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Case Report

A primary psoas abscess with renal fistulization: A rare case in a 2-year-old child ☆,☆☆

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ABSTRACT

Iliopsoas abscess is a rare condition in children, yet it carries a significant risk of morbidity and mortality if not promptly diagnosed and treated. We report an unusual case of a primary psoas abscess in a previously healthy 2-year-old male, complicated by fistulization into the kidney. The patient presented with a painless left lumbar mass and low-grade fever. Contrast-enhanced computed tomography (CT) revealed a multiloculated retroperitoneal abscess involving the left psoas and quadratus lumborum muscles, with extension into the ipsilateral kidney. Laboratory tests showed leukocytosis and elevated inflammatory markers. Surgical drainage of the abscess identified Staphylococcus aureus as the causative pathogen. Postoperative antibiotic therapy led to a favorable outcome. This case highlights the importance of considering psoas abscess in the differential diagnosis of pediatric lumbar masses and underscores the need for early imaging and intervention to prevent severe complications such as renal fistulization.

Introduction

Iliopsoas abscess results from an infectious process leading to purulent collection within the iliopsoas muscle [1,2]. The condition was first described by Henry Mynter in 1881 as a complication of tuberculous infection affecting the spine or sacroiliac joints [2–5].

Although relatively rare [1–3,6–9], iliopsoas abscess is even more uncommon in neonates and children [5,10]. In neonates, only 20 cases have been reported in the English literature [5,10]. The true incidence of the disease remains unknown [2], but its diagnosis has become more frequent due to advancements in imaging techniques [1,8,9]. One study reported a statistically significant increase in incidence, from 0.5 cases per 10,000 hospital admissions between 1993 and 2004 to 6.5 cases per 10,000 between 2004 and 2007 [1,9].

Delayed diagnosis can lead to severe complications, with septic shock occurring in up to 20% of cases [1–3]. Here, we report a rare case of primary psoas abscess in a 2-year-old im-

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munocompetent child, complicated by fistulization into the kidney—a feature that adds to the uniqueness of this case.

Case presentation

We report the case of a 2-year-old male child with no significant medical history, no known exposure to tuberculosis, and no prior medication use. He was born at term via vaginal delivery without perinatal complications. The child was brought to the pediatric surgical emergency department due to a left lumbar mass incidentally discovered by his parents.

On clinical examination, the child was in good general condition but presented with a fever of 38°C. A left lumbar mass was palpated; it was soft, nontender, and without local inflammatory signs. A positive psoas sign was noted, characterized by painful flexion of the left thigh toward the pelvis. The remainder of the physical examination was unremarkable.

Laboratory findings revealed leukocytosis (20,500/mm³) with neutrophil predominance (16,000/mm³) and a markedly elevated C-reactive protein (CRP) level (400 mg/L). Blood, throat, and urine cultures were negative. Ultrasound demonstrated infiltration of the subcutaneous soft tissues with a localized deep collection. Contrast-enhanced computed tomography (CT) revealed a multiloculated left retroperitoneal abscess involving the psoas and quadratus lumborum muscles, extending from L2 to L4. The collection appeared well-defined, lobulated, and hypodense, with peripheral contrast enhancement, measuring 42 × 32 × 35 mm (AP × H × T) (Fig. 1A and B).

A diagnosis of a left psoas and quadratus lumborum abscess with a fistulous connection to the ipsilateral renal cortex was established. On the second day of hospitalization, surgical drainage was performed, and a drain was placed in the abscess cavity. Approximately 30 mL of purulent fluid was collected. Culture of the abscess fluid was positive for Staphylococcus aureus. The patient was started on antibiotic therapy, and the postoperative course was favorable, with no complications.

Discussion

The psoas muscle is a long, fusiform muscle originating from the transverse processes and lateral borders of the vertebrae D12 to L5 [1,7,11]. It descends caudally along the pelvic brim, passes beneath the inguinal ligament and anterior to the hip joint capsule, before forming the psoas tendon, which merges with the iliacus muscle to insert on the lesser trochanter of the femur. The iliopsoas muscle is innervated by the L2–L4 nerve roots and occupies a retroperitoneal space known as the iliopsoas compartment [1,7,11].

Psoas abscesses are classified into 2 types: primary and secondary, differing in both their pathogenesis and microbial profile [1–4,7–9]. Primary (idiopathic) abscesses occur in the absence of an identifiable source of infection, typically resulting from hematogenous or lymphatic dissemination [2,4,5,7,9,13,14]. These are rare and predominantly affect young patients and neonates in developing countries [4,5,8,9,12,13], which is consistent with our case.

The precise etiology of primary psoas abscess remains unclear and is subject to ongoing debate. Certain conditions that predispose to infection and bacterial dissemination are recognized as risk factors. Elderly individuals, immunocompromised patients, those with HIV infection, diabetes, renal insufficiency, intravenous drug use, or chronic corticosteroid therapy are at higher risk. Additionally, a history of abdominal or spinal trauma, malnutrition, and low socioeconomic status have also been implicated as contributing factors [1,7,8,11,12,14]. Notably, our patient did not present with any of these predisposing conditions.

