

Stress Fracture of the Lesser Trochanter: A Case Report and Review of the Literature

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ABSTRACT

Stress fractures are common sports-related injury, but rare in the lesser trochanter. Fractures of the lesser trochanter are usually insufficiency fractures with malignancy as a common cause. We present a case of stress fracture of the lesser trochanter in a 50-year old female and review the literature.

Keywords: Fracture, lesser trochanter, stress

Fracturas del Trocánter Menor Debidas al Estrés: Reporte de Caso y Revisión de la Literatura

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RESUMEN

Las fracturas por estrés son lesiones comunes relacionadas con los deportes, pero raras en el trocánter menor. Las fracturas del trocánter menor suelen ser fracturas de insuficiencia con malignidad como causa común. Presentamos un caso de fractura del trocánter menor en una mujer de 50 años de edad, y revisamos la literatura.

Palabras claves: Fractura, trocánter menor, estrés

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INTRODUCTION

Insufficiency fractures are relatively uncommon. The aetiology of these includes malignancy and stress fracture. The lesser trochanter is a relatively uncommon site for stress fracture, with only a few cases described in the literature. We report a case of stress fracture of the lesser trochanter in a 50-year old female and review the literature.

CASE REPORT

A 50-year old fit and well female presented to her general practitioner with a six-week history of right-hip pain radiating to the knee. She had an antalgic gait with exacerbation of pain on internal rotation and adduction of the hip. The range of movements of the right-hip was relatively preserved. The left hip and both knees were unremarkable. She had tried analgesics without any significant benefit.

Radiographs of the right-hip were performed which did not reveal any abnormality. On magnetic resonance imaging

(MRI), there was extensive oedema within the right proximal femur with a transverse incomplete fracture involving the lesser trochanter extending into the proximal femur with extensive osseous oedema (Fig. 1).

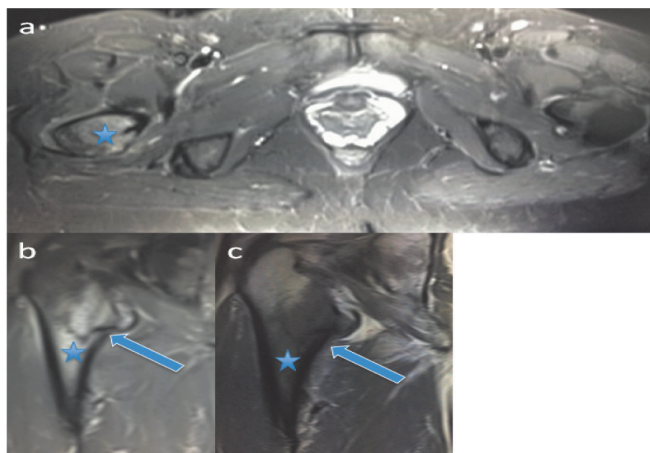


Fig. 1: STIR axial (a), STIR coronal (b) and T1 coronal (c) showing an incomplete fracture (arrow) involving the proximal femur with extension into the lesser trochanter and marked osseous oedema (*).

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Bone scan demonstrated increased tracer uptake within the right proximal femur. No other abnormal area of radio-tracer uptake was noted (Fig. 2). Computed tomography (CT) of the chest, abdomen and pelvis, as well as mammograms was unremarkable. There was irregularity of the right lesser trochanter at the site of the fracture (Fig. 3).

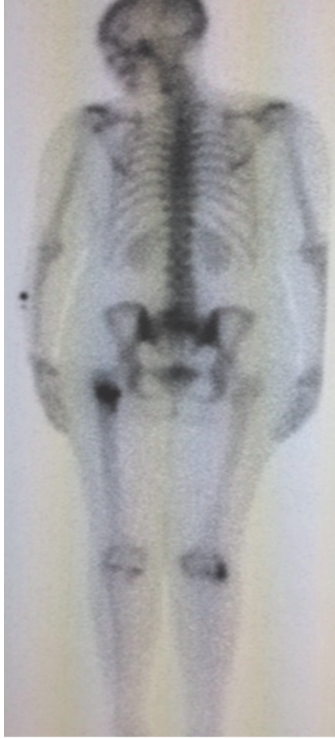


Fig. 2: Bone scan demonstrating isolated increased uptake in the right proximal femur.

