

An Unusual Anterior Superior Iliac Spine Avulsion Fracture in an Adolescent Athlete

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Avulsion fractures of the anterior superior iliac spine (ASIS) are rare. Cases occur predominantly in adolescent athletes when participating in competitive sports. Actions such as sudden starts and stops while running and kicking make adolescent athletes more prone to avulsion fractures. In this study, we present a 16-year-old male who had sudden onset of pain in the right groin while running a race and consequently was unable to raise his right leg. He was treated conservatively and returned to full weight bearing 3 months later. He was followed up at the orthopedic department and recovered uneventfully without residual functional impairment.

Key words: avulsion fractures, anterior superior iliac spine, ASIS, adolescent athletes

INTRODUCTION

Avulsion fractures occur when a piece of bone is pulled off by an attached tendon or ligament as a result of sudden forceful contraction of the related muscle. They are more common in adolescents, because adolescent bones, ligaments, and tendons are not as mature as those in adults in terms of sustaining stress.

The three most common sites for avulsion fractures of the pelvis are the sartorius attachment on the anterior superior iliac spine (ASIS), the rectus femoris attachment on the AIIS, and the hamstring attachment on the ischial tuberosity. Physicians must be cautious when assessing patients with complaints of groin pain and keep in mind the possibility of an ASIS avulsion fracture. Avulsion fractures of the ASIS are usually treated conservatively. Surgical reattachment or excision can be considered when the fragment has migrated more than 3 cm, entrapment of the lateral femoral cutaneous nerve has occurred, or when the patient is eager for an early recovery.

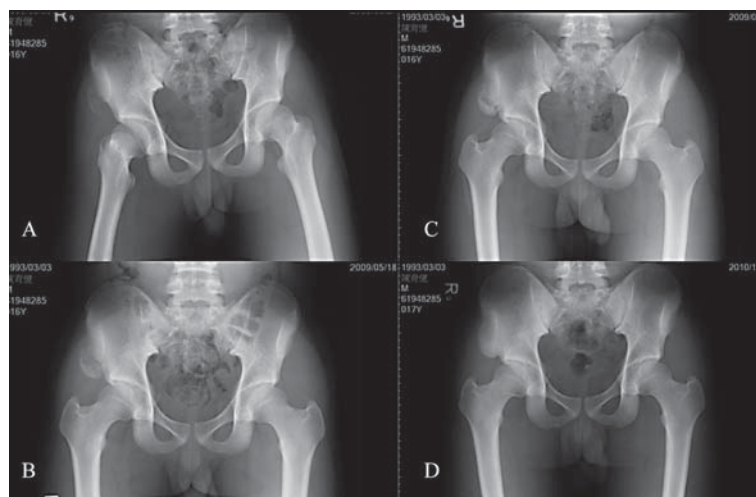


Fig. 1 A series of radiographs of the young athlete with avulsion fracture of the anterior superior iliac spine (ASIS) show the healing process. A. Initial AP view of plain radiograph at the ER; B. Callus formation developed 2 months after discharge; C: The avulsed bony fragment has almost healed 5 months after discharge; D: Complete bony healing is seen 20 months after discharge.

CASE REPORT

Three weeks prior to arrival at our hospital, a 16-year-old adolescent athlete felt sudden right groin pain during a running race. Physical examination in the emergency room showed palpable tenderness over his right groin area and limited active flexion and abduction of the right hip. A plain pelvic radiograph showed an avulsion fracture of the ASIS. The avulsed fragment, measuring 1.7 cm×0.5 cm, was displaced 1.8 cm inferiorly and 1.2 cm laterally (Fig. 1). A computed tomography scan

