Pyomyositis of the pectineus muscle in an adolescent male

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ABSTRACT

The 'irritable hip' continues to pose a challenge for clinicians. Even with predictive clinical algorithms, decision making can be difficult. Emergency treatment is required if septic arthritis is suspected. Other differential diagnoses such as transient synovitis, pyomyositis of the pelvic girdle muscles and osteomyelitis must be considered in order to help guide appropriate investigations and allow early treatment.

We report the case of a 13-year-old boy presenting to our institution with an acutely painful left hip but still able to weight bear. Despite a fever and raised inflammatory markers, the clinical examination did not correspond to that of an infected hip joint. Urgent magnetic resonance imaging (MRI) confirmed pyomyositis of the pectineus muscle. To our knowledge, this is the first reported case in the literature. The child was treated with seven days of intravenous antibiotics. There was a good clinical response as well as normalisation of the C-reactive protein level and white cell count. The patient was discharged home with a further week of oral antibiotics. Follow-up MRI at two weeks demonstrated a dramatic reduction in the inflammation of the pectineus. At the clinic follow-up appointment, the child was asymptomatic and back to normal function.

Pyomyositis is typically found in tropical areas but its rates in temperate climates have been rising. It usually affects large groups of muscles such as the quadriceps and gluteal muscles. MRI is the gold standard investigation. If diagnosed early, the condition can be treated successfully with intravenous antibiotics alone. Given the widespread availability of MRI, we recommend its increased use to distinguish between pyomyositis and other paediatric hip pathologies.

KEYWORDS

Irritable hip – Pyomyositis – Pectineus

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Primary pyomyositis is a bacterial infection of the skeletal muscles.¹ It generally has a predilection for large groups of muscles, and typically affects the iliopsoas, gluteal and obturator muscles. The disease has been described as 'tropical myositis' because of its low prevalence in temperate climates.² The condition was only first described in the UK in 1998 and it continues to be a rare entity.³ Awareness of the disease is important as left untreated, progression can lead to systemic deterioration in the form of septic shock. Magnetic resonance imaging (MRI) is the gold standard for diagnosis. If it is identified early, this condition can be treated successfully with intravenous antibiotics alone.

We report a case of primary pyomyositis of the pectineus muscle in an adolescent boy. To our knowledge, this is the first reported case in the literature.

Case history

A 13-year-old boy of Southeast-Asian background presented to the emergency department with a 3-day history of a painful left hip. The pain was constant but he was able to weight bear. The child had no past medical history and

immunisations were up to date. Clinically, he was mildly pyrexial (37.8° Celsius) and tachycardic. On examination, an antalgic gait was observed. The left leg was held in flexion and external rotation. No palpable mass was found. Full internal and external rotation of the hip joint was possible with pain only provoked on extremes of internal rotation. No pain was elicited when 'telescoping' the hip. Abdominal, respiratory and cardiovascular examinations were unremarkable. A small superficial abrasion was noted on the ipsilateral knee, sustained a week earlier during a soccer match.

Radiography of the chest and pelvis was normal. Urinalysis was negative. Inflammatory markers were raised with a white cell count of $15.0 \times 10^9/l$, an erythrocyte sedimentation rate of 14mm/h and a C-reactive protein level of 63mg/l. Blood cultures revealed no growth after seven days.

MRI was performed the following morning. This demonstrated an expansile mass-like lesion extending through the entire pectineus muscle with extensive contained oedema. Additionally, mild oedema was noted in the adductor brevis and longus muscles. The patient continued to be pyrexial and given the scan findings, he was started on intravenous

ceftriaxone with a working diagnosis of pyomyositis of the pectineus muscle. Owing to the unusual findings on the initial MRI, the patient underwent repeat imaging with contrast. The imaging was reviewed by the regional sarcoma team and their impression was also that of an infective rather than a neoplastic aetiology (Fig 1).

The patient responded well to intravenous antibiotics and after one week of treatment, the inflammatory markers had also normalised. He was discharged home with an additional week of oral antibiotic therapy. Follow-up MRI with contrast was performed three weeks later (Fig 2). This showed a significant reduction in inflammation and oedema around the pectineus muscle. At the outpatient clinic follow up appointment, the child was asymptomatic and the symptoms had resolved.

