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Original article

Management of paediatric psoas abscess: our experience

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Abstract

Background: Ilio-psoas abscess (IPA) is uncommon in children. It has varied clinical presentation causing difficulties in diagnosis. We present our experience with management of psoas abscess in 23 children.

Materials and methods: Records of 23 patients managed at a tertiary institute between March 2011 and December 2016 were reviewed and retrospectively analysed on the basis of age at presentation, presenting complaints, clinical and radiological findings and management.

Results: Age of presentation ranged between 20 days and 11 years. Most of the patients presented with fever (n = 20) followed by abdominal pain (n = 11), hip pain (n = 9) and back pain (n = 6). Abscess volume ranged from 20 ml to 300 ml. Ten patients with unliquified abscesses were managed by intravenous antibiotics. Six patients underwent USG-guided aspiration of abscesses (volumes: 20 ml to 150 ml). Pigtail catheter was inserted in 7 patients with partially liquefied abscesses of volume 150 to 300 ml. Clinical response was rapid. The catheter was removed after drainage was stopped and USG confirmed the absence of residual collection. The 15 patients with fixed flexion deformity underwent skin traction. Bacteriological examination was performed in 13 patients – there was no growth in 4 patients, *methicillin-resistant Staphylococcus aureus* (*MRSA*) in 1 patient, *methicillin-sensitive Staphylococcus aureus* (*MSSA*) in 6 patients and *acid-fast bacilli* (*AFB*) in 2 patients.

Conclusion: IPA is a rare disease in children. Intravenous antibiotics covering *S. aureus* and image-guided percutaneous drainage are effective in managing most patients. Open drainage is required if percutaneous drainage fails to completely resolve the abscess and clinical symptoms deteriorate despite antibiotic treatment.

Keywords

Psoas abscess, paediatric, management.

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Introduction

Ilio-psoas abscess (IPA), though uncommon in children, presents with varied signs and symptoms, often resulting in delayed management [1-3]. The increasing use of cross-sectional imaging modalities, including USG (Ultrasound) and CT (Computed Tomography) scans has allowed earlier diagnosis [1].

In the past, IPA was a common complication of tuberculous spinal infection. After the introduction of anti-tuberculosis drugs, non-tuberculous pyogenic IPA has become the predominant form [4]. Clinically, IPA is classified according to its origin into primary or secondary [2]. Primary IPA is thought to be related to an unrecognized staphylococcal bacteremia, while secondary IPA is caused by underlying conditions such as gastrointestinal or genitourinary tract diseases, spread of infection from postoperative aortic aneurysm, osteomyelitis, septic arthritis, and infection subsequent to renal surgery [4-6]. Primary IPA is usually seen in younger patients and in developing countries, while secondary IPA occurs more frequently in developed countries with mixed enteric flora [4, 7].

Though this origin-based IPA classification is adopted in clinical practice, it does not usually help clinicians to make appropriate treatment decisions. Traditionally, surgical drainage by the extraperitoneal approach was the standard method of treatment of an IPA [1, 8]. In recent years, image-guided percutaneous drainage has been shown to be a safe and effective alternative to surgery in the management of psoas abscess in both adults and adolescent patients [1]. However, whether percutaneous drainage or surgical intervention should be used in IPA patients remains controversial [4].

We describe our experience in the clinical profiling and management of IPAs in 23 paediatric patients.

Materials and methods

Records of 23 patients managed at a tertiary institute between March 2011 and December 2016 were reviewed and retrospectively analysed on the basis of age at presentation, presenting complaints, clinical and radiological findings and management.

All patients were admitted and started on broad-spectrum intravenous antibiotics. All patients underwent X-ray of the spine and USG evaluation. Abdominal CT scan and Magnetic Resonance Imaging (MRI) were performed in selected cases (**Fig. 1**). Patients with small and unliquified abscesses were managed conservatively with empirical antibiotics alone and followed up with serial USG. Liquefied abscesses of less than 150 ml volume on USG were aspirated under USG guidance. Percutaneous drainage (pigtail catheter insertion: 8 to 12 Fr)

Figure 1. MRI spine of a patient with right psoas abscess.

under real-time USG guidance using the Seldinger technique was performed for larger or partially liquefied abscesses (**Fig. 2**). Open drainage was offered if the above procedures were not feasible or had failed.

The aspirated pus was sent for routine microscopy, culture and antibiotic sensitivity, *acid-fast bacilli* (*AFB*) microscopy and culture. Antibiotics were then changed as *per sen*sitivity and antitubercular treatment was started in patients with positive microscopy for *AFB*.

Patients with fixed flexion deformity (FFD) of the hip joint were given skin traction and physiotherapy. Patients were discharged when asymptomatic and USG showed no collection.