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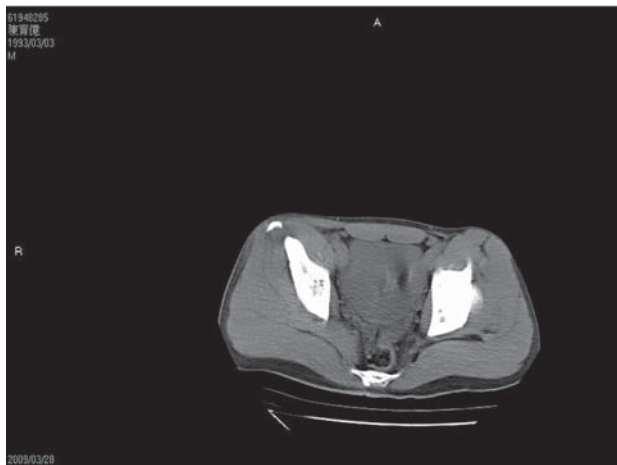


Fig.2 Computed tomography scan showed an avulsion fracture of the right ASIS with perifocal soft-tissue swelling.

showed an avulsion fracture of the right ASIS with perifocal soft-tissue swelling (Fig. 2). We prescribed bed rest for the patient and administered ice packs and pain-relief treatment. Physical therapy, including gait training on crutches, hip mobilization, and stretching exercises, were carried out in the outpatient department (OPD). A follow-up plain radiograph showed good fibrous union after 2 months. The patient regained a full range of motion (ROM) of the right hip and was able to return to full weight bearing after 3 months.

DISCUSSION

The sartorius muscle originates from the apophysis of the iliac crest. This apophysis ossifies at the age of 15 years and unites with the ilium between the ages of 20 and 25.¹ Avulsion fractures are more predominant in males (a ratio of 13:1),⁷ and are caused by a sudden and forceful pull on the attachments of the sartorius and tensor fascia lata muscles on the ASIS, especially with the knee in the flexed position, e.g., in sprinters at the starting line^{4,7-9,11} - which dislocates the fragment caudally and laterally. Diagnosis is usually based on medical history, physical examination, pelvic AP x-rays, and computed tomographic scan.^{3,5,6} On medical history, the ASIS avulsion fracture of the pelvis should be considered, especially in young adults with sudden onset of pain in the groin after vigorous flexion of the hip. A popping sound could be heard at the time of the injury.¹³ On physical examination the avulsed fragment of the ASIS, may not be palpated because the ASIS is situated deep near the

sartorius and iliopsoas muscles.¹⁷ Thus, it is difficult to localize the pain and the exact area of the pathology, but this area may be swollen, warm and red. Walking with a limp is also a sign after injury, as well as pain possibly occurring from hip flexion. The characteristic of the pain in AIIS fracture of the pelvis is generally persistent and radiating to the thigh, which could mislead the physician to consider a musculotendinous injury. X-rays are the first step in special investigations. It is essential to take a comparison x-ray of the contralateral apophysis to ensure the avulsed fragment is separated from the ilium. A computed tomographic scan can be ordered if the avulsion fracture cannot be defined on x-rays or if more precise measurement of a displacement fragment is needed for surgical intervention. However, avulsion fractures of the ASIS are commonly treated conservatively by limiting weight bearing for 3 weeks and initiating progressive resistance and isometric exercises.¹⁴ An avulsion fracture of the ASIS treated conservatively will usually heal in 8 weeks.¹⁵ Conservative treatment usually has good functional results and complications are rare. Surgical reattachment or excision has been advocated when the fragment has migrated more than 3 cm,^{7,8,12,14} entrapment of the lateral femoral cutaneous nerve has occurred,² or when the patient is eager for an early recovery.¹⁶ Besides, warm-up and stretching before practice or competition as well as maintaining physical fitness such as strength, flexibility, and endurance are ways to prevent this kind of injury.

Avulsion fractures of the ASIS in adolescents are uncommon. We presented this case to show these types of fractures are commonly seen in adolescent athletes. Physicians should carry out detailed physical examinations and correlate the clinical conditions with the radiological findings to make a precise diagnosis. Conservative treatment could be considered in most cases.

DISCLOSURE

All authors declare that this study has no conflict of interest.

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