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Case Report

A case report: Osteomyelitis of the ischiopubic synchondrosis with abscess formation ☆

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ABSTRACT

Osteomyelitis of the ischiopubic synchondrosis is an uncommon condition with high morbidity rates that present with nonspecific symptoms in the pediatric population. In this article, we report a case of a 10-year-old female who presented with right hip pain and fever following a trivial trauma. Laboratory tests revealed leukocytosis and elevated inflammatory markers. Despite negative blood culture and deceptively normal plain radiographs, magnetic resonance imaging demonstrated osteomyelitis of the ischiopubic synchondrosis with intra-osseous and intra-muscular abscess which was managed surgically by incision and drainage. We highlight the clinical importance of familiarity with such uncommon condition and the role of early magnetic resonance imaging in establishing the diagnosis to facilitate prompt surgical intervention.

Introduction

Pelvic acute hematogenous osteomyelitis is relatively uncommon among children originating frequently in metaphyseal-equivalents and is associated with extensive soft-tissue inflammation and abscesses at the time of diagnosis [1]. The bones adjacent to ischiopubic synchondroses are metaphyseal equivalents susceptible to acute osteomyelitis [2]. However, the diagnosis is seldom straightforward due to the intricate physiological fusion of ischiopubic synchondrosis during skeletal maturation as well as the overlap of clinical and radiological findings with other more common disease processes.

Case report

We present a 10-year-old female who was not known to have any medical conditions aside from eczema, who presented to the emergency department with a history of right hip and leg pain of 1-week duration followed by on-and-off high-grade

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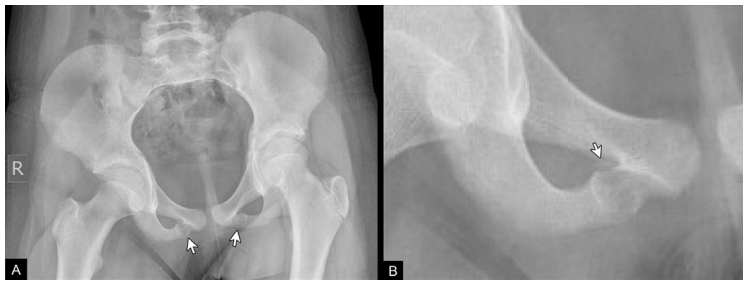

Fig. 1 – Anteroposterior pelvic radiograph (A) showing ischiopubic synchondroses bilaterally with lucency (arrows). A magnified view of the right ischiopubic ramus (B) showing a subtle crescentic bone fragment along the superior aspect of the right ischiopubic synchondrosis (arrow).

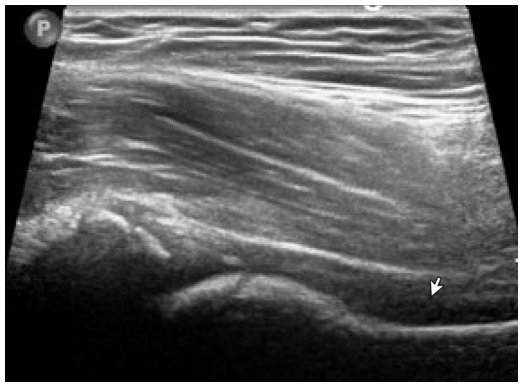

Fig. 2 – Ultrasound of the right hip joint showing a trace of joint effusion (arrow).

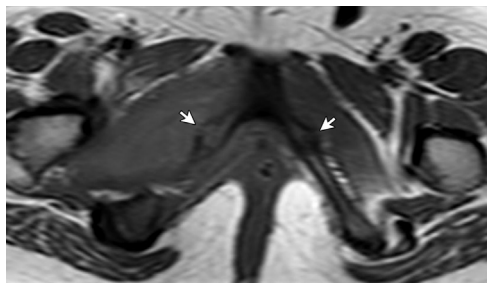

Fig. 3 – Axial T1-weighted MR image showing expansion of the IPS bilaterally.

fever, nearly a week after sustaining a minor trauma with resultant bruises on her right lower extremity. At the time of presentation, she was conscious, alert, and oriented. Her vital signs revealed a temperature of 39°C. On physical examination, she was tender in the right hip and thigh and felt moderate pain upon internal rotation of the hip. There was no local erythema, decrease in range of movement, or neurovascular deficits. However, she was unable to fully bear weight on her right leg and had a limp.

