

Iliopsoas abscess in children: report on five patients with a literature review

Arzu Karlı¹, Nurşen Belet¹, Murat Danacı², Gülhadiye Avcu¹, Şule Paksu³, Özlem Köken³, Gülnar Şensoy¹

¹Division of Pediatric Infectious Diseases, ²Department of Pediatrics and ³Department of Radiology, Ondokuz Mayıs University Faculty of Medicine, Samsun, Turkey. E-mail: drarzukarli@yahoo.com

SUMMARY: Karlı A, Belet N, Danacı M, Avcu G, Paksu Ş, Köken Ö, Şensoy G. Iliopsoas abscess in children: report on five patients with a literature review. Turk J Pediatr 2014; 56: 69-74.

We aimed in this study to present the clinical findings in children with iliopsoas abscess (IPA) and to discuss the diagnosis and treatment. The files of five patients, hospitalized between August 2011 and June 2013 and monitored with a diagnosis of IPA, were reviewed retrospectively. Demographic characteristics, symptoms and signs, laboratory examinations, and diagnostic and treatment methods of the cases were evaluated. Two of the cases were females and three were males, and their ages ranged from 10 to 15 years. Before the diagnosis, the duration of symptoms in patients ranged from five days to one year. The primary symptoms included fever and difficulty in walking. One patient presented with septic shock and had a history of trauma as a predisposing factor. All patients except one had a higher erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP) value. Psoas abscess was demonstrated by ultrasonography (USG), except in one patient. Four patients underwent percutaneous drainage of the abscess. The isolated microorganisms included *Staphylococcus aureus*, *Mycobacterium tuberculosis*, and *Enterococcus faecalis*. All the cases recovered without sequelae. Diagnosis of IPA in children is difficult, and many physicians are usually consulted before any diagnosis is made. IPA should be considered in the differential diagnosis in patients presenting with complaints of lower back, hip, groin and leg pain and difficulty in walking.

Key words: psoas abscess, Pott's disease, appendicitis, sepsis.

Iliopsoas abscess (IPA) is rare, and its incidence is reported to be 0.4/100,000. It is categorized as primary or secondary, according to etiology. Because the iliopsoas is a well-vascularized muscle, infectious agents enter through the lymphohematogenous route and form an abscess, which is considered primary IPA. Secondary IPA occurs through the direct spread of an adjacent infectious or inflammatory condition. Primary IPA is more common in children¹⁻³. The etiology can vary, depending on the geographic area. Primary IPA is more common in Asia and Africa, while Europe is more likely to have secondary cases⁴. The diagnosis is usually prolonged, and the treatment is often delayed due to the rarity of the disease and the lack of specific clinical signs. This article presents five cases who were followed with a diagnosis of IPA, and the clinical symptoms, diagnosis and treatment

are also discussed.

Material and Methods

Demographic characteristics, location and origin of the abscess, associated predisposing factors, symptoms and signs, physical examination findings, radiological findings, bacteriological results, and treatment of five patients diagnosed with IPA in our hospital between August 2011 and June 2013 were recorded retrospectively from their files.

Results

Of the patients with psoas abscess, three were males and two were females, and the average age was 12.8 (10-15) years. The primary complaint on admission was difficulty in walking. Only two patients had fever. The symptoms of all the patients were unilateral, and they had restricted and painful movements

in the hip joint. The hip was in a flexion position, and severe pain occurred when an attempt was made toward extension. The patient who was followed with a diagnosis of spinal tuberculosis (TB) also had thoracolumbar kyphosis. The duration of the symptoms lasted 5 days for 1 patient, 10 days for 1 patient, 20 days for 2 patients, and 1 year for 1 patient.

The average white blood cell count was 12,060/mm³ (8,000-19,000/mm³) at admission. Except for the case of IPA that developed secondary to Pott's disease, all other patients had a higher erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP) value at the time of admission. Three patients had primary psoas abscess, while two patients had the secondary type (Table I).

Of the two cases followed with a diagnosis of secondary IPA, one revealed a history of maternal pulmonary TB during the newborn period for which no prophylaxis was given; the other patient had undergone surgery for perforated appendicitis five years ago.

All the patients underwent abdominal ultrasonography (USG) at the time of admission; the abscess within the psoas muscle was shown by USG in all cases, except in Case 3, who had a small abscess. Additionally, all patients underwent magnetic resonance imaging (MRI). The MRI of Cases 1 and 4 revealed a psoas abscess (Figs. 1, 2).