Discussion

The 'irritable hip' in childhood was first described by Lovett and Morse in 1892.⁴ Despite the passing of two centuries, the spectrum of diagnoses represented by the irritable hip continues to challenge physicians. Various clinical algorithms have been published to aid with risk stratification for septic arthritis. Kocher *et al* identified raised white cell count, increased erythrocyte sedimentation rate, inability to weight bear and history of fever as positive predictors for septic arthritis.⁵

Although such predictive algorithms are useful guides for assessment, a thorough clinical examination is still mandatory. A large number of patients will often fulfil the requirements for the Kocher criteria, and being guided by laboratory numbers alone can lead to inappropriate hip aspirations and often surgical washouts being performed. Other important differential diagnoses for childhood hip pain

Figure 1 Top (from left to right): Coronal T2 weighted; short tau inversion recovery (STIR); T1 weighted, fat saturated; and T1 weighted, fat saturated, gadolinium enhanced. Images show encapsulated abscess with mural enhancement, central non-enhancing regions and extensive surrounding soft tissue oedema along the left pectineus muscle.
xBottom (from left to right): Axial proton density weighted; STIR; T1 weighted, fat saturated; and T1 weighted, fat saturated, gadolinium enhanced. Sequences confirm the extensive perilesional soft tissue oedema.

Figure 2 Coronal (top) and axial (bottom) T1 weighted imaging with fat saturation and gadolinium enhancement before treatment (left) and three weeks after treatment (right). Image series demonstrates dramatic reduction in the size of the left pectineus abscess with only a small residual of intramuscular enhancement.

include osteomyelitis, appendicitis, neoplasms and acute pyomyositis of the pelvic muscles. In our case, the clinical examination of the hip clearly demonstrated a low likelihood for septic arthritis and early MRI was subsequently organised, confirming pyomyositis of the pectineus muscle.

Primary pyomyositis has distinct stages and its clinical presentation will depend on the stage of disease progression. Usually, during the initial inflammatory stage, there is pain and swelling over the affected muscle. The tissue can become indurated and has been described as having a 'wooden texture' on palpation.⁶ Without treatment, the disease can progress, leading to the purulent stage and formation of an abscess that usually requires radiological or surgical intervention.

In terms of location, in children, the pelvic girdle muscles are the most commonly affected. In a relatively large case series of 13 patients, Unnikrishnan *et al* found frequent involvement of the obturator internus, obturator externus and adductors.⁵ Numerous other case reports reinforce this, and also report pyomyositis of the iliacus, piriformis and psoas muscles.^{7–10}

In tropical conditions, the causative organism is typically *Staphylococcus aureus* (~90%). Even in temperate climates, *S aureus* is the most common isolated organism and the incidence is around 60%.¹¹ The aetiology is not completely understood and pyomyositis is thought to be caused by haematogenous spread. Bickles *et al* have described an association with trauma.¹ In our case, the child was found to have an abrasion over the knee sustained while playing soccer one week prior to presenting to our emergency department.

The primary role of the pectineus is that of a hip flexor, and so the recent breach in skin and potential overuse of the muscle from playing soccer may have predisposed our patient to the condition.

The key to diagnosis is performing urgent MRI. Unfortunately, owing to the condition mimicking septic arthritis of hip, treatment is frequently delayed. In the case series reported by Unnikrishnan *et al*, the initial diagnosis was always different to the final diagnosis.⁵ Septic arthritis was the most common initial diagnosis and ultrasonography was performed in all cases. The lack of effusion prompted clinicians to pursue further imaging, leading to the diagnosis of pyomyositis. All cases responded to intravenous antibiotics following the correct diagnosis. When treated early, most patients are managed successfully without surgery and this is again supported in the literature.¹²

Gottschalk *et al* undertook a retrospective analysis of urgent pelvis MRI versus immediate hip aspiration for investigating hip sepsis.¹⁵ Although there were limitations, the study showed that MRI provided greater diagnostic efficacy and led to statistically significant lower rates of reoperation (approximately three times lower than for the hip arthrocentesis patients). The importance of MRI has also been highlighted by Mignemi *et al*.¹⁴ In their study of 53 children who presented with an irritable hip, patients were evaluated using a well known clinical algorithm, ultrasonography and MRI. Interestingly, 32% of their cases were found to have pericapsular pyomyositis compared with only 15% having septic arthritis.

The benefits of MRI are clear and we recommend its increased use when investigating a painful hip in children. However, in the UK, logistics can play a big role in its availability, particularly in the district general hospital setting. The timing of investigation is crucial and patients frequently have a long delay to imaging, which is not acceptable for a presumed infected hip joint. The problem can often be confounded as younger children (<6 years) may require

sedation by an anaesthetist for the imaging. Despite these challenges and given the low rates of septic arthritis, osteomyelitis and pericapsular pyomyositis, most hospitals should be able to make allowances and provide an efficient service. A delay in diagnosis can have severe repercussions for the patient.

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