CASE REPORT

Musculoskeletal Sonography Facilitates the Diagnosis of Adolescent Anterior Superior Iliac Spine Avulsion Fracture

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Anterior superior iliac spine (ASIS) avulsion fractures are not common. We describe a 15-year-old boy who suffered from sudden onset of pain on the left side of his groin when running a race, accompanied by weakness in raising his left leg. Physical examination revealed local tenderness over left ASIS area, initial pelvic radiograph showed no abnormalities, but kidney-ureter-bladder radiograph revealed a small indistinct radiopaque shadow lateral to iliac bone. Then, musculoskeletal sonography disclosed the displacement of the apophysis from the left ASIS, and avulsion fracture was impressed. Pelvic computed tomography confirmed the diagnosis. The patient gradually recovered after conservative treatment. Groin pain in athletes is a dilemma in diagnosis, and careful correlation of the clinical condition and radiological findings is essential to avoid misdiagnosis. Musculoskeletal ultrasound is a useful tool for quick screening and to facilitate diagnosis.

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Introduction

Avulsion fractures of the apophyses and spines of the pelvis are considered uncommon injuries. They occur almost exclusively in adolescent athletes mainly as a result of the sudden, forceful, or unbalanced contraction of the attached musculotendinous unit when the subject is engaged in a sporting event [1,2].

The three most common avulsion sites of lower limbs are the ischial tuberosity of the hamstring attachment, anterior inferior iliac spine of the rectus femoris attachment, and anterior superior iliac spine (ASIS) of the sartorius attachment [3].

Musculoskeletal sonography has been shown to be effective for many applications related to sports medicine [4] and has been reported to reveal ASIS avulsion fracture [5].

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Here, we report a 15-year-old boy with an ASIS avulsion fracture that was diagnosed with the help of sonography.

Case Report

A 15-year-old boy had a sudden onset of pain on the left side of his groin when running a race, accompanied by weakness in raising his left leg. Soft tissue strain was impressed in the emergency department because of negative findings on initial pelvic radiograph (Fig. 1), and he was referred to the rehabilitation division. Physical examination by a physiatrist revealed local tenderness around the ASIS area, with no rebound pain and difficulty in left hip active flexion. An incomplete iliac crest portion was found on the pelvic radiograph, and kidney-ureter-bladder (KUB) radiograph, which was taken subsequently, revealed a small indistinct radiopaque shadow lateral to the iliac bone (Fig. 2). Therefore, musculoskeletal sonography was then performed immediately, which disclosed the displacement of an apophysis at the left ASIS (Fig. 3). The patient was transferred to the orthopedic division because of suspicion of left ASIS avulsion fracture. Pelvic computed tomography (CT) confirmed the diagnosis on the same day (Fig. 4). An orthopedic specialist suggested a conservative treatment. The family members reported that the patient’s pain subsided, left hip flexion gradually improved, and walking returned to normal, but he did not return to hospital for follow-up.

Discussion

Groin pain in athletes is a dilemma in diagnosis because the anatomy of the region is complex, and two or more injuries often coexist. The differential diagnosis may include intra-abdominal pathology, genitourinary abnormalities, referred lumbosacral pain and sports hernia, iliopsoas bursitis, stress fractures, avulsion fractures, nerve compression, and snapping hip syndrome [3]. Early diagnosis is important to prevent these injuries from becoming chronic and potentially career limiting [3].

Most avulsion injuries of the pelvis in adolescents occur during vigorous sports. They are often mistaken for muscle or tendon injuries [6]. ASIS avulsion fracture accounts for only 1.4% of injuries to the pelvis [7] and may result from forceful contraction of the sartorius and tensor fascia lata muscles [8].

Patients with ASIS avulsion fracture develop immediate pain, swelling, limping, and disability and may also hear or feel a pop. Clinical examination may reveal localized pain, ecchymosis, swelling, and tenderness near the tendon-bone interface, resistance test exacerbates the pain, and range of motion is often diminished [9].

Radiographic assessment consists of a standard anteroposterior view of the pelvis supplemented by axial and oblique views when indicated. CT, magnetic resonance imaging, and scintigraphy were performed in only a few reported cases when the radiographic findings were equivocal [10].

Pisacano and Miller [5] described the sonographic appearances of pelvic apophyseal avulsion, such as widening of the normally hypoechoic physis between the apophysis and the pelvis. They concluded that sonography should be considered an alternative imaging modality compared with magnetic resonance imaging in patients in whom conventional radiography fails to reveal a clinically suspected avulsion. In their study, sonography could demonstrate pelvic apophyseal avulsion fracture even when the radiographic finding was negative.

The treatment of this injury is usually conservative [8], and surgery may only be necessary when the displacement of a large fragment is more than 20 mm or when the patient desires to be a professional athlete [11].

Apophyseal avulsion fractures of the hip and pelvis can be easily missed [12]. In this patient, pelvic radiograph was negative, but an indistinct radiopaque shadow was found on the KUB radiograph. Review of the pelvic and KUB radiographs and CT images showed that the avulsed bony
fragment was located on the anterolateral side of the anterosuperior iliac spine. The symmetric presentation on both sides of the iliac bone on pelvic radiograph resulted from the counterclockwise positioning of the pelvis such that the overlapped images of the fractural bony fragment and iliac bone could not be distinguished. The present case shows that adolescent ASIS avulsion fracture may not be recognized early enough. To avoid misdiagnosis, physicians must carefully consider both the clinical condition and the radiological findings from different angles. Musculoskeletal sonography is an effective tool for rapid screening and to facilitate diagnosis.

References


Fig. 3. (A) Transverse view of right side shows a normal apophysis overlying the anterosuperior iliac spine. (B) Transverse view of the left side shows widening of the apophysis. (C) Longitudinal view of the right side shows a normal apophysis overlying the anterosuperior iliac spine. (D) Longitudinal view of left side shows the displacement of the avulsed apophysis from the underlying anterosuperior iliac spine. Arrow head indicates apophysis; arrow indicates anterosuperior iliac spine. Note: The scale bars in transverse view and longitudinal view are different.

Fig. 4. Pelvic computed tomography shows the left anterior superior iliac spine (apophysis) avulsion fracture (arrow).