Results

Results are presented in **Tab. 1**. Age of presentation ranged between 20 days and 11 years. There were 12 males and 11 females. Most of the patients presented with fever (n = 20) followed by abdominal pain (n = 11), hip pain (n = 9) and back pain (n = 6). FFD (**Fig. 3**) was the most common clinical finding seen in 65% cases (n = 15); local swelling was present in 48% patients (n = 11). Three patients had a prior history of trauma.

X-ray of the abdomen and pelvis were essentially normal in all patients. The diagnosis of IPA was made by USG of the abdomen, which suggested IPA in all patients. Abscess volume ranged from 20 ml to 300 ml.

All patients were started on empirical intravenous antibiotics – a combination of third-generation cephalosporin/amoxicillin-clavulanic acid/piperacillin-tazobactam with metronidazole was started initially. The antibiotics were then changed as per the bacteriological analysis of the pus. Antitubercular treatment was started if the pus was reported to be *AFB*-positive.

Ten patients with unliquified abscesses (volumes of 40-60 ml) were managed by intravenous antibiotics alone. All 10 patients responded well to antibiotics.

Six patients underwent percutaneous USG-guided aspiration of liquefied abscesses with volumes ranging from 20 ml to 150 ml. Amongst these, 2 patients with abscess volume less than 100 ml responded to single aspiration, with the subsequent USG showing no residual abscess. Four

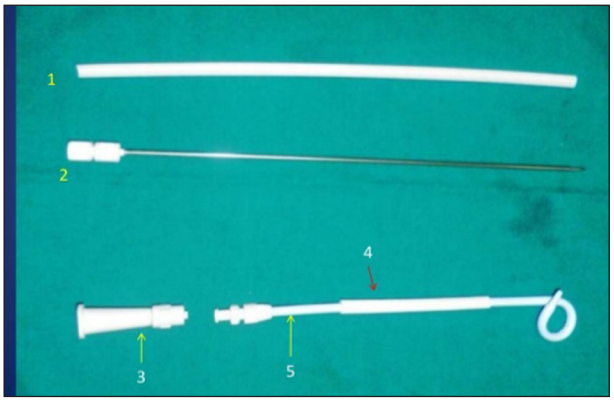

Figure 2. Pigtail catheter and its various parts.

Figure 3. Clinical image showing left fixed flexion deformity (FFD) in a patient with left psoas abscess.

Table 1. Table showing management of psoas abscess in 23 children.

Number of patients	Ultrasound findings		Management	Outcome
	Type of abscess	Volume (in ml)		
10	Unliquified	40-60	Intravenous antibiotics alone	Resolution
2	Liquified	Less than 100	USG-guided aspiration (single attempt)	Resolution
2		100-150	USG-guided aspiration (multiple attempts)	Resolution
2		100-150	USG-guided aspiration (multiple attempts)	Persistent abscess warranting open surgical drainage followed by complete resolution
7	Partially liquified	150-300	USG-guided catheter drainage	Resolution

patients with large abscesses (100 ml to 150 ml) required multiple aspirations – the abscess resolved in 2 patients after 2 and 3 attempts of aspirations, respectively. The other 2 patients, however, did not respond even to 3 attempts at aspiration and thus warranted open drainage.

Seven patients underwent percutaneous drainage of partially liquefied abscesses using pigtail catheter. The abscess volume in these patients ranged from 150 to 300 ml. Clinical response was rapid. The catheter was removed after drainage was stopped and USG confirmed the absence of residual collection.

The 15 patients with FFD underwent skin traction.

Bacteriological examination was performed in 13 patients – there was no growth in 4 patients, *methicillin-resistant Staphylococcus aureus* (*MRSA*) in 1 patient, *methicillin-sensitive Staphylococcus aureus* (*MSSA*) in 6 patients and *AFB* in 2 patients. Bacteriological examination could not be performed in the 10 patients with unliquified abscesses.

Associated renal anomalies were detected in 2 patients – 1 patient had horseshoe kidney with renal calculus and pyonephrosis, the other patient had xantho-granulomatous pyelonephritis with multiple recurrences requiring ipsilateral nephrectomy.

All patients recovered uneventfully. The average hospital stay ranged from 7 to 10 days. Patients were discharged after complete resolution of their symptoms and signs and after USG suggested complete resolution. There was no mortality.

Discussion

IPA, a collection of pus in the ilio-psoas compartment, was first described by Mynter in 1881 [9]. Acute pyogenic abscess of the ilio-psoas is uncommon in children [1]. The diagnosis is based on clinical laboratory and radiological findings [1]. IPA is classified as primary or secondary depending on the presence of underlying disease [1, 8, 10]. Secondary IPA occurs as a result of the direct expansion of a nearby infectious/inflammatory process into the ilio-psoas. In children, it can be mistaken for septic arthritis [8, 10].