Full blood tests were ordered which revealed that her white blood cell count (WBC) was 14.98 × 10^9/L and neutrophils absolute count was 12 × 10^9/L. Her erythrocyte sedimentation rate and c-reactive protein rose from 60 to 121 mm/hour and from 145.79 to 150.95 mg/L respectively within 1 day. Blood and urine cultures were sterile.

Plain pelvis and right hip radiographs showed bilateral focal lucency and expansion of the ischiopubic synchondroses, more pronounced on the right side with a subtle crescentic bone fragment along the superior aspect of the right ischiopubic synchondrosis (Fig. 1), suspicious for underlying pathology. The remainder of the pelvis and particularly both hip joints appeared normal. Ultrasound of the hip joints showed a trace of right hip joint effusion (Fig. 2).

Given the clinical suspicion of an underlying occult infection, she was treated with an intravenous broad-spectrum antibiotic (Ceftriaxone 2 g daily) and arranged to undergo an MRI of the pelvis. The MRI demonstrated abnormal signal intensity in the inferior pubic and ischial rami with involvement of the right ischiopubic synchondrosis and breach of the outer cortex. There was corresponding intramedullary contrast enhancement connected to a large multiloculated intramuscular collection in the right quadratus femoris and adductor magnus muscles that extended through the right obturator foramen to further involve the ipsilateral obturator internus muscle (Figs. 3-5). Significant reactive myositis of the rest of the adductor muscles and a trace of reactive right hip effusion were also noted.

A diagnosis of IPS osteomyelitis with abscess formation was made and managed surgically by incision and drainage of the pus cavity over the adductor magnus muscle. The microbiology analysis yielded growth of Staphylococcus aureus and the patient was then started on intravenous Clindamycin (500 mg 8 hourly) for 4 days. There was improvement of the clinical course with gradual decrease in leukocyte count and inflammatory markers. The pelvic drain was removed on postoperative day 4 and the patient was discharged in stable condition on oral Clindamycin (300 mg 8 hourly) for 10 days. The patient had wound dressing changed daily for 5 days and a follow-up appointment after 6 weeks that revealed wound healing and resolution of her symptoms.

Discussion

Synchondroses are primary cartilaginous joints composed of hyaline cartilage found primarily in the immature skeleton; occurring between ossification centers of developing bones.

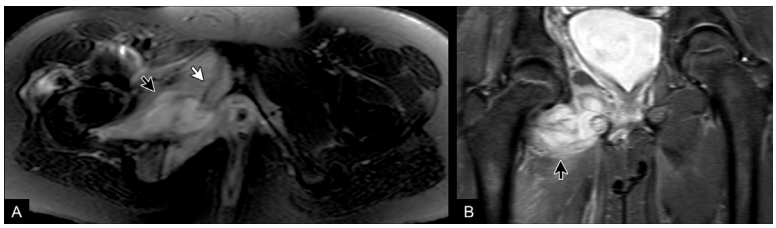

Fig. 4 – Axial (A) and coronal (B) fat-saturated T2-weighted MR images showing abnormal high T2 signal intensity involving the right inferior pubic and ischial rami (white arrow) and a loculated fluid signal intensity in the substance of the right obturator internus and adductor magnus (black arrow).

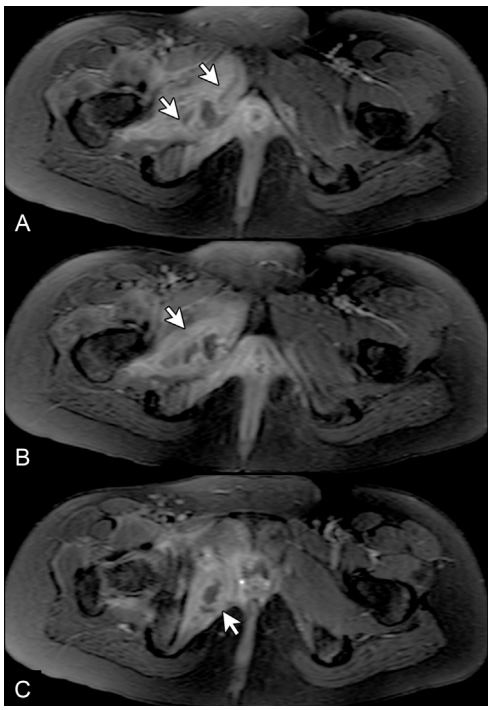

Fig. 5 – Axial fat-suppressed Gadolinium enhanced T1-weighted MR images showing enhancement of the right inferior pubic and ischial rami (A) and marked peripheral enhancement of the right adductor magnus (B) and obturator internus (C) loculated fluid collection.