Four patients underwent percutaneous drainage of the abscess, while one case recovered with antibiotic therapy without requiring abscess drainage. Growth was determined in the blood and abscess culture of the first two cases who were followed for primary IPA and in the

abscess culture alone of the other cases. The isolated microorganisms included *Staphylococcus aureus*, *Mycobacterium tuberculosis*, and *Enterococcus faecalis* (Table II).

Case 1, with growth of *S. aureus* (penicillin-resistant, methicillin-sensitive), initially received intravenous vancomycin and was later switched to ampicillin-sulbactam therapy, according to the results of the culture. The patient, with improved clinical and regressed acute phase, was discharged with oral amoxicillin-clavulanate acid therapy; the treatment lasted for 28 days. The second case presented with a 39.5-40°C fever and severe hip pain. A heavy object had fallen on her hip 10 days before. She was quite weak and prone to sleeping, and unable to move her right hip joint. Her blood pressure was 80/50 mmHg. She had renal dysfunction and cholestasis (creatinine: 1.45 mg/dl, total bilirubin: 3.7 mg/dl, direct bilirubin: 3.3 mg/dl). Cefotaxime and teicoplanin were initiated for the patient, who received abscess drainage with USG on day three of the hospitalization. Clinical and laboratory presentation rapidly regressed following drainage. With growth of *S. aureus* (penicillin-resistant, methicillin-sensitive) determined in the blood and abscess culture, treatment of the patient was initiated with intravenous therapy for 21 days, then continued with ciprofloxacin oral therapy, which was completed in six weeks. Case 3, with

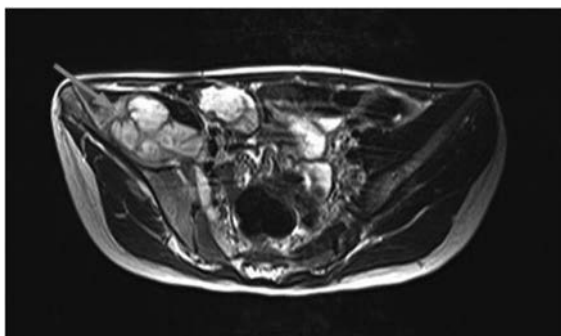
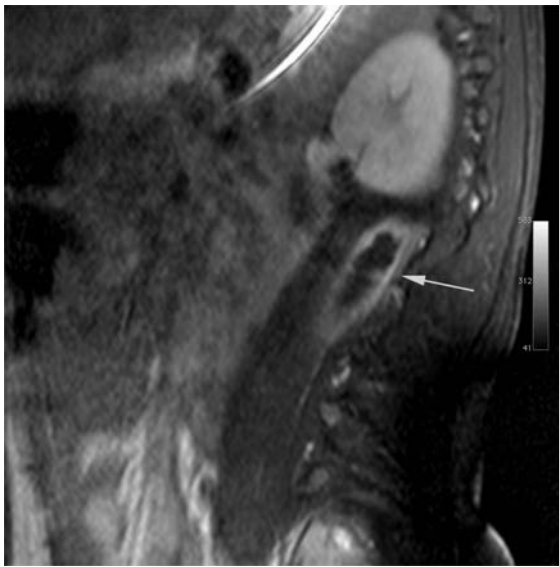


Fig. 1. (Patient 1). Pelvic MRI shows a thin septation in the right psoas muscle, with abscess size of 78x92 mm (arrow).



Fig. 2. (Patient 4). a) Contrast-enhanced T1-weighted sagittal MRI image shows T12 vertebra height loss, wedge and thoracolumbar kyphosis (arrow).



b) Contrast-enhanced T1-weighted axial image shows peripheral enhanced abscess in the right psoas muscle (arrow).

no drainage, received intravenous ampicillin-sulbactam for 10 days; the treatment was completed with oral amoxicillin-clavulanate acid therapy in four weeks. The case that had psoas abscess with spinal TB presented with complaints of lower back pain for one year and difficulty in walking. The mother had suffered from pulmonary TB during the newborn period. The patient developed severe thoracolumbar kyphosis and gibbus deformity, and the abscess culture showed growth of *M. tuberculosis*; an anti-TB therapy containing isoniazid, rifampicin, pyrazinamide, and ethambutol was initiated. Pyrazinamide

and ethambutol were discontinued at the end of the second month. The treatment with isoniazid and rifampicin was completed in 18 months. Case 5 developed psoas abscess after perforated appendicitis and the abscess culture showed growth of *E. faecalis*. The patient received intravenous ampicillin-sulbactam and gentamicin therapy for 10 days according to antibiogram, and the treatment was completed in six weeks with oral administration of amoxicillin-clavulanate acid. All the patients recovered with no sequelae or relapses.

