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*CASE REPORT*

# Pelvic girdle sepsis in childhood
# An illustrative case of the difficulty in diagnosis

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**The child who presents with fever, limp and hip pain will often undergo multiple diagnostic procedures before a definitive diagnosis is made. We describe a diagnostically challenging case of a 14-year-old boy presenting with an atraumatic painful limp and pyrexia. Eventually the diagnosis of obturator internus muscle abscess with associated ischial osteomyelitis was made. Of the 19 previous cases reported, four children had associated osteomyelitis and were of an older age. Symptomatology varies, clinical examination is non-specific and the diagnosis can be difficult. Haematological indices are more predictive than in cases of classical osteomyelitis or septic arthritis. Subtle features on conventional radiography and isotope bone scanning should not be overlooked while CT and MRI may be complementary in diagnosis.**

## INTRODUCTION

The child who presents with fever, limp and hip pain will often undergo multiple diagnostic procedures before a definitive diagnosis is made. The more common differential diagnoses include osteomyelitis, transient synovitis of the hip, juvenile rheumatoid arthritis, septic arthritis, pelvic pyomyositis and tumour. Clinical history taking, examination, haematological investigations and musculoskeletal imaging all contribute to making the diagnosis. We will describe a diagnostically challenging case of paediatric pelvic pyomyositis and briefly discuss the use and limitations of all these modalities to highlight the difficulty often encountered in clarifying the diagnosis in the child with suspected musculoskeletal sepsis.

## CASE HISTORY

A 14-year-old boy presented with a 4-day history of an atraumatic left sided painful limp, anorexia and nausea. He was pyrexial and systemically unwell. Clinical examination was entirely normal. Haematological investigations revealed a leucocyte count of $10.3 \times 10^9$/L, an ESR of 27 mm/hr (normal 0-10) and a CRP of 172.4 IU (normal < 10). Plain radiographs of the pelvis and hips were reported as normal (fig 1). A tri-phase isotope bone

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***Fig. 1.*** — AP (a) and Frog Lateral (b) radiographs of pelvis and both hips

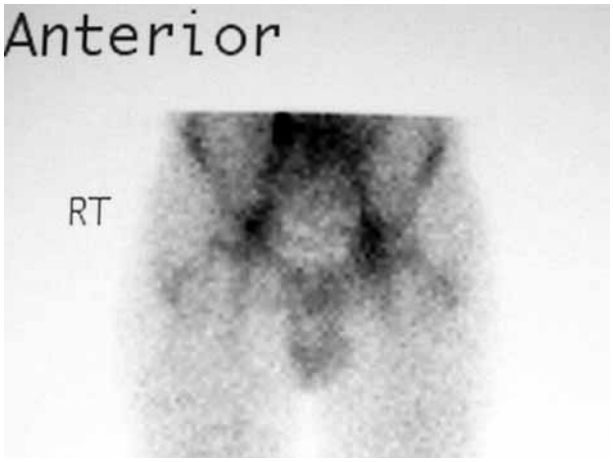


***Fig. 2.*** — Blood pool of Technetium isotope bone scan

***Fig. 3.*** — Sagittal T2 weighted MRI of pelvis and proximal femora.

scan revealed a mild increase in radioisotope uptake in the posterior aspect of the left hip joint in the first and second phases only (fig 2).

Gram stain and cell count from hip aspiration were nondiagnostic. The child was then commenced on intravenous Flucloxacillin (150 mg/kg BW/day, q6h) and oral Fucidin (50 mg/Kg/day, q8h) as per departmental protocol. Subsequently blood cultures revealed *Staphylococcus aureus* sensitive to Flucloxacillin. Despite 18 hours of intravenous antibiotics the child's condition deteriorated with a swinging pyrexia suggestive of an abscess. ESR was 184 mm/hr and CRP > 215 IU. T1 weighted MRI scan of pelvis and both hips demonstrated a heterogeneous mass in the area of the left obturator internus muscle with increased signal intensity on both the T2 weighted and STIR images (fig 3), in keeping with an inflammatory phlegmon/abscess. There was a scanty effusion in the left hip joint and no convincing evidence of primary osteomyelitis. To facilitate surgical decompression he underwent CT examination with contrast on the 3rd day (fig 4). This confirmed an organising abscess within and adjacent to obturator internus, extending from the fovea to the most caudal prominence of the ischial tuberosity. Periosteal

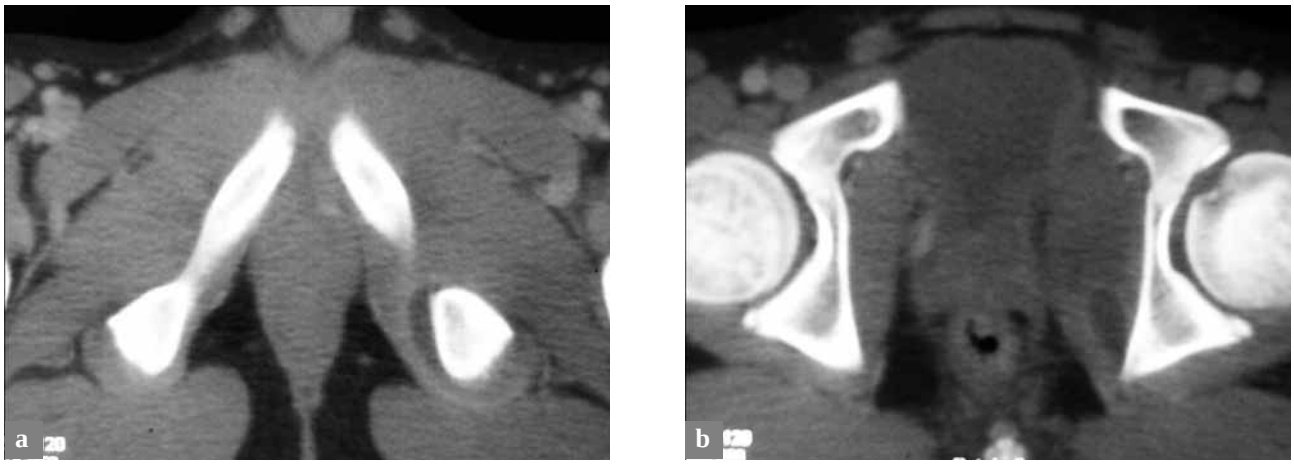


*Fig. 4.* — Axial CT images of pelvis at level of ischial tuberosity (a) and of fovea (b)

elevation at the ischial tuberosity with no convincing evidence of cortical or medullary bone destruction was seen.

Under general anaesthetic and in the lithotomy position a direct incision was made over the ischial tuberosity (modified Radley's approach) and an extra periosteal approach was made to the inflammatory collection. Twenty millilitres of pus was drained and a moderate amount of inflammatory phlegmon was debrided from the cavity. The wound was loosely closed over a Penrose drain. Microbiological examination of the operative specimens confirmed *Staphylococcus aureus*. Histological examination revealed necrotic bone within a fibropurulent inflammatory exudate in keeping with primary osteomyelitis. By the fourth post op day he was mobilising pain free with crutches and the drain was removed and intravenous antibiotics were discontinued. He was discharged ten days after surgery, pain free, apyrexial and on oral antibiotics for a further 18 days. At clinical review at six weeks he had made a complete and uncomplicated recovery.

## DISCUSSION

The obturator internus muscle (OIM) is an extremely uncommon site of abscess with nineteen cases previously reported (*7, 10, 13*). Despite its rarity, the literature suggests a striking similarity in the presentation of fever, limp, hip pain, joint tenderness and decreased hip range of motion. The hip is 'classically' held in the flexed, abducted and exernally rotated position (*4-7, 10, 13*). However in practice these are quite non-specific clinical findings and could be considered typical of many of the differential diagnoses listed earlier. This current case for instance had a very 'atypical' presentation. Our primary differential diagnoses at presentation were discitis, spinal or pelvic osteomyelitis, or early septic arthritis of the hip. Having critically reviewed all previously reported cases we identify a peculiarity of OIM abscess when associated with pelvic osteomyelitis, as in this case. The median age of children with isolated pyomyositis is 7.5+/-2.9 years. Of the four cases with associated osteomyelitis the median age is 13.5+/-1.4. This difference in age at presentation is statistically significant ($p = 0.003$, Students t-test).

While fever is not a consistent accompaniment of acute hematogenous osteomyelitis (*11*) it is anticipated in a child with a collection of pus. Of all the reported cases of OIM abscess, all but one had a pyrexia, with a mean temperature at presentation of 39.8°C. Most series of AHO and septic arthritis confirm the absolute leucocyte-count and differential are abnormal in only 25% and 50% of cases respectively. When we reviewed all cases of OIM abscess, we found the absolute count predictive in 69% and the differential in 87.5%, suggesting a use

in distinguishing a pelvic abscess from septic arthritis or osteomyelitis. Surprisingly then, these parameters were normal in our case at presentation, further adding to the difficulty in diagnosis. ESR and CRP are the most useful laboratory tests in childhood musculoskeletal sepsis (*3*). The ESR is elevated in 90% to 95% of cases of AHO and septic arthritis and in all previously reported cases of OIM abscess (mean : 69 mm/hr ; range : 33 to 115). However its limited usefulness is appreciated as it may take 72 hours to become elevated and only returns to normal 2-4 weeks after elimination of the infection. The CRP is much more useful rising within 6 hours of the stimulus, increasing several hundred fold and peaking within 36-48 hours. Because of its short half-life (46 hours), it responds quickly to successful treatment, has greater sensitivity, specificity, positive and negative predictive value than the ESR in the diagnosis and monitoring of childhood musculoskeletal sepsis (*12*). Our review suggests that leucocyte count, ESR and CRP are more predictive in cases of pyomyositis than in classical osteomyelitis or septic arthritis. One explanation may be the rapid and aggressive development of abscess collection and myonecrosis typical in this condition. As with all musculoskeletal infections in children *Staphlococcus aureus* is the most common aetiological agent in OIM abscess. *Streptoccus pyogenes, Enterococcus faecalis* and *Neisseria gonorrhoea* have also been reported as agents.

Imaging studies are critical to the diagnosis and management of musculoskeletal infections. Conventional radiography is usually the first imaging study performed. It takes a number of days before radiological features of infection become evident and reliability is questionable. Sensitivity is only 0.70, specificity 0.56, accuracy 0.72, positive predictive value (PPV) 0.91, negative predictive value (NPV) 0.24. Ultrasound is helpful in detecting joint effusions and fluid collections in the soft tissue and subperiosteal regions, and may guide localisation for aspiration or drainage. Scintigraphy is useful in identifying subtle (*2*) and / or multifocal involvement, an important consideration in neonatal osteomyelitis and chronic recurrent multifocal osteomyelitis. Sensitivity is approximately 90%, specificity 96% and accuracy 88%. CT can demonstrate osseous and soft tissue abnormalities and is ideal for detecting gas in soft tissues. NMR provides accurate information on both soft tissues and bones and is our imaging study of choice for evaluating the local extent of musculoskeletal infections. Gradient echo T1 weighted, fast spin echo T2 weighted and inversion recovery spin echo (IRSE) axial sequences are the most frequently performed. The literature demonstrates that the IRSE sequence is most reliable at determining underlying disorder. Interobserver agreement is very good with unweighted kappa values of 0.85-0.91, 95% confidence intervals 0.77, 0.99. Sensitivity of MRI is 0.83, specificity 1.00, accuracy 0.84, PPV 1.00 and a NPV of 0.36 (*1, 8, 9*).

The most recently published review of obturator internus abscess (*7*) stated that “in all cases, radiographs and bone scans were negative”. In our case radiographs were initially thought unremarkable. The blood phase image from a bone-scan showed faint uptake in the posterior aspect of the left hip joint. When the diagnosis of pelvic pyomyositis was made and the images reviewed, it was apparent that the fat stripe of the left OIM was displaced. Our review of previous cases revealed that this subtle feature has once previously been reported in a case of an older boy (10 years) who also had associated ischial osteomyelitis. MRI images showed an abnormal high signal within and about the left obturator internus muscle from the level of the fovea of the head of the femur to the ischial tuberosity. There was normal signal in the marrow of the left femur, acetabulum and remainder of the pelvic girdle. The CT confirmed an organising abscess of obturator internus muscle on the left side. There was associated periosteal elevation with no convincing evidence of cortical or medullary bone destruction. This was a feature not visualised on the MRI examination performed only 24 hours earlier. Whether this difference reflects the superiority of the CT for such cortical / periosteal detail or just the progression of the disease is unclear.

In summary, obturator internus muscle abscess has been reported in 19 previous cases. Four children had associated osteomyelitis and were of an older age. Symptomatology varies, clinical

examination is non-specific and the diagnosis can be difficult. Haematological indices are more predictive than in cases of classical osteomyelitis or septic arthritis. Subtle features on conventional radiography and isotope bone scanning should not be overlooked while CT and MRI may be complementary in diagnosis. Pelvic pyomyositis should always be considered in the differential diagnosis of the child presenting with symptoms and signs suggestive of musculoskeletal sepsis.

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