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CASE REPORT

A Painful Victory: A Case of Avulsion Fracture of Anterior Superior Iliac Spine

WAN NOR AIDA WMS, AAINA IRYANI M, AHMAD KHALDUN I

Department of Emergency Medicine, Faculty of Medicine, Universiti Kebangsaan Malaysia Medical Centre, Jalan Yaacob Latif, Bandar Tun Razak, 56000 Cheras, Kuala Lumpur, Malaysia.

ABSTRAK

Fraktur avulsi tulang belakang iliac anterior (ASIS) jarang terjadi, dan lebih lumrah berlaku di kalangan remaja muda semasa bersukan. Ini disebabkan oleh rawan apophyseal yang lemah semasa remaja, apabila kontraksi otot yang kuat mengatasi ASIS semasa aktiviti olahraga. Seorang lelaki berusia 15 tahun dibawa ke Jabatan Kecemasan (ED) mengadu sakit pinggul kanan selepas perlumbaan semasa Hari Sukan sekolahnya. Ketika dia melintasi garisan penamat dan menang, dia tiba-tiba rasa sensasi "pop" di pinggul kanannya dan jatuh ke tanah dengan kesakitan. Di ED, dia baring meniarap dengan skor sakit 6/10. Intravena Ketorolac diberikan untuk melegakan kesakitannya. Pemeriksaan fizikal menunjukkan kesakitan setempat di kawasan hadapan pelvis kanan, tanpa bengkak atau kecacatan pada sendi pinggul kanan. Tiada perbezaan antara kepanjangan kaki kanan berbanding kaki kiri. Pergerakan pinggul kanan terhad akibat kesakitan. Pemeriksaan neurovaskular adalah normal. Radiografi pelvis menunjukkan fraktur avulsi ASIS kanan. Beliau telah dirujuk kepada pasukan Ortopedik dan telah dirancang untuk rawatan konservatif rehat di katil, analgesik, dan ambulansi tanpa berat. Dia dibenarkan pulang dan dirancang untuk temujanji di Klinik Ortopedik. Pemeriksaan semula selepas 2 bulan kecederaan menunjukkan pesakit sihat dan bebas kesakitan. ASIS mudah terdedah kepada kecederaan avulsi semasa menjalankan aktiviti sukan kerana otot sartorius menarik anteroinferior ASIS semasa lekukan maksimum pinggul dan lanjutan lutut. Walaupun fraktur avulsi apophyses pelvis jarang berlaku, ia harus dipertimbangkan di kalangan atlet remaja jika mekanisma kecederaan adalah sangat sugestif.

Kata kunci: fraktur avulsi, remaja, tulang belakang iliac anterior

Address for correspondence and reprint requests: Wan Nor Aida Wan Mohd Shukri. Department of Emergency Medicine, Faculty of Medicine, Universiti Kebangsaan Malaysia Medical Centre, Jalan Yaacob Latif, Bandar Tun Razak, 56000 Cheras, Kuala Lumpur, Malaysia. Tel: +603-9145 5703 Email: wannoraida@gmail.com

ABSTRACT

Avulsion fractures of the anterior superior iliac spine (ASIS) are rare, occurring mostly among young teenagers during sports. This is due to the weaker, immature apophyseal cartilage in adolescent, when forceful muscle contractions avulse the ASIS during athletic activity. A 15-year-old male presented to the Emergency Department (ED) complaining of right hip pain after a race during his school's Sports Day. As he crossed the finishing line and won, he felt a popping sensation over his right hip and fell to the ground in pain. On arrival to ED, he was lying supine with the pain score of 6/10. Intravenous Ketorolac was given for pain relief. Physical examination revealed localised tenderness over the anterior right pelvic region, with no swelling or deformity over the right hip joint. There was no limb length discrepancy of the right leg compared to the left. Active movement of the right hip was restricted due to pain. Neurovascular examination was unremarkable. Plain radiograph of the pelvis showed avulsion fracture of the right ASIS. He was referred to the Orthopaedics team and was planned for conservative management of bed rest, analgesics, and non-weight bearing ambulation. He was discharged home and planned for review as outpatient at the Orthopaedic Clinic. Subsequent review 2 months post injury revealed patient was well and ambulating pain-free.. The ASIS is susceptible to avulsion injury during running activity as the sartorius muscle pulls the ASIS anteroinferiorly during maximum flexion of hip and extension of the knee. Although avulsion fracture of the pelvic apophyses is rarely encountered, it should always be considered among athletic adolescents if the mechanism of injury is highly suggestive.