Discussion

Iliopsoas abscess (IPA) is rare in children, and diagnosis is difficult because of the variable clinical signs of the disease. The most common symptoms include lower back and back pain, and common suspicious abdominal pain. The disease may present with fever, tachycardia, nausea, vomiting, and weight loss. An accurate diagnosis is made firstly based on suspicion of the disease, a good physical examination, and laboratory and radiological findings. If the patient is in his or her most comfortable position, with the hip in flexion with a slightly external rotation and the knee in flexion, then IPA should be considered. The tests displaying iliopsoas inflammation, which causes contraction of and pain in the iliopsoas muscle, can be useful in the diagnosis^{1,5,6}. The primary complaints of our cases included difficulty in walking and hip and groin pain, and all the patients reported pain upon any attempt to move the hip joint. Although laboratory tests are not specific, high leukocytosis, CRP, and ESR can be detected⁷. All our patients had a

Table I. Clinical and Laboratory Characteristics of Patients on Admission

Patient number	Age/sex years	Duration of symptoms*(d)	Clinical features	WBC count (x10 ⁹ /L)	ESR (mm/h)	CRP mg/L
P1	14/F	20	Fever, right hip pain, difficulty walking	19000	58	213
P2	14/F	10	Right hip pain, difficulty walking	14500	130	317
P3	15/M	5	Right groin pain	8000	80	74
P4	10/M	360	Backache, gibbus deformity, difficulty walking	9800	20	3
P5	11/M	20	difficulty walking	9000	74	40

CRP: C-reactive protein. d: Day. ESR: Erythrocyte sedimentation rate. WBC: White blood cell.

*Until hospital admission.

Table II. Methods of Diagnosis and Treatment

Patient number	Psoas abscess type	Imaging	Drainage	Type of sample	Microorganism	Therapy
P1	Primary	USG, MRI	Yes	Blood, pus	<i>S. aureus</i>	Vancomycin
P2	Primary	USG, MRI	Yes	Blood, pus	<i>S. aureus</i>	Cefotaxime, teicoplanin
P3	Primary	USG, MRI	No	No	No	Ampicillin and sulbactam
P4	Secondary	USG, MRI	Yes	Pus	<i>M. tuberculosis</i>	Isoniazid, rifampicin, ethambutol, pyrazinamide
P5	Secondary	USG, MRI	Yes	Pus	<i>E. faecalis</i>	Ampicillin and sulbactam, gentamicin, clindamycin

MRI: Magnetic resonance imaging. USG: Ultrasonography.

higher acute phase, except one case with IPA that developed secondary to Pott's disease.

Iliopsoas abscess (IPA) is more common in young persons than in older ones; 83% of primary IPA cases were detected in persons younger than 30 years, while 40% of cases with secondary IPA were found in persons older than 40 years². The average age of our cases was 12.8 years.

Secondary IPA is mostly associated with Crohn's disease, appendicitis, gastrointestinal diseases such as diverticulitis, urinary tract infections, operations for breaking up renal calculi, vertebral osteomyelitis, septic arthritis, and sacroiliitis². One of our cases developed IPA after appendectomy, and the other case developed IPA secondary to Pott's disease. Prior to modern anti-TB treatment, IPA was known as a well-defined complication of vertebral and sacroiliac joint TB. However, with the decrease in TB and Pott's disease, pyogenic IPAs have been less associated with the vertebra and have become less common in developed countries. It remains a major problem in Turkey and in developing nations, where TB incidence is still high. Half of the cases with bone and joint TB have spinal involvement. The thoracolumbar area is commonly involved, and the spread of infection into the paravertebral and extraspinal soft tissues results in IPA^{8,9}. Similar to our study's findings, prolonged and insidious lower back pain could be attributed to many other causes. Delayed diagnosis can lead to spinal deformity and bone destruction.

Diabetes mellitus, receipt of steroids or chemotherapy, and trauma are risk factors for

primary IPA, particularly in adult cases^{5,10,11}. We monitored our three cases diagnosed with primary IPA, and one of the cases had a history of trauma that occurred 10 days previously.