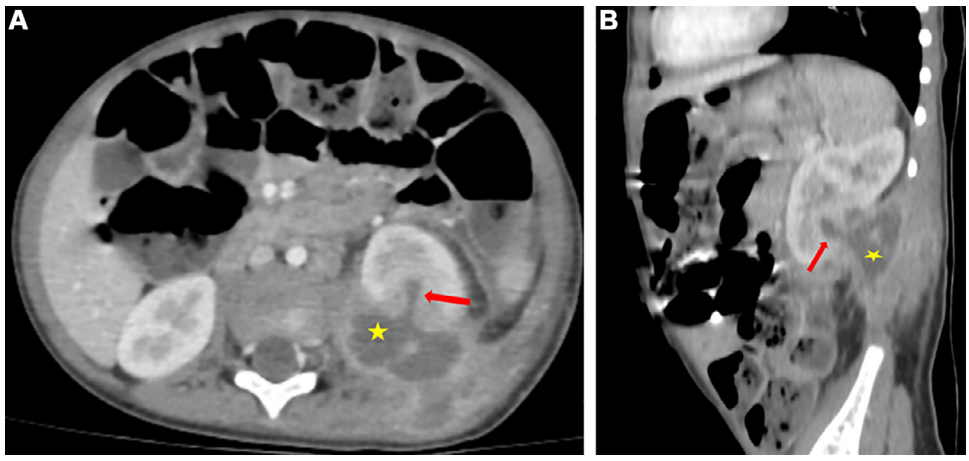

Fig. 1 – Contrast-enhanced abdominal CT scan in axial (A) and sagittal (B) planes, showing an abscess of the left psoas and quadratus lumborum muscles (yellow star) with a fistulous tract extending to the ipsilateral renal cortex (red arrow). Topographically:
- Posteriorly: The collection encompasses the muscles of the ipsilateral posterior thoracic wall, with infiltration of adjacent soft tissues.
- Anteriorly and superiorly: It extends into the ipsilateral posterior para-renal space, displaces the ipsilateral kidney anteriorly, and infiltrates its lower pole, with a fistulous tract extending to the renal cortex (B).

Secondary psoas abscesses are more common than primary forms and are predominantly observed in Europe and North America [4,8,9,13,14]. They result from the direct extension of an adjacent infectious focus through contiguity [2,4,5,8,9,12–14].

The infectious foci can originate from various anatomical structures in close proximity to the psoas muscle or its fascia. Given its course, the iliopsoas muscle is in contact with multiple retroperitoneal structures (kidneys, ureters, inferior vena cava, aorta), intraperitoneal organs (sigmoid colon, colon, appendix, female reproductive organs), and osteoarticular elements (vertebral bodies and intervertebral discs, sacroiliac joints, hip joints, and the anterior bursa over which the iliopsoas tendon glides) [1,7,12,13]. Each of these structures can serve as a primary site of infection, spreading to the psoas muscle by contiguity, or conversely, may develop a secondary infection due to involvement of the muscle [1,8].

The etiologies of secondary psoas abscesses classically follow a hierarchical frequency, with Crohn's disease being the most common cause (60%), followed by appendicitis (16%), diverticulitis, intestinal perforation, colorectal carcinomas, urinary tract infections and instrumentation, vertebral infections (10%), osteomyelitis, septic arthritis, pleural empyema, and pulmonary infections [1,2,5–8,11,12]. Less frequently, chronic leukemia, pancreatitis, septic arthritis, and Henoch-Schönlein purpura have also been implicated [11].

In neonates and children, secondary infections may result from intramuscular hemorrhage within the iliopsoas muscle, infections acquired via an umbilical venous catheter, urethral infections, or bacteremia [5,10]. However, our patient did not present with any of these predisposing factors.

From a microbiological perspective, secondary psoas abscesses are typically polymicrobial, whereas primary abscesses are more often monomicrobial [2]. This distinction was consistent with our case. Although iliopsoas abscesses were historically associated with tuberculosis, the widespread use of antibiotic therapy and improved public hygiene have significantly reduced this etiology. In contrast, nontuberculous pyogenic iliopsoas abscesses have become increasingly prevalent [4,13].

In 88% of primary psoas abscesses, Staphylococcus aureus is the predominant causative agent, as observed in our patient [5]. S. aureus, a common component of the skin and gastrointestinal flora, typically disseminates hematogenously, particularly in neonates with immature immune defenses. This hematogenous spread leads to infection and inflammation in the highly vascularized iliopsoas muscles, culminating in abscess formation [5].

