

## Case Report

# Pyogenic Psoas Abscess: Discussion of its Epidemiology, Etiology, Bacteriology, Diagnosis, Treatment and Prognosis - Case Report

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### ABSTRACT

Psoas muscle abscess is a rare condition with vague clinical presentation, which presents a diagnostic challenge requiring a high index of suspicion. We report a case of primary pyogenic psoas abscess caused by

*Staphylococcus aureus*. In this article, the epidemiology, etiology, bacteriological diagnosis and treatment options of this condition are discussed.

KEY WORDS: psoas abscess, *staphylococcus aureus*, surgical drainage,

### INTRODUCTION

We describe a case of primary pyogenic psoas abscess caused by *Staphylococcus aureus*. Because psoas abscess is rare, has an insidious onset and is uncommonly discussed in primary care medical literature, primary care physician may miss the diagnosis<sup>[1,2]</sup>. A total of 434 cases of psoas abscesses have been reported<sup>[2]</sup>. Psoas abscess may be classified as primary or secondary, depending on the presence or absence of underlying disease.

### CASE REPORT

A 10-year-old male child presented with fever, vomiting, pain in the right pelvic region and limping of a few days duration. No diarrhea or urinary symptoms were noted. His mother gave a history of a blunt trauma to his back while playing one week before. An orthopedic surgeon who saw him prescribed analgesics. She also gave a past history of recurrent abscess formation at different places of the child's body. Physical examination revealed a temperature of 38 °C, a pulse rate of 110 bpm and a blood pressure of 105/65 mm Hg. He was pale and toxic. The chest was clear with normal heart sounds. Abdominal examination revealed only mild tenderness in the right flank but no masses and the abdomen was soft and lax. He had physical signs of psoas inflammation (Table 1). The white cell count was  $16.3 \times 10^9/l$ , and his urine was clear. The ESR was 81 mm/hour. Liver enzymes, creatinine and blood urea, and nitrogen values were normal. Plain X-ray of the abdomen showed obliteration of the right psoas shadow with right-sided scoliosis (Fig. 1). Radiography of the hip was

normal. Ultrasound examination was indefinite. Computed tomography (CT) scan of the abdomen and pelvis showed a large right psoas abscess (Fig. 2). Broad spectrum antibiotic therapy was started (Flagyl, Cloxacillin and Gentamycin). Surgery was done via a grid iron McBurney incision, muscle splitting, extra-peritoneally, and the peritoneum was pushed medially until exposure of the right psoas muscle. The muscle was first aspirated then incised and 180 ml of purulent material which grew *Staphylococcus aureus* was drained. A large hemovac drain was inserted into the incised portion of the right psoas muscle and fixed to the skin via a separate incision. The wound was closed in layers. Post-operatively, the patient improved dramatically and the post-operative period was uneventful. Follow up CT showed substantial reduction of the size of the collection (Fig. 3). The drain was removed after 12 days. The wound was dry and clean. Multiple blood cultures were negative.

### DISCUSSION

#### Anatomy

The psoas muscle is a retroperitoneal muscle that originates from the lateral borders of the 12<sup>th</sup> thoracic to fifth lumbar vertebrae and inserts in the lesser trochanter of the femur. In 70% of people, it is a single structure (psoas major), but 30% also have a smaller psoas minor muscle, which lies anterior to the psoas major along the same course. It is innervated by branches of L2, L3, and L4 nerves before the formation of the femoral nerve. The psoas muscle lies in close proximity to many

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Fig. 1: Plain X-ray abdomen showing obliteration of right psoas shadow with right sided scoliosis.

**Table 1**

Tests for Iliopsoas Inflammation

**Maneuvers to test for iliopsoas inflammation.\***

Place your hand just proximal to the patient's ipsilateral knee. Then ask the patient to raise his thigh against your hand. This causes contraction of the psoas against resistance and leads to pain.

With patient lying on the unaffected side, hyperextension of the affected hip results in pain due to stretching of the psoas muscle.

\* These maneuvers may also yield positive results in conditions such as appendicitis in which there is inflammation of the iliopsoas without the formation of psoas abscess.

other organs, including the sigmoid colon, jejunum, appendix, ureters, aorta, renal pelvis, pancreas, iliac lymph nodes, and spine. Thus, infections in these organs can contiguously spread to the psoas muscle. The psoas muscle has a rich vascular supply that is believed to predispose it to hematogenous spread from sites of occult infection.