Bresee et al.³ examined 142 pediatric cases diagnosed with IPA, and found right localization in 57%, left localization in 40%, and bilateral localization in 3% of abscesses. All our cases had unilateral IPA with right localization; however, bilateral psoas abscess secondary to TB was reported in the literature¹².

The abscess factor can produce microorganisms in blood cultures. Factor microorganisms were produced in the blood and abscess cultures in two of our cases. The other cases had growth only in the abscess culture. The commonly isolated factor was *S. aureus* in 80% of primary IPA. The other pathogens included *Serratia marcescens* and *Pseudomonas aeruginosa*. Secondary psoas abscess is caused by enteric bacteria such as *Escherichia coli* and *M. tuberculosis* in developing countries^{2,7}. Two of our cases monitored for primary IPA who received abscess drainage had *S. aureus*, while the other case that developed IPA after perforated appendicitis had *E. faecalis*. The case with IPA that developed secondary to spinal TB had growth of *M. tuberculosis*.

Ultrasonography (USG) is affordable, free from radiation effects, and easy to use, but it is a practitioner-dependent diagnostic method. This method is diagnostic in 60% of the cases; however, it is difficult to display the retroperitoneal area because of intestinal gases. A computed tomography (CT) can reveal the retroperitoneal area better, and sensitivity increases when USG and CT are performed in

combination¹⁰. An MRI is preferred because it is superior to CT in displaying soft tissues and does not require intravenous contrast material to display the abscess wall and peripheral structures¹³. All our cases underwent USG; only one case did not undergo USG to display the abscess within the psoas muscle. All the cases underwent MRI for diagnosis and treatment planning.

The treatment of psoas abscess involves drainage and antibiotic therapy. Septic complications may occur if no abscess drainage is performed. Antibiotics can be chosen, based on the culture of abscess material, but antistaphylococcal therapy should be initiated immediately in patients suspected to have primary psoas abscess. Antibiotic therapy is only sufficient for small abscesses with early diagnosis. One of our cases with a small abscess recovered with appropriate antibiotic therapy. Clindamycin, antistaphylococcal penicillin, and aminoglycoside therapy to include staphylococcus and enteric organisms should be initiated in secondary IPA, and the treatment should be arranged by culture outcomes^{3,7}. Anti-TB therapy, vertebra immobilization, and abscess drainage usually result in improvements in IPA associated with TB; surgical intervention may be required for cases that, despite medical treatment, show no improvement and develop a neurological deficit. Recurrence of the abscess has been reported rarely in those cases unresponsive to the anti-TB therapy¹⁴.

Abscess drainage can be surgical or percutaneous. Percutaneous drainage can be performed with USG or CT; however, USG may be insufficient to display the localization of the abscess due to intestinal gases. A CT is therefore more commonly preferred, but has a higher risk of radiation. Percutaneous drainage is less invasive than surgical drainage and has less risk of complications¹⁵. Surgical drainage can be selected, particularly for those with Crohn's disease, and for those with underlying gastrointestinal diseases¹⁶. Four of our cases had percutaneous drainage for the abscess; two received drainage with CT, while the other two had drainage with USG. No surgical drainage was applied, and no relapses occurred.

Delayed diagnosis may lead to presentation of cases with septic shock¹⁷. One of our cases had a more toxic presentation and was in septic

shock involving multiple organs at the time of admission; however, the patient showed rapid recovery through abscess drainage, intensive support, and antibiotic therapy. The mortality rate in secondary IPA is higher than that in primary cases. The mortality rate can be up to 100% in untreated cases². In particular, the mortality rate is found to be higher in the elderly with a late diagnosis and underlying chronic systemic diseases, who receive inadequate treatment¹⁰. No mortality occurred in our cases, and the response to the treatment was good.

When the medical literature is scanned for psoas abscess, it is seen that most studies include adult patients. On the other hand, data associated with pediatric patients are usually in the form of case reports. In this article, five pediatric cases with primary and secondary IPA have been presented. This is the largest series reported in the literature for children. In this article, various microorganisms were isolated and different etiologies were determined. Thus, this essay has contributed a variety of cases to the literature.

In conclusion, IPA is rare and difficult to diagnose because of nonspecific symptoms, which results in a delayed diagnosis and many complications. Therefore, IPA should be considered in the differential diagnosis in patients with complaints of lower back, hip, groin, and leg pain and difficulty in walking. Diagnostic methods, particularly MRI and CT imaging, should be used. We think that IPA should be kept in mind in the differential diagnosis of spinal TB since TB is seen frequently in our country.

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