

Lesser Trochanter Avulsion: A Rare Cause of Groin Pain

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Abstract: *Apophyseal avulsion injuries are peculiar injuries seen in the adolescent age group. They are caused by sudden contraction of a muscle attached to the epiphysis and a cause of pain and concern in patient and relatives. Apophyseal injuries of the pelvis and proximal femur are uncommon. We report a case of a 15 year old boy who presented to us with groin pain and was diagnosed to have had an avulsion of the lesser trochanter while sprinting.*

Keywords: Lesser trochanter avulsion, apophysis, groin pain

1. Introduction

The apophysis is a secondary centre of ossification contributing to a change in shape or size of the bone, but not its length [1]. Milch [2] suggested that injuries to the apophysis were similar in nature to epiphyseal injuries and he called them apophysiolyis. A traction epiphysis is the site of the insertion or origin of a major muscle or muscle group, and its weakest point is the epiphyseal plate because the Sharpey's fibres attaching the muscle to the epiphysis are stronger than the junction of cells between the calcified and uncalcified epiphysis [3]. This is the basis of avulsion injuries of the apophysis due to sudden forceful muscle contraction.

Apophyseal avulsion fractures of the hip and pelvis are injuries that usually occur in the adolescent athlete. If not properly diagnosed and treated, these injuries can be debilitating to an adolescent athlete. An increase of adolescent participation in competitive sporting activities and better musculoskeletal imaging techniques has led to an increased awareness of these injuries by the medical community.

We report a case of a 15 year boy who suddenly developed groin pain while sprinting, the cause of which turned out to be avulsed lesser trochanter.

2. Case Report

A 15 year old schoolboy presented to our out patient department with a two day history of pain in his left groin and a limp. His symptoms had started acutely while sprinting recreationally two days ago. He had been to a local doctor who treated him conservatively with rest, analgesics and ice application for a presumed muscle strain. However as his symptoms persisted he was brought to our OPD.

On examination, the boy has an antalgic limping gait. There was tenderness in the groin and medial side of upper thigh without any external evidence of trauma. Hip movements were painful especially flexion. The patient also had weakness of hip flexion. There was no distal neurovascular deficit. The patient was vitally stable and the general examination was unremarkable.

Radiographs of pelvis with both hips [Figure 1] revealed an

avulsion of the left lesser trochanter with proximal migration by about 1 cm.

We treated the boy conservatively with analgesics and non-weight bearing mobilisation with crutches for 2 weeks followed by gradual weight bearing as tolerated. Passive hip mobilisation and muscle strengthening exercises were started as soon as pain subsided. The boy could weight bear completely by 4 weeks and by 8 weeks resumed normal day to day activities. The only complaint at 8 weeks was pain felt in the groin on sitting cross legged for prolonged periods of time. A radiograph taken at 8 weeks revealed no signs of union, and there was no further migration of the avulsed lesser trochanter. By 12 weeks the boy was completely free of symptoms and had resumed recreational sporting activities.

3. Discussion

Six apophyseal sites that can sustain avulsion fractures have been identified in the pelvis and proximal femur.[4] The more common sites of injury in adolescent athletes are the ischial tuberosity (as a result of excessive pull from the hamstrings), the anterior inferior iliac spine (from the rectus femoris), and the anterior superior iliac spine (from the sartorius). Avulsion fractures of the lesser trochanter, greater trochanter, and iliac crest are less common.[5] Although not as common as other avulsions in the pelvis, lesser trochanter avulsion causes considerable pain and decreased function.

In adults avulsions of the lesser trochanter are rare and are virtually always secondary to metastatic bone disease [6].The main cause of avulsion of the lesser trochanter in adolescents is forceful contraction of the iliopsoas tendon during hip flexion. The excessive stress concentration at the site of the iliopsoas muscle leads to a tensile failure of the apophysis of the lesser trochanter. These injuries are usually seen between the ages of seven and sixteen years, most commonly occurring at fourteen years of age.[7] Due to fusion of the lesser trochanteric apophysis, the age-limit for these injuries occurs at eighteen or nineteen years [4, 8].

The diagnosis may be suggested by a history of sudden onset of groin pain while sprinting in an adolescent. However, thorough workup for other causes of paediatric hip pathology must be carried out to avoid the devastating sequelae of undiagnosed septic arthritis, slipped capital femoral epiphysis and Perthes' disease in this age group.

Volume 5 Issue 7, July 2016

www.ijsr.net

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Groin pain and limp with little external evidence of trauma is the most frequent presenting scenario. These patients may mimic an acute episode of apophysitis or tendonitis. Both patients with apophysitis/ tendonitis and avulsions fractures may have tenderness and swelling at the site of injury. However patients with apophysitis/ tendonitis usually do not have significant bruising or ecchymosis, which may be present with an acute fracture. Patients with an apophyseal avulsion fracture should be able to recall a specific event that triggered the pain compared to apophysitis/ tendonitis, which has a more insidious onset of pain.[7] Clinical examination generally reveals local tenderness, antalgic gait and weakness of flexion of hip.

Radiographic views of the proximal femur will demonstrate the avulsed fragment of the lesser trochanter and is classified as a Salter-Harris I fracture. The fragment is displaced proximally by the pull of the iliopsoas muscle. However, most apophyseal avulsion fractures of the lesser trochanter do not displace significantly as the periosteum is usually in continuity with the fragment [9]. A femoral metaphysic bone flake may accompany the avulsed lesser trochanter, particularly in patients reaching skeletal maturity when the growth plate becomes less active [4]. Radiographs may appear normal in avulsion fractures of unossified bone. If the diagnosis is suspected, further assessment with ultrasonography or magnetic resonance imaging may be helpful.[10]

Treatment is initially symptomatic with protected weight-bearing on crutches for 3 to 4 weeks and analgesia as required. Early return to sports has been associated with risk of recurrent injury and chronic groin pain. Hence, sporting activities should be avoided until healing has completed which could take up to 12 weeks.[7] Many authors have described displacement of >2 cm, painful non-union, exostosis and inability to return to sport as indications for surgery.[11-16]

McKinney and Nelson used displacement as a tool to classify the avulsion fractures and they felt that this helped them in determining the need for surgery [17] (Table I).

Table 1: Classification of avulsion fractures [17]

Type 1 : Undisplaced
Type 2 : <2 cm
Type 3 : >2 cm
Type 4 : Non-union

Surgical treatment consists of open reduction and internal fixation with a screw. Khemka et al. have reported favourable outcomes using arthroscopically assisted fixation of lesser trochanter.[18]

4. Conclusion

The approach to the evaluation of musculoskeletal injuries in adolescents requires consideration of the peculiarities of the immature skeleton. Children can sustain avulsion fractures from mechanisms that typically cause sprains in adults. The treatment of such injuries is predominantly conservative

with certain specific indications for surgery.



Figure 1: Anteroposterior x-ray of pelvis with both hips showing avulsion of the left lesser trochanter.

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