

STRESS FRACTURE OF FEMORAL DYAPHYSIS MIMICS  
OSTEOSARCOMA

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**ABSTRACT**

Stress fractures of the femur are relatively uncommon. They can mimic other pathological entities, such as tumors, and can be the source of some diagnostic problems. The cause of stress fractures is often multifactorial and various modifiable and non-modifiable factors have been proposed to play a role: ethnicity, high bone turnover, vitamin D insufficiency, nicotine and alcohol abuse, steroid use, low bone density, low adult weight, anorexia, or bisphosphonate therapy. Hence they might be missed in other groups of patients that present with anterior thigh pain without history of significant trauma.

We report a stress fracture that mimicked tumoral process of the long bone, but patho-histological analysis revealed that it was a non-specific inflammation.

Symptoms often mislead the clinicians, and because they mimic other conditions, a high index of suspicion/indication is required to uncover the true diagnosis.

The importance of early detection and management needs to be conveyed, with a view to prevent complete fracture and bonedisplacement or, as in our reported case, to avoid un-necessary exploration.

**Key words:** stress fracture, osteosarcoma, femoral dyaphysis fracture

**INTRODUCTION**

Stress fractures of the femur are relatively uncommon, and data from the published literature suggest that they constitute only around 2,8- 7% of all sport related stress fractures[1-3]. They can mimic other pathological conditions such as tumors, and can be the source of some diagnostic problems.

The cause of stress fractures is often multifactorial and various modifiable and non-modifiable factors have been proposed to play a role: ethnicity (being Caucasian), high bone turnover, vitamin D insufficiency, nicotine and alcohol abuse, steroid use, low bone density, low adult weight, anorexia, or bisphosphonate therapy[4]. Hence they might be missed in other groups of patients that present with anterior thigh pain without history of significant trauma[5]. However it should be taken into consideration as a differential diagnosis because any delay in treatment may lead to potentially serious complications associated with secondary displacement[6].

We report a stress fracture that mimicked tumor-like lesion of the long bone, but

patho-histological analysis subsequently revealed that it was a non-specific inflammation.

**CASE REPORT**

A 41-year-old man, previously healthy and physically active taxi driver, presented to our clinic with history of left thigh pain, without trauma. The pain present only upon weight bearing. Medical history revealed that he had not lost weight in the last month, however in the last year he has had occasional back pain, which prevented him from working. He was treated mainly with anti-inflammatory non-steroidal medications in the emergency room.

During the physical examination, the patient walked without crutches, had a positive Laseq sign to the right at 60 °, full range of motion in both hips, and tenderness in the anterior and medial part of the thigh. He presented no neurological signs.

He was discharged with anti-inflammatory medication and a prescription for an elective CT of L/S spine. After 5 days, the patient returned to our clinic with a CT

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of L/S spine with indicated DH of L4 / L5 and L5 / S1 grade I, and worsening of pain despite the prescribed medication. We next prescribed X-ray of left thigh (Figure 1).



Figure 1. X-ray of left thigh.

Repeated anamnestic examination does not provide information on previous fractures, bone disease, rheumatic disease, or use of the bisphosphonates. His alkaline phosphatase was within normal limits, and only presented with an elevated leukocyte levels of 10.9.



Figure 2. Normal physiology using X-ray.

It was decided to do a biopsy for suspected osteosarcoma and tissue and bone swab for suspected osteomyelitis. A 17