**Epidemiology**

In 1992, the occurrence of psoas abscess was 12 cases per year worldwide<sup>[1]</sup>. This was a significant

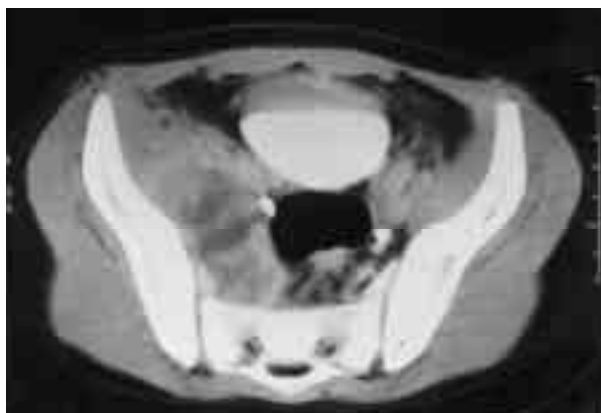


Fig. 2: CT Abdomen and pelvis showing a large right psoas abscess.



Fig. 3: Follow-up CT abdomen and pelvis showing substantial reduction in the size of the right psoas abscess with a drain inside it.

increase from the calculated occurrence of 3.9 cases per year before 1985<sup>[2]</sup>. The increase was attributed to improved diagnosis with the widespread use of computed tomography (CT)<sup>[1,2]</sup>. It is likely that incomplete reporting, particularly in the developing world, spuriously lowered the incidence. Up to 1985, all the cases of psoas abscess reported in developing countries were primary, whereas in the United States and Canada nearly 50% of all cases were secondary<sup>[1]</sup>. Earlier reports suggested that primary psoas abscess was more common in younger patients, with 83% of the cases diagnosed in patients less than 30 years of age. In contrast, up to 40% of the secondary psoas abscesses were diagnosed in patients more than 40 years old. Primary and secondary psoas abscesses were relatively rare in the elderly<sup>[3]</sup>. This age distribution is different from the findings in a recent series of 18 patients from John Hopkins University School of Medicine. In this series, researchers found secondary psoas abscess (age range, two to 78 years) to be more prevalent (61%) than primary psoas abscess (age range 27 to 81 years). It is notable that 28% of the patients were over the age of 65. Of the patients with primary psoas abscess, 86% were intravenous drug users, and 57% were infected with the human immunodeficiency virus (HIV). None of the

patients with secondary psoas abscess had HIV infection or a history of intravenous drug abuse<sup>[4]</sup>. It is possible that the incidence of primary psoas abscess will increase with the HIV pandemic<sup>[4,5]</sup>. Other predisposing conditions include diabetes, immunosuppression, and renal failure<sup>[5,6]</sup>. Underlying diseases in patients with secondary psoas abscess are shown in Table 2<sup>[1]</sup>.

### Bacteriology

*Staphylococcus aureus* is the pathogen in 80% of cases of primary psoas abscess<sup>[1-3]</sup>. Other pathogens include *Serratia marcescens*<sup>[4]</sup>, *Pseudomonas aeruginosa*<sup>[5]</sup>, *Haemophilus aphrophilus*<sup>[6]</sup> and *Proteus mirabilis*<sup>[7]</sup>. Secondary psoas abscess is usually caused by enteric bacteria<sup>[4]</sup>. These include *Escherichia coli*, streptococcus species, enterobacter species, and *Salmonella enteritidis*. Methicillin resistant *Staphylococcus aureus* is also a known pathogen<sup>[5]</sup>. *Mycobacterium tuberculosis* as a cause of psoas abscess is currently rare in the United States<sup>[7,8]</sup>. In areas of the world where tuberculosis is still a common disease, it continues to be an important pathogen, as evidenced by recent case reports of psoas abscess caused by *M kansasii*<sup>[7]</sup> and *M xenopi*<sup>[8]</sup>.

### Diagnosis

Symptoms are often nonspecific. Patients may present with fever, flank pain, abdominal pain, or limp. Because of the innervation of the psoas muscle by L2, L3, and L4, pain due to inflammation sometimes radiates anteriorly to the hip and thigh. Other symptoms are nausea, malaise, and weight loss.

A good physical examination is critical for the prompt diagnosis of psoas abscess. The diagnosis may be suspected if the patient is noted to favor the position of greatest comfort, which is the supine position, with the knee moderately flexed and the hip mildly externally rotated. Rarely, psoas abscess is associated with a painless subinguinal mass. There are well-described signs of psoas abscess (Table 1). The premise of these tests is that psoas muscle is the primary hip flexor. Flexion and stretching or contraction of the inflamed psoas muscle results in pain.