The most common organism in primary and also in secondary psoas abscess is *S. aureus* [11]. *M. tuberculosis* has generally been implicated in psoas abscess in the context of secondary psoas abscess with spread from an adjacent source, be it skeletal, genitourinary or gastrointestinal [9, 11-13]. Primary psoas abscess with *M. tuberculosis* has been seen presumably with haematological spread from the respiratory system [9]. Psoas abscess with *M. tuberculosis* is associated with a delay from onset of symptoms to diagnosis with a lower incidence of pyrexia and leucocytosis [9, 12]

The classic presenting symptoms of a psoas abscess are fever, flank or abdominal pain and limp or flexion deformity of the involved hip [1, 9, 12]. Many patients will present with an insidious onset of nonspecific features such as malaise and low grade pyrexia which may progress into more specific symptoms, such as abdominal/flank discomfort, a flexed and externally rotated hip, pain on movement of the hip [9, 12]. Fever is usually the most common symptom to start with but it is a nonspecific symptom, though many patients later on develop specific symptoms such as FFD, flank pain and hip pain. FFD is the most common specific symptom, followed by flank and hip pain [9, 13-15]. The majority of the patients in this series had the above symptoms. Fever was the most common presenting symptom and FFD was the most common clinical sign.

The insidious nature of its onset progressing to localised disease makes it very difficult to diagnose IPA at an early stage. Detailed history, thorough clinical examination and high level of suspicion are needed for diagnosis. History must also be directed to a primary source such as tuberculosis in the case of secondary psoas abscess [9].

Examination can be difficult due to the deep anatomical location of the psoas muscle bellies, their sheaths and their conjoined tendon. However, abdominal tenderness, antalgic passive hip movements, and flank mass can be seen [16].

Routine laboratory investigations including full blood count, C-reactive protein and erythrocyte sedimentation rate are useful in confirming the diagnosis of an inflammatory mass [4, 14]. Formal imaging is required however not only to confirm the diagnosis, but to plan further treatment.

Both USG and CT have been shown to be reliable methods for diagnosing diseases of the IPA [1, 9, 12, 17]. USG, because of its inherent advantages (easy availability, low cost, lack of radiation, no need for intravenous contrast medium) should be the initial diagnostic modality in a patient suspected of having an IPA. CT, however, may still be necessary to demonstrate the entire extent of the abscess, especially in abscesses which extend into the pelvis because of interference by the overlying bowel gases and also to look for associated pathology in adjacent structures [9, 12,

18]. In this series, all patients were diagnosed by USG abdomen.

MRI has recently been shown to be more sensitive than CT in intra-abdominal abscesses, with more accurate delineation of inflammatory change, including that beyond the abscess site; however, an MRI is usually not required and is not feasible for practical application, as USG can accurately diagnose the condition in almost all cases.

The agreed first-line treatment in the literature is broad-spectrum antibiotics that will cover *S. aureus* and also any possible primary source of the psoas abscess [4, 12, 17-19]. In this series, empirical antibiotic treatment covering *S. aureus* was initially started in all patients and was later changed according to sensitivity reports if required. Ten patients (43%) were managed with intravenous antibiotics alone. Two patients required anti-tubercular treatment.

Some authors have suggested that targeted antibiotics may be sufficient to treat abscesses up to 60 mm; however, without aspiration of the abscess these antibiotics are often a best guess rather than targeted therapy [19].

Traditionally, surgical drainage was the treatment of choice, and some authors have described quicker recovery following open drainage [1]. In this series, only 2 patients (9%) underwent open drainage. These patients had a quick recovery despite having been more ill preoperatively.

Percutaneous drainage is an effective method of treatment for the management of psoas abscesses and an effective alternative to open surgical drainage. It is done under USG-guidance, it does not require general anaesthesia and it is associated with less pain. Percutaneous drainage, i.e. needle aspiration for small abscesses and catheter drainage for large abscesses is a less invasive but equally effective alternative to surgery in paediatric patients. In this study, a total of 11 patients (48%) were managed successfully by percutaneous drainage (4 by aspiration and 7 by pigtail insertion). Ten patients (43%) responded to management by antibiotics alone. Only 2 patients (9%) required open surgical drainage.

Conclusions

IPA is a rare disease in children. A high index of suspicion is required for diagnosis. Intravenous antibiotics covering *S. aureus* and image-guided percutaneous drainage are effective in managing most patients. Open drainage is required if percutaneous drainage fails to completely resolve the abscess and clinical symptoms deteriorate despite antibiotic treatment.

Declaration of interest

The Authors declare that there is no conflict of interest.

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