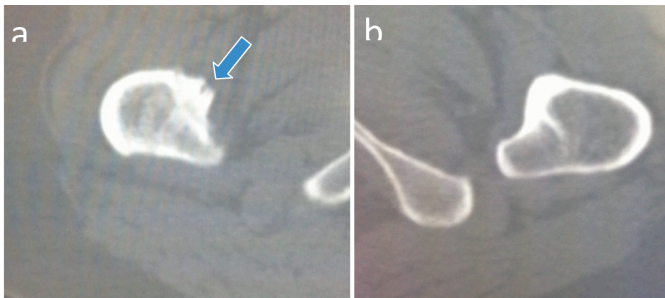


Fig. 3: CT axial scan (a) showing irregularity of the lesser trochanter and (b) demonstrating normal lesser trochanter.

She was discussed with an orthopaedic oncology multi-disciplinary team at a tertiary referral centre and diagnosis of stress fracture was made. She was presented to the orthopaedic team with increasing right hip pain. Radiographs were performed which revealed progression of incomplete fracture involving the proximal femur to a complete undisplaced transverse fracture (Fig. 4). At this stage, a history of recent extensive exercise regimen with an aim to lose weight over the last six months was deciphered. She was managed with an intra-

medullary nail with good results (Fig. 5). Medullary reamings were taken during the procedure and sent for histology which was unremarkable.



Fig. 4: Frontal radiograph of the right-hip demonstrating extension of incomplete fracture of proximal femur to a complete un-displaced fracture.



Fig. 5: Frontal radiograph showing an intramedullary nail for proximal femoral fracture.

DISCUSSION

Fractures occur when mechanical forces exceed the structural integrity of bone. Non-traumatic fractures result from low impact forces and can be broadly divided into those involving abnormal bone or normal bone (1). When bone is abnormal (genetics, structural abnormality, cancer infection), fractures that occur are termed as insufficiency fractures. In stress fractures, the bone is normal; however, there is repetitive or prolonged stress on the bone (2).

Existing theories of stress fracture development are: 1) increased muscular force applied to a bony landmark or attachment; 2) muscle fatigue, which impairs muscular shock absorbing property/function, resulting in increased mechanical stress applied to bone and 3) cyclical overload of bone. Most of the recognized risk factors contribute to these theories. These include repetitive stresses, sudden increase in training (either in distance, intensity or frequency), change in running surface or terrain, inappropriate footwear, abnormalities in the bone, nutrition and hormones (3–6). Most of these factors contribute to the theories mentioned above. Some studies have suggested prolonged use of alendronate as a contributory factor for these fractures (7, 8).

Stress fractures are common injuries with repetitive activities such as in athletes, dancers and military recruits. Often, these are seen in the lower limbs, particularly toes, fibula and metatarsal bones. Those involving upper limbs and ribs have also been described in baseball players, tennis players and rowers (2, 9).

Lesser trochanter fractures usually occur with other fractures (greater trochanter and femoral neck). The anatomical location and surrounding musculature of the lesser trochanter gives protection from direct trauma, making isolated lesser trochanter fractures rare (10). Hence, on-traumatic lesser trochanter fractures are uncommon (11, 12). Indirect trauma can be exerted by the ilio-psoas muscle, resulting in avulsion fractures in un-fused growth plates in the younger population (10, 13).

In the index patient, the bone density and bone profile were normal and she was not post-menopausal. The initial fracture was incomplete with marked osseous oedema involving the lesser trochanter. She had a six-month history of exercise regimen with an aim to lose weight. This had resulted in repetitive stress on normal bone. The exercise regimen involved yoga, a classical Indian form of exercise. In yoga, there are several exercises (involving flexion and adduction of hips) which cause increased stress on the ilio-psoas which is attached to the lesser trochanter. This is likely to be the cause for the stress fracture in our case. This aspect of the history was not proffered during the initial presentation, raising the possibility of insufficiency fracture. Radiological investigations including bone scan and CT did not reveal any sinister features.

There was progression of fracture from incomplete to complete fracture, which is presumed to be due to continuing stress on the hip during the duration between the two presentations. As the fracture was complete, this was managed successfully with an intra-medullary nail.

CONCLUSION

Stress fracture of the lesser trochanter is extremely rare. Eliciting a detailed history is essential and a high index of suspicion is required to diagnose and manage appropriately.

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