In our case, S. aureus was identified as the primary pathogen, consistent with its well-documented role in psoas abscesses. In contrast, secondary abscesses are predominantly caused by enteric bacteria, such as Enterococcus and Escherichia coli, reflecting the frequent extension of infection from adjacent abdominal or pelvic structures [1,5,8,11,13].

The symptoms of a psoas abscess are often nonspecific, with a subacute onset in many cases [1,2,8,10–12,14]. Although the classic triad—fever, back pain, and limping—is well-documented, it is observed in only one-third of patients [1,2,5,7,8,12,14].

Initial manifestations may be mild and nonspecific, including malaise, fatigue, and low-grade fever. However, as the condition progresses, more severe symptoms may develop, such as abdominal, inguinal, or lumbar pain, hip mobility limitations, high fever, anorexia, weight loss, and a palpable lumbar mass [1–3,7,8].

Due to this variable clinical presentation, diagnosis is often challenging, as symptoms can mimic lumbar or abdominal pathologies [2,7]. Imaging plays a crucial role in confirming the diagnosis, particularly in cases where the classic symptoms described by Mynter—fever, limping, and back pain—are absent or atypical [2,4,5,7,10–12,14].

This was the case with our patient, who presented with a painless lumbar mass and low-grade fever, highlighting the atypical nature of some presentations.

Laboratory studies and imaging techniques are essential for diagnosing psoas abscesses [1–2,4–8,10–12,14]. A complete blood count typically reveals leukocytosis, sometimes associated with anemia, and elevated inflammatory markers such as C-reactive protein (CRP) and erythrocyte sedimentation rate (ESR) [1–3,5,7,11,12].

Ultrasound is often the first-line imaging modality due to its availability and safety, but its sensitivity and specificity are limited, particularly in cases of intestinal gas interference or pelvic bone obstruction [1–5,7,8,10–12].

Computed tomography (CT) is the imaging modality of choice, offering high diagnostic accuracy, guidance for percutaneous drainage, and essential information for surgical planning [1–5,7,8,10–12,14]. The hallmark imaging finding is a hypodense collection with peripheral enhancement after iodinated contrast injection, forming the characteristic "ring sign" [8].

Magnetic resonance imaging (MRI) is particularly useful for detailed soft tissue assessment, evaluation of adjacent structures, and cases where vertebral involvement is suspected [1,4,5,7,8,10–12,14]. Typical MRI findings include a hypointense signal on T1-weighted images, hyperintensity on T2-weighted sequences, and peripheral enhancement after gadolinium injection [8].

From a microbiological perspective, blood cultures are positive in 41% to 68% of cases. However, definitive identification of the causative pathogen requires abscess fluid culture, which should ideally be performed before the initiation of antibiotic therapy [1].

In conclusion, a combination of laboratory investigations and imaging—particularly CT and MRI—plays a crucial role in the diagnosis, management, and follow-up of psoas abscesses [1–12,14].

Proper diagnosis and management are crucial to prevent severe complications of psoas abscesses, including septic shock, paralytic ileus, deep vein thrombosis, hydronephrosis, and death [1]. In our case, the patient developed a particularly unique complication: the fistulization of the abscess into the kidney.

The treatment of a psoas abscess generally involves drainage, either percutaneous or surgical, along with appropriate antibiotic therapy [1–2,5–7,9,11–14]. Percutaneous drainage, preferred for its minimally invasive approach, is effective in the majority of cases [2–3,5,8,9,11]. However, when percutaneous drainage fails or is contraindicated, surgical

drainage is necessary, providing the added benefit of debridement of adjacent infected tissues [2–3,5,8,9,11].

Antibiotic therapy should be initiated as early as possible, ideally after obtaining culture samples for microbiological identification. Antibiotics should then be tailored according to the culture results [2–5,8,11–14].

The prognosis of psoas abscesses largely depends on the timeliness and adequacy of treatment. Primary abscesses have a relatively low mortality rate of 2.4%, while secondary abscesses have a significantly higher mortality rate of 18.9% [3,12–14]. Prompt management is critical to prevent life-threatening complications such as sepsis, which carries a high mortality rate if drainage is delayed [1–8,12].

Conclusion

Although rare in pediatric patients, psoas abscesses can lead to severe complications, such as fistulization into adjacent organs, as demonstrated in this case. Early recognition, accurate imaging, and timely intervention are paramount for improving patient outcomes. This case underscores the necessity of maintaining a high index of suspicion in children presenting with atypical lumbar masses and highlights the importance of early surgical drainage combined with targeted antibiotic therapy for favorable outcomes. The successful management of this patient emphasizes the critical role of multidisciplinary collaboration in the diagnosis and treatment of complex pediatric infections.

Author contributions

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Guarantor of submission

The corresponding author is the guarantor of submission.

Ethics approval

Our institution does not require ethical approval for reporting individual cases or case series.

Patient consent

Written informed consent was obtained from the patient(s) for their anonymized information to be published in this article.

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