Laboratory tests are helpful in the evaluation of suspected psoas abscess. Leucytosis (mean count, 15,900/mm<sup>3</sup>), elevated erythrocyte sedimentation rate (ESR) (mean, 90 mm/hr), and elevated blood urea nitrogen (BUN) (mean, 30.5 mg/dL) were reported in 100% of patients in the series from Johns Hopkins<sup>[4]</sup>. These are not universal findings. Pyuria is sometimes present<sup>[6]</sup>. As in most clinical problems, diagnosis is aided by appropriate radiological testing. Before the availability of

**Table 2**  
Conditions Associated with Secondary Psoas Abscess

Disease site	Conditions
Gastrointestinal	Diverticulitis, appendicitis, Crohn's disease, colorectal carcinoma, appendiceal tumor
Genitourinary	Urinary Tract infection, extracorporeal shock wave lithotripsy, cancer.
Musculoskeletal Infections	Vertebral osteomyelitis, lumbar spondylodiskitis, infectious sacroiliitis, septic arthritis.
Others	Endocarditis, femoral artery catheterization, infected abdominal aortic aneurysm, hepatocellular carcinoma, trauma, intrauterine contraceptive device, acupuncture, spinal surgery sepsis, suppurative adenitis, long-term hemodialysis or peritoneal dialysis

ultrasonography and CT, many cases of retroperitoneal abscess were diagnosed at autopsy. Whenever psoas abscess is suspected, CT should be done for definitive diagnosis. This has superseded ultrasonography as the radiological test of choice<sup>[1]</sup>. Ultrasonography is diagnostic in only 60% cases of psoas abscess<sup>[6]</sup> compared with 80% to 100% for CT<sup>[9-11]</sup>. Sensitivity and specificity of diagnosing psoas abscess is not improved by magnetic resonance imaging (MRI) and, with its higher cost and greater patient discomfort, MRI has no role in the diagnosis of psoas abscess<sup>[1]</sup>.

### Treatment

Treatment involves the use of appropriate antibiotics, as well as drainage of the abscess<sup>[1]</sup>. Knowledge of common pathogens should guide initial choice of antibiotics. Adjustments should be based on report of abscess fluid culture and sensitivity testing. It has been suggested that in cases of psoas abscess believed to be primary, antistaphylococcal antibiotic therapy should be started before final bacteriologic diagnosis<sup>[1,2]</sup>. However, the identification of non-staphylococcus organisms in some patients with primary psoas abscess and the identification of staphylococcus in patients with secondary psoas abscess<sup>[3,4]</sup>, makes it prudent in all cases of psoas abscess to start treatment with broad spectrum antibiotics pending final bacteriologic diagnosis<sup>[4]</sup>. Coverage should include staphylococcal and enteric organisms for which agents such as clindamycin, antistaphylococcal penicillin, and an aminoglycoside may be used<sup>[1]</sup>. Less cumbersome regimens can be easily formulated. Drainage of the abscess may be done through CT-guided percutaneous drainage or surgical drainage. Percutaneous drainage is much less invasive and is effective for draining uniloculated and

multiloculated psoas abscesses<sup>[9]</sup>. It is technically similar to open surgical drainage, and it has been advocated as the drainage method of choice<sup>[10]</sup>. Surgical drainage is associated with shorter hospital stay (15.9 vs 28.5 days)<sup>[11]</sup>. Surgical drainage may be ideal for patients with underlying Crohn's disease or other gastrointestinal diseases<sup>[10]</sup>. In these patients, performing a single operation to drain abscess and resect the diseased bowel is desirable<sup>[9,10]</sup>. An occasional patient will require multiple operations<sup>[11]</sup> or repeated percutaneous drainage before the abscess resolves<sup>[9]</sup>. Abscess drainage needs to be continued until obliteration of the abscess cavity occurs and there is evidence of clinical improvement. Parameters that can be used to determine clinical recovery include defervescence and normalization of the white blood cell (WBC) count, as well as subjective improvement. The duration of antibiotic therapy should be individualized. Antibiotics are sometimes continued up to two weeks after complete drainage of the abscess<sup>[1]</sup>.

### Prognosis

With appropriate treatment the prognosis is generally good. Primary psoas abscess has a better prognosis, the mortality rate being only 2.4%. Secondary psoas abscess has a mortality rate of 18.9%. The major cause of death is delayed or inadequate therapy. Mortality in un-drained cases

approaches 100%, with sepsis being the usual cause of death<sup>[2]</sup>.

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