



Avulsion Fracture of the Anterior Inferior Iliac Spine among Amateur Football Players

Amatör Futbol Oyuncusunda Anterior Inferior İliak Spine Avulsiyon Kırığı

Alper Çıraklı¹, Eyüp Çağatay Zengin¹, Hicabi Sezgin¹, Sevgi Çıraklı², Murat Erdoğan¹

¹Department of Orthopedics and Traumatology, Faculty of Medicine, Ondokuz Mayıs University, Samsun, Turkey

²Department of Pediatrics, Faculty of Medicine, Ondokuz Mayıs University, Samsun, Turkey

ABSTRACT

Avulsion fractures of the pelvic apophyses among athletes in the adolescent period are rare injuries caused by sudden contraction of the adhesive muscles. Avulsion fracture of the anterior inferior iliac spine (AIIS) in a 15-year-old amateur athlete is presented. The patient's history revealed a sudden pain in the right hip when shooting the ball while playing football on a synthetic field. Pelvic radiograph showed avulsion fracture of the AIIS. The patient was given conservative treatment consisting of an analgesic, anti-inflammatory treatment, and bed rest. The patient, who experienced pain relief following the medical treatment and bed rest for 3 weeks, was mobilised with hip exercises and on crutches. After the detection of union on radiographs taken at the end of the fourth week, he was mobilised with full weight bearing. The patient, who underwent an exercise programme, was allowed to participate in sporting activities at the end of the third month.

Keywords: Anterior inferior iliac spine, avulsion fracture, conservative treatment

Received: 20.10.2012 **Accepted:** 04.02.2013

ÖZET

Adölesan dönemde sporcularda pelvisteki apofizlerde avulsiyon kırıkları yapışan kasların ani kasılması sonucu meydana gelen nadir yaralanmalardır. Yazımızda 15 yaşındaki amatör sporcuda meydana gelen anterior inferior iliak spine (AIIS) avulsiyon kırığı sunuldu. Hikayesinde halı sahada top oynarken şut çeken hastanın ani sağ kalça ağrısı geliştiği öğrenildi. Çekilen pelvis radyografisinde AIIS lokalizasyonunda avulsiyon kırığı gözlemlendi. Hastaya analjezik, antienflamatuar tedavi ve yatak istirahatinden oluşan konservatif tedavi uygulandı. Üç hafta ilaç kullanımı ve yatak istirahatinden ardından ağrıları azalan hastaya kalça egzersizleri ve koltuk değneği ile mobilizasyona başlandı. Dördüncü haftanın sonunda çekilen radyografide kaynama bulguları gözlenen hasta desteksiz mobilize edildi. Egzersiz programı uygulanan hastaya üçüncü ayın sonunda sportif faaliyetlerine başlaması için izin verildi.

Anahtar Kelimeler: Anterior inferior iliak spine, avulsiyon kırığı, konservatif tedavi

Geliş Tarihi: 20.10.2012 **Kabul Tarihi:** 04.02.2013

Introduction

Avulsion fractures of the pelvis are rarely observed in adolescent athletes. These fractures occur in the growth cartilage of the apophyseal plates (1). Most apophyseal fractures of the pelvis are mainly observed in the anterior inferior iliac spine (AIIS), the anterior superior iliac spine (ASIS), and the ischial tuberosity; those of the iliac crest and the minor femoral trochanter are rarer (2). Avulsion fractures occur as a result of sudden, violent or unbalanced contractions of the muscles with insertions in these areas (3).

Case Report

Consent was obtained from the patient's family. A 15-year-old patient consulted the paediatric emergency department due to a sudden pain in the right hip occurring during a ball shot while playing football on a field. On physical examination, palpation elicited a poorly localised pain of the right hip. Movements of the right hip were painful. The pain was especially pronounced during flexion and extension, increasing with extension. Neuromotoric and vascular system examinations were normal. On the posteroanterior X-ray projection of the pelvis, a bone fragment in the AIIS appeared to be displaced to the right by approximately 1 cm (Figure 1). The patient was offered analgesic and anti-inflammatory drug treatment and bed rest in the acute stage. The pain abated after 3 weeks of drug treatment and bed rest, following which the patient was started on hip exercises and mobilisation

Address for Correspondence/Yazışma Adresi:

Dr. Alper Çıraklı, Clinic of Orthopedics and Traumatology, Omu Hospital, Kurupelit, Samsun, Turkey
Phone: +90 362 312 19 19-2361 E-mail: alperomu@gmail.com

©Copyright 2013 by Emergency Physicians Association of Turkey - Available online at www.jaemcr.com

©Telif Hakkı 2013 Acil Tıp Uzmanları Derneği - Makale metnine www.jaemcr.com web sayfasından ulaşılabilir.