Keywords: adolescent, anterior superior iliac spine, avulsion fracture

INTRODUCTION

Avulsion fractures of the pelvic apophyses are uncommon and often overlooked. They predominantly occur among adolescents during sports activities. These fractures occur in this age group as their pelvic apophyses have not completely ossified and fused with the corresponding pelvic tuberosities, creating a potential site of weakness (Bendeddouche et al. 2010). The pelvic apophyses are also the sites of insertion for strong muscles such as the sartorius, rectus femoris and the tensor lata muscles, further compounding the risk of avulsion fractures during high impact sporting activities when strong muscle contraction occurs. The most common sites of fracture are the ischial tuberosity, anterior superior iliac spine (ASIS), anterior inferior iliac spine, and the iliac crest (Schiller et al. 2017). Avulsion fracture of the ASIS has been found to be commonly caused by running activity as seen in sports such as athletics, football and rugby (Anduaga et al. 2018).

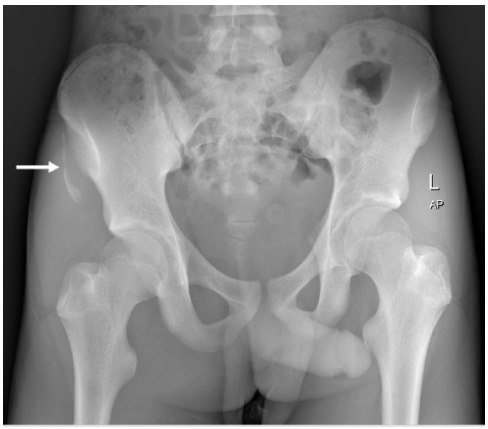

Figure 1: Plain pelvis radiograph showing avulsion fracture of right anterior superior iliac spine (white arrow).

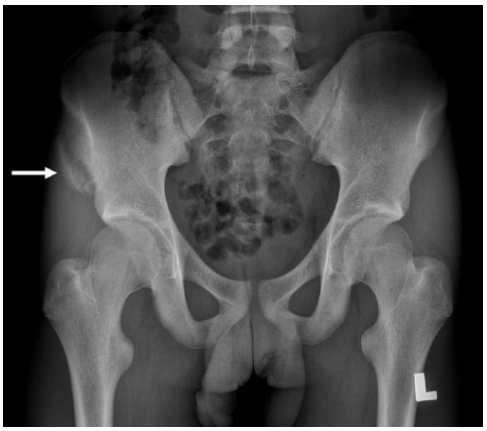

Figure 2: Plain pelvis radiograph two months post trauma showing callus formation over avulsed right anterior iliac spine fragment (white arrow).

Several cases describing avulsion fractures of the ASIS have been reported (Bendeddouche et al. 2010). However, there are no previous published reports from Malaysia. We hereby report a case of an adolescent male with a diagnosis of avulsion fracture of ASIS after sprinting in a race.

CASE REPORT

A 15-year-old male presented to the Emergency Department (ED) complaining of right hip pain that developed suddenly while he was sprinting in a race to cross the finishing line during his school's Sports Day. As soon as he crossed the finishing line, he claimed to have felt a popping sensation over his right hip, before he fell to the ground in pain. He was unable to ambulate afterwards as the movement of his right hip aggravated the pain and was subsequently transported by car to the ED by his father.

On arrival, he was transferred onto a trolley and triaged to the semi-critical area as he was unable to sit down due to severe right hip pain. He was brought in lying supine on the trolley, alert and hemodynamically stable with a pain score of 6/10. He was given intravenous Ketorolac for pain relief.

Physical examination revealed localised tenderness over the anterior aspect of his right pelvic region. There was no swelling or deformity noted over the right hip joint. No limb length discrepancy of the right leg was seen in comparison to the left lower limb. He was unable to perform active movements of the right hip due to pain and passive movements elicited tenderness. Neurovascular examination of the right lower limb was otherwise unremarkable with intact sensation, adequate volume of the distal pulses and a capillary refill time of less than two seconds.

