

Avulsion fracture of the lesser trochanter apophysis

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Abstract

Avulsion injuries of the apophysis in adolescents are found most commonly in the pelvis and proximal femur. Among them avulsion fracture of the lesser trochanter apophysis is relatively an uncommon injury. We report a 15 year old patient with an avulsion fracture of the lesser trochanter apophysis on left side who sustained it with a forceful extension of the left hip. Conservative management has been the most popular treatment modality, and we decided to proceed with non-surgical management of the injury since the displacement was not significant. Surgical fixation is indicated when there is a significant displacement or if the patient has higher functional demands.

Introduction

Apophysis is a bony process, with an independent centre of ossification and associated growth plate, serving as attachment for a ligament or tendon. Avulsion fractures of the apophysis are rare injuries caused by sudden, vigorous muscle contraction. As the insertion of the tendon to the cortex of the bone is stronger than the growth plate, a forceful muscle contraction can cause disruption of the growth plate when the tendon pulls off the bone fragment where it is anchored.

Avulsion injuries of the apophysis in adolescents are found most commonly in the pelvis and proximal femur. The most common reported site is avulsion of the ischial tuberosity, followed by the anterior superior iliac spine, anterior inferior iliac spine and rarely avulsion of the greater trochanter and lesser trochanter of the femur [1] (Figure 1).

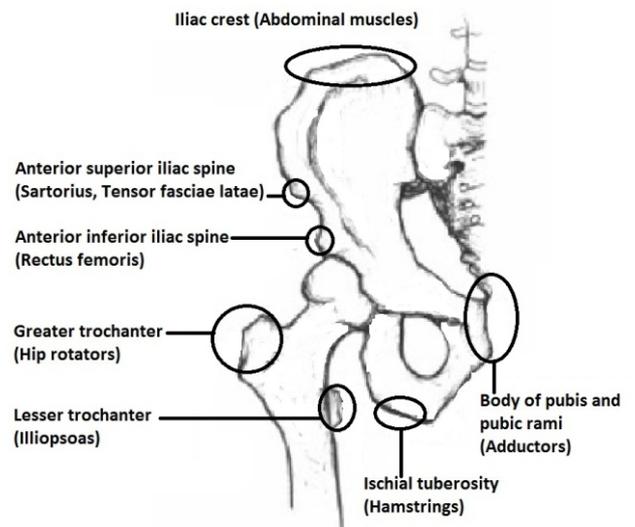


Figure 1. Apophyseal sites in the pelvis and proximal femur.

Case presentation

A 15 year old boy presented with a sudden onset of right side groin pain while running after a ball in a game of cricket. He experienced this when his right foot stuck in a pit hole leading to a forcible extension of the hip and he was fallen on ground. He could not walk following the incidence and experienced a left side groin pain on standing. On examination there was a localized tenderness at the inner upper thigh just below the mid inguinal point, but there was no external swelling over the region. He could not perform an active flexion of the hip especially in a seated posture, but rest of the hip and knee movements were normal. Passive movements of the left hip was pain free. In the accident and emergency services unit, we performed X-ray pelvis antero-posterior view including both hip joints. An avulsion fracture of the Left lesser trochanter apophysis was evident in the X-ray (Figure 2). We decided on non-surgical management of the injury since the displacement of the avulsed fragment was insignificant.

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Figure 2. Pelvis antero-posterior view. White arrow points to the avulsion fracture of the left lesser trochanter apophysis.

Discussion

Inability to raise the thigh when in a sitting position which is known as positive 'Ludloff sign' indicates pathology related to the iliopsoas tendon. In adolescents this may indicate an avulsion injury of the lesser trochanter but in adults this may be due to tendinitis [2]. Avulsion fractures may not be always evident in radiographs, especially when the bones are unossified. In such instances one should have a high degree of suspicion and ultrasonography or magnetic resonance imaging should be used to confirm the diagnosis [5]. Apophyseal avulsion of the lesser trochanter can be classified as a Salter-Harris type I fracture. Even though the fragment is displaced proximally by the pull of the iliopsoas muscle, mostly the displacement is not significant as the periosteum is usually in continuity with the fragment [4]. Conservative management with an anti-inflammatory medications and non-weight bearing for a period of 6 weeks, has been the most popular mode of treatment for the avulsion fractures of the lesser trochanter. Immobilization in a spica-cast has not been proved to be of an additional benefit in the conservative approach [3, 5]. It has been suggested that surgical intervention should be considered with fragment displacement of greater than 2 cm or if early return to sports is indicated, but the fragment should be of sufficient size to hold hardware. According to the literature the complications of Conservative management are non-union and exostosis which will

warrant a surgical intervention [3, 4]. According to McKinney and Nelson based on the displacement, avulsion fractures of apophyses can be classified into four types. Even they believed that surgery as the best mode of treatment for type 3 and 4 injuries [6] (Table I). In the recent literature Khemka et al has reported arthroscopic fixation of avulsion fractures of the lesser trochanter when it is still in the apophyseal stage [3].

Type I	Undisplaced
Type II	< 2 cm
Type III	> 2 cm
Type IV	Non-union

Table I. Apophyseal avulsion fracture classification [6]

Conclusion

Among all the apophyseal avulsion fractures in the pelvis and proximal femur, avulsion fracture of the lesser trochanter apophysis are rare. Conservative management has been the most popular treatment modality, but when there is a significant displacement or in a functionally demanding patient, surgery is indicated. Non-union or exostosis formation would be the most common complications of conservative management which need to be treated surgically.

References

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Key Points:

- Apophyseal avulsion fracture of the lesser trochanter is a relatively uncommon injury in a skeletally immature patient and can be the result of forceful hyper-extension of the hip joint.
 - In an adolescent with Ludloff sign (inability to flex the hip in seated posture) following running or any other activity with hyper extension of the hip and an acute onset of inguinal pain, one should exclude a lesser trochanter avulsion injury.
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