Figure 1. A-P X-ray of the pelvis

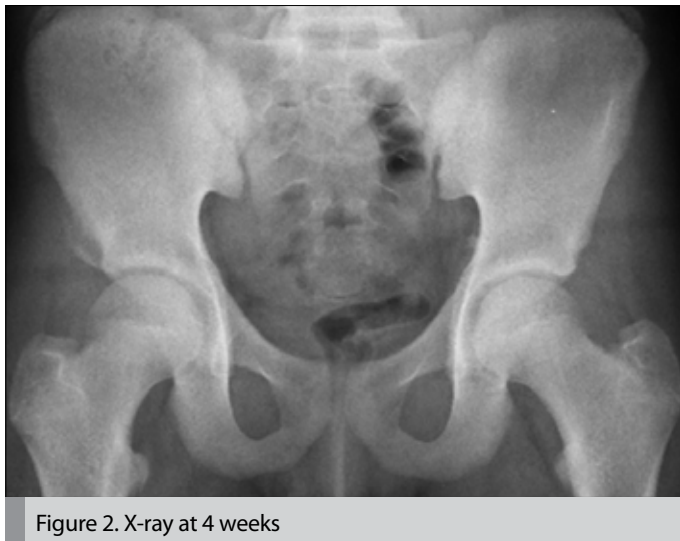


Figure 2. X-ray at 4 weeks

supported by crutches. Signs of bone repair were observed in the X-ray examination at the end of the fourth week and the patient was then mobilised without support (Figure 2). The patient was allowed to start athletic activity at the end of the third month, in addition to his exercise programme. The patient is continuing his athletic activities without either pain or loss of muscle strength.

Discussion

Apophyses are specialised ossification centres that in immature skeletal systems, provide peripheral growth of the bones adjacent to joints (1). Etymologically, an apophysis may describe any tuberosity or outgrowth on the bone (4). Such areas represent the insertion points of the muscles of muscle groups. Avulsion fractures generally occur as a result of sudden, violent or unbalanced contractions of these muscles with an insertion in these areas, and less frequently, they may be due to direct contact and repeated stress (3, 5).

Pelvis fractures are divided in four different groups in the Torode and Zieg classification, in which avulsion fractures are considered to be

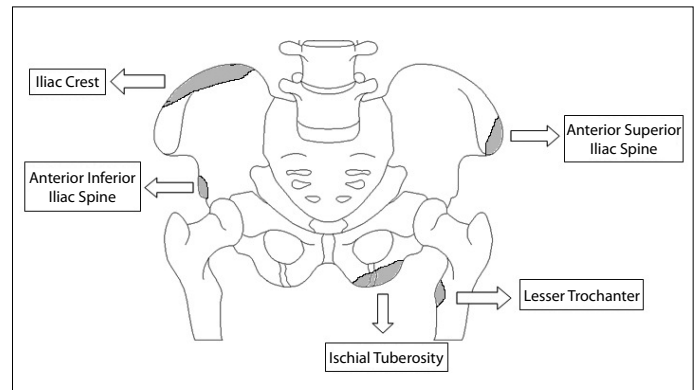


Figure 3. Localisation of avulsion fractures of the pelvis

Type 1 (2). Their incidence has been reported as approximately 4% (6). Most apophyseal fractures of the pelvis are observed in the AISIS with the insertion of the straight head of the rectus femoris, in the ASIS with the insertion of the sartorius and the tensor fasciae latae, and the ischial tuberosity with the hamstring and hip adductors; less frequent are those of the iliac crest, carrying the minor femoral trochanter with the iliopsoas insertion (Figure 3) (2, 6). AISIS fractures are less frequent than those of the ASIS (3). The avulsion fracture in the case presented here was a result of a sudden, powerful contraction of the straight head of the rectus femoris. This type of fracture generally develops with a hyperextended hip and flexion of the knee, while hitting a ball with the foot, running or jumping (6, 7). In the present case, it occurred during the act of shooting a ball with the foot.

The majority of these fractures result from sports injuries. They are generally seen shortly before the closure of the apophyses, at 11-17 years of age, more frequently in male patients (2, 6). Consistent with this, the case presented here was an adolescent male of 15 years of age who practised sports.

While in cases of AISIS avulsion patients have difficulties locating the fracture exactly because of its depth, patients with ASIS avulsion fractures are able to pinpoint the location (1). Passive movement increases pain due to the increase of tension on the muscles; in the case of an avulsion fracture of the tuberositas ischii, the pain manifests itself during flexion and abduction of the hip, while in those of the AISIS, ASIS and trochanter, minor extension is more painful (2). In the present case, the localisation of the fracture was not felt exactly and the pain increased on extension.