Plain radiographs of the pelvis (Figure 1) and right hip were obtained which

revealed avulsion fracture of the right ASIS. He was immediately referred to the Orthopaedics team. A decision for conservative management was made and he was advised for bed rest and non-weight bearing ambulation. He was discharged from ED with oral analgesia. He was planned to be seen at the Orthopaedics Clinic for further follow-up. Subsequent reviews of the patient in clinic revealed improvement of pain and callus formation on repeated pelvis radiograph (Figure 2) at 2 months post injury. He was well, pain-free and mobilising unaided upon discharge from clinic.

DISCUSSION

This case involves a teenager sustaining avulsion fracture of the ASIS during a strenuous athletic activity. Avulsion fractures would occur when a fragment of bone is pulled away from the apophyses during sudden and forceful contraction of the attached muscles during sporting activities. Ossification of the pelvic apophyses occur during adolescence, with the apophyses potentially being the weakest part of the musculotendinous unit until the growing cartilage ossifies (Porr et al. 2011; Serbest et al. 2015). As such, the muscles, tendons and ligaments are stronger and more resilient than bone, and when subjected to large powerful forces, the apophyses are unable to resist. In the pelvis, these potential weak apophyseal sites are the anterior iliac spines, the ischial tuberosity, the iliac crest and the pubic symphysis (Bendeddouche et al. 2010).

A study of anterior iliac spine avulsion fractures among adolescent athletes by Anduaga et al. in 2018 reported a higher incidence among males (80%) in comparison to females (20%), likely due to the greater muscle masses in males. The mean age of incidence was 14.5 years, with older patients more likely to injure the ASIS and iliac crest due to the iliac apophyses ossifying last (Calderazzi et al. 2018). Mechanism of injury also differed according to the site of avulsion fractures, with running and sprinting commonly causing avulsion fractures of the ASIS, ischial tuberosity and iliac crest.

This patient was within the mean age of incidence, male, and the mechanism of injury in this patient's case is typical of avulsion fracture of the ASIS. He felt a popping sensation over his right hip while running followed by sudden onset of pain and inability to ambulate. The ASIS has been found to most prone to avulsion injury during running. At the ASIS, the sartorius muscle is inserted anteriorly while the tensor fascia lata muscle is inserted more laterally and posteriorly (White et al. 2002). The characteristic mechanism of avulsion fracture of the ASIS is the sartorius muscle pulling the ASIS apophysis anteroinferiorly during maximum flexion of the hip and extension of the knee (Rossi & Dragoni 2001; White et al. 2002). Another mechanism described by White et al. (2002) involved the tensor fascia lata muscle avulsing a larger fragment of the ASIS laterally, sustained commonly while swinging a bat with the hip in extension. Clinically, the patient would complain of sudden and acute pain at

the site of ASIS after a sudden abrupt movement, associated with an audible crack or popping sensation around the area of injury (Bendeddouche et al. 2010).

Physical examination often reveals localised pain on palpation of the ASIS, with thickening or a hematoma seldom present. Pain elicited on passive stretching of the concerned muscle is also a very suggestive sign. Rarely, meralgia paresthetic may occur, a neurological complication caused by the avulsed fragment stretching or compressing the lateral femoral cutaneous nerve (Bendeddouche et al. 2010).

The patient did not present with any other significant complications to warrant a computed tomography (CT) of the pelvis. Plain radiography of the pelvis is considered sufficient to confirm the diagnosis of avulsion fracture of the ASIS. However, CT of the pelvis might be necessary if other complications are present, for example a large hematoma or the presence of neurological impairment.

The patient received adequate analgesia and was advised for bed rest and non-weight bearing ambulation. Treatment for avulsion fractures of the pelvic apophyses is generally symptomatic and conservative. The recommencement of weight-bearing and physical activity would be gradual, with most patients reporting complete recovery without complications from two weeks to four months (Schiller et al. 2017; Bendeddouche et al. 2010). Surgical management by open reduction and internal fixation is seldom done but would be considered if the avulsed fragment is significantly displaced more than 2 cm or if the patient is a professional competitive athlete (Anduaga et al. 2018; Bendeddouche et al. 2010; White et al. 2002).

CONCLUSION

Avulsion fracture of the pelvic apophyses is rarely encountered but should always be considered among athletic adolescents especially if the mechanism of injury is highly suggestive. Sports induced injuries should not be easily dismissed as muscle strain without excluding avulsion fracture via plain radiography. Our role in the ED is to ensure an accurate diagnosis and administer adequate analgesia to relieve pain, with timely referral to the appropriate primary team.

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