At follow-up, following completion of the antimicrobial regimen, symptoms and signs had resolved.

Discussion

The iliopsoas compartment is extraperitoneal, consisting of the iliacus and psoas muscles. The psoas muscle arises from the transverse processes and lateral borders of the T12-L5 vertebrae, coursing down across the pelvic brim to insert on the lesser trochanter of the femur. It is the primary flexor of the hip and trunk [3,4].

Anatomical relations of the muscle include:

1. Anteriorly: The gastrointestinal and urinary tracts, the inferior vena cava, the abdominal aorta, and iliac lymph nodes.
2. Posteriorly: The quadratus lumborum muscle and the transverse spinous processes.

3. In the thigh: The iliopsoas forms part of the floor of the femoral triangle (Fig. 4).

A breach in the retroperitoneal fascial planes by infective, hemorrhagic, or neoplastic processes can pre-dispose the iliopsoas to direct contact with infectious material from adjacent structures [5]. Its rich blood supply makes it susceptible to hematogenous spread of infection [6,7].

Psoas abscesses (PA) may be classified as primary or secondary depending on the etiology. Primary abscesses arise de novo without the presence of an infective focus elsewhere in the body or through hematogenous or lymphatic routes from a distant, occult source. They may be associated with immunosuppression, diabetes mellitus, renal failure, or HIV [7-9]. Trauma and hematoma formation may pre-dispose to the development of a primary psoas abscess [10-12]. Occurrence in children tends to be primarily de novo, as opposed to secondary spread from contagious infectious processes seen in adults [5, 11-13].

The most common organism in a primary psoas abscess is *S. aureus* (88.4% of cases), with other pathogens including *Streptococcus* (4.9%) and *Escherichia coli* (2.8%) [13]. Other organisms such as *Bacteroides* spp., *Mycobacterium tuberculosis*, *Enterococcus faecalis*, and *Pepto streptococcus* have also been reported. MRSA has been documented on a

case-by-case basis [14]. A case series by Lopez et al. in 2009 found that of ninety-three confirmed microbial causes, twenty-three were due to *S. aureus*, of which only one was MRSA [15]. Current literature from Western countries shows that hematogenous spread from the gastrointestinal tract is the most common cause of idiopathic psoas abscess [16], while studies from tertiary care centers in North India and South India indicate that *M. tuberculosis* is the predominant cause of idiopathic psoas abscess [1, 2], highlighting geographic variations.

Secondary abscesses are more common in adults over 50 years old and occur due to direct spread of infections from adjacent sites, such as the gastrointestinal tract (*E. coli* and other Enterobacteriaceae), genitourinary tract, vertebral column, and hip joint (*M. tuberculosis*) [13, 17]. The most common cause in this group is Crohn's disease [18].

Given that no secondary source of infection was identified in our patient, her psoas abscess is likely of primary etiology.

The typical age of presentation in children is between 5 and 9 years, with a higher prevalence in males [8, 14]. The classical triad of fever, limp, and back pain is present in fewer than 30% of patients [19]. Some patients may also experience associated abdominal, genitourinary, spinal complaints, thigh or loin pain (or mass), and fixed flexion deformity of the affected side [8, 14, 19, 20].

Hip flexion deformity can be a helpful differentiating feature, as 96% of patients with iliopsoas abscesses hold the hip in flexion to relieve pain. Our patient presented with an insidious onset of non-specific symptoms, including fever, hip pain, limping, and inability to bear weight, prompting a provisional diagnosis of septic arthritis. Both septic arthritis and psoas abscess can present with limp and hip pain as well as systemic features, such as fever, making differentiation challenging. The presence of abdominal pain may be more suggestive of a psoas abscess [21]. The diagnosis of septic arthritis is particularly favored when patients meet the Kocher criteria, as seen in our patient, who exhibited all four criteria (non-weight bearing, temperature $>38.5^{\circ}\text{C}$, ESR >40 mm/h, and WBC $>12,000$ cells/mm³). Some studies have even described psoas abscess as a consequence of septic arthritis, although others could not establish this correlation [22].

Due to the variability in clinical presentation, imaging studies are crucial for distinguishing iliopsoas abscesses from other inflammatory processes, such as septic arthritis [10, 23, 24]. Imaging is performed for both confirming the diagnosis and planning management [11, 25].

1. Plain abdominal X-ray: May reveal an abnormal psoas shadow, soft tissue mass, or subluxation of the involved joint

[11, 25].

2. Ultrasonography: Preferred as the first-line investigation due to its affordability, availability, and lack of radiation exposure [26, 27]. It may demonstrate a hypoechoic mass suggestive of a psoas abscess and can also show hip effusions in the case of arthritis, but it cannot identify the cause of the abscess [11, 25, 28, 29].

3. Computed tomography (CT) scan: CT with contrast helps accurately diagnose a psoas abscess and aids in therapeutic percutaneous drainage (PCD) [30-32].

4. MRI: Assists in surgical planning by delineating the zone of involvement [33].

Conventional treatment options for iliopsoas abscesses in pediatric patients typically involve appropriate antibiotic administration (empiric followed by targeted therapy) along with abscess drainage, either surgically or through radiologic guidance [8, 11, 12, 18]. Surgical intervention is often necessary in cases where there is a large abscess or failure of conservative management. Open drainage is traditionally performed through a retroperitoneal approach, which provides direct access to the abscess while minimizing complications related to surrounding structures [34-36]. Alternatively, PCD is increasingly utilized due to its minimally invasive nature and favorable outcomes in select cases [4, 5, 6].

In our patient, the abscess was successfully drained through the retroperitoneal approach, coupled with appropriate antimicrobial therapy tailored to the cultured organism. The choice of linezolid for MRSA was crucial, highlighting the need for sensitivity-based treatment in the face of rising antibiotic resistance. The post-operative course was uneventful, and the patient exhibited significant clinical improvement, regaining functional mobility within weeks.

Conclusion

This case underscores the importance of considering PPA in pediatric patients presenting with hip pain, limping, and systemic signs of infection. Given the often-subtle presentations and overlapping symptoms with septic arthritis, a high index of suspicion is vital. Prompt imaging studies and appropriate management, including drainage and targeted antibiotic therapy, can lead to successful outcomes.



Clinical Message

The article highlights the importance of early diagnosis, targeted treatment, and management in pediatric cases of PPA. A high index of clinical suspicion is essential, as PA are commonly associated with tuberculosis and immunocompromised individuals in the subcontinent. Due to overlap with the clinical presentation of conditions, such as septic arthritis and non-specific symptoms such as hip pain, limping, and systemic signs of infection, prompt imaging with MRI or CT scans is crucial for accurate diagnosis and timely intervention. Early intervention, including surgical drainage and culture-guided antibiotic therapy, is essential, particularly for addressing antibiotic-resistant pathogens, such as MRSA. The case underscores the need for targeted treatments to improve patient outcomes.

Declaration of patient consent: The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given the consent for his/ her images and other clinical information to be reported in the journal. The patient understands that his/ her names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Conflict of interest: Nil **Source of support:** None

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