In most cases, an X-ray assessment of the pelvis in anteroposterior projection is sufficient for the diagnosis. Comparison with the contralateral image is useful in order to confirm the diagnosis and avoid unnecessary additional imaging procedures (2). The diagnosis was established directly by X-ray assessment in our patient, with no need for other imaging. This protected the patient from unnecessary radiation damage and unnecessary expense due to additional examinations.

In the overwhelming majority of cases, conservative treatment of pelvic avulsion fractures is successful (1, 2). Surgical repair is to be considered in patients who need to return soon to their former activities,

those with a dislocation of 2 cm or more, and those in whom non-union or exostosis is observed (3). Conservative treatment consists of analgesic and anti-inflammatory drug treatment and bed rest in the acute stage, followed within a few weeks by exercise and mobilisation with crutches, depending on the pain level (1). Full healing is reported to occur in 3 weeks to 4 months from the date of fracture (3). Many publications indicate that patients fully recover their function. Possible complications are chronic pain, loss of muscular strength, and nonunion. Full healing of the fracture should be ascertained before fully mobilising the patient and exercise to build up muscle strength must be applied. The most unfavourable results, including those with nonunion, are reported in avulsion fractures of the ischial tuberosity.

Conclusion

Anterior inferior iliac spine avulsion fractures are rarely observed fractures in adolescents who practise sports, generally occurring as a result of sudden, violent or unbalanced contractions of the rectus femoris muscle. These injuries easily escape attention; a delay in diagnosis may result in chronic pain and reduced sports performance, therefore an avulsion fracture should be considered as a possibility in cases with a typical history and evaluated by comparative, bilateral X-ray. Advanced imaging procedures (computerised tomography, magnetic resonance, ultrasound, or bone scintigraphy) may be used in uncertain cases (1, 5).

Conflict of Interest

No conflict of interest was declared by the authors.

Peer-review: Externally peer-reviewed.

Author Contributions

Concept - A.Ç., S.Ç.; Design - A.Ç.; Supervision - M.E.; Funding - A.Ç.; Materials - S.Ç.; Data Collection and/or Processing - A.Ç., E.Ç.Z., H.S.,

S.Ç.; Analysis and/or Interpretation - M.E.; Literature Review - A.Ç., E.Ç.Z., H.S., S.Ç.; Writer - A.Ç.; Critical Review - M.E.

Çıkar Çatışması

Yazarlar herhangi bir çıkar çatışması bildirmemişlerdir.

Hakem değerlendirmesi: Dış bağımsız.

Yazar Katkıları

Fikir - A.Ç., S.Ç.; Tasarım - A.Ç.; Denetleme - M.E.; Kaynaklar - A.Ç.; Malzemeler - S.Ç.; Veri toplanması ve/veya işlemesi - A.Ç., E.Ç.Z., H.S., S.Ç.; Analiz ve/veya yorum - M.E.; Literatür taraması - A.Ç., E.Ç.Z., H.S., S.Ç.; Yazıyı yazan - A.Ç.; Eleştirel İnceleme - M.E.

References

1. Tüzüner T, Ozturan KE, Karaca E, Ulgür M. [Avulsion fracture of the anterior superior iliac spine in a volleyball player]. *Acta Orthop Traumatol Turc* 2003; 37: 340-3.
2. Herring J.A. Tachdjian's Pediatric Orthopedics. Editor of the Translation: Prof. Dr. Tuncay Centel. 4th Edition, Saunders Elsevier Vol. 3. Section 43. 2012; 2573-97.
3. Atalar H, Kayaoğlu E, Yavuz OY, Selek H, Uraş İ. Avulsion fracture of the anterior inferior iliac spine. *Ulus Travma Acil Cerrahi Derg* 2007; 13: 322-5.
4. Kocatürk U. Commented Dictionary of Medical Terms, 9th Edition. Gaye İç ve Dış Ticaret A.Ş. Gaye Matbaacılık-Ankara 2000; 62.
5. Sanders TG, Zlatkin MB. Avulsion injuries of the pelvis. *Semin Musculoskeletal Radiol* 2008; 12: 42-53. [CrossRef]
6. Beaty JH, Kasser JR. Rockwood and Wilkins: Fractures in Children. Editors of the Translation: Prof. Dr. Uğur Şaylı, Doç. Dr. Cemil Yıldız. 6th Edition, Lippincott Williams & Wilkins Section 4. 2011; 833-61.
7. Rossi F, Dragoni S. Acute avulsion fractures of the pelvis in adolescent competitive athletes: prevalence, location and sport distribution of 203 cases collected. *Skeletal Radiol* 2001; 30: 127-31. [CrossRef]