In the pelvis, the ischiopubic synchondrosis (IPS) exists as a temporary joint between the inferior pubic and inferior ischial rami in children, which gradually ossifies before puberty.

In young children, the ischiopubic synchondroses are enlarged bilaterally. Later in childhood, the enlargement can persist unilaterally before complete fusion; commonly in the nondominant leg secondary to asymmetrically applied mechanical forces [3].

The majority of patients found to have delayed closure of the ischiopubic synchondrosis, or IPS asymmetry, are asymptomatic and as such the finding is recognized to represent a developmental variant. However, patients with IPS asymmetry who present with hip, groin, or buttock pain, restricted range of motion of the hip joint, and limping are likely to be a diagnostic dilemma as the nonspecific clinical presentation overlaps with diverse disease processes including synchondrosis ischiopubic syndrome (SIS); also known as van Neck-Odelberg disease, stress fracture, osteomyelitis, neoplastic process, and post-traumatic osteolysis.

The bones adjacent to ischiopubic synchondroses are metaphyseal equivalents which contain highly vascularized sinusoidal lakes where blood flow is slow predisposing them; as much as the metaphyses of the long bones, to acute hematogenous osteomyelitis. It can also occur following direct spread of infection, after trauma, or as a result of vascular insufficiency [2].

The clinical manifestations are varied, including hip pain and tenderness, sometimes involving the groin or gluteal region, limitation of movement of the hip joint, inability to bear weight, limping, and pyrexia. The laboratory findings include leukocytosis and elevated inflammatory markers; particularly erythrocyte sedimentation rate with reported levels $\geq$ 40 mm/hour having the highest positive predictive value (26%) [4]. Staphylococcus aureus is the most frequent organism found on blood culture; however, negative culture does not exclude the diagnosis of an infection [5].

Conventional radiographs can be challenging to interpret not only due to the marked asymmetry in the pattern of ossification but also because bone infection can be subtle relative to the extent of surrounding soft tissue involvement as in our case. Although radiographs have low sensitivity and specificity for detecting osteomyelitis, they should still be the first-line imaging study as they may guide subsequent imaging evaluation by excluding other differential diagnoses such as fractures. MR imaging has been widely recognized as the modality of choice in the evaluation of suspected osteomyelitis in children because of the lack of ionizing radiation, superior soft-tissue contrast, and hence higher sensitivity for the detection of early infection [6]. The earliest finding of acute osteomyelitis is bone marrow edema which produces low signal intensity on T1-weighted images and high signal intensity on T2-weighted images or STIR. Bone infection will demonstrate increased enhancement relative to the adjacent normal bone marrow on fat-suppressed gadolinium-enhanced T1-weighted images. The infection can evolve into rim-enhancing intraosseous and subperiosteal abscesses that may further extend to involve the adjacent soft-tissue or muscular compartments in the form of inflammation; such as cellulitis and myositis respectively, and subsequently abscess formation. When untreated, features of chronic osteomyelitis

are likely to develop. Other imaging modalities have a limited role in the diagnosis of osteomyelitis and evaluation of disease extent given the lower sensitivity compared with MRI. Yet, sonography might detect soft-tissue involvement, computed tomography is superior to MRI in evaluating osseous changes such as cortical destruction, and 3-phase bone scintigraphy can aid in the assessment of multifocal disease [7].

Osteomyelitis affecting the ischiopubic synchondrosis can be a diagnostic challenge to the clinician and radiologist alike due to the variable clinical presentation and nonspecific laboratory and conventional radiographs findings. Multidisciplinary team effort plays a pivotal role as clinical suspicion of osteomyelitis can facilitate early MR imaging which has a significant impact on outcome.

Conclusion

This case report highlights the crucial awareness of IPS osteomyelitis in the pediatric population. Since the bone abnormality is often relatively small compared with the substantial soft-tissue involvement, radiologists must be attentive to detect subtle findings and adequately image the soft-tissue. MRI has been shown to be essential in prompt and accurate diagnosis of IPS osteomyelitis. Therefore, a multidisciplinary team approach is crucial as appropriate clinical suspicion can guide early therapy and surgical intervention.

Patient consent

The authors confirm that written informed consent for publication of this case report was obtained from the patient's parents, allowing us to use the patient's medical information and imaging in this article. All identifiable details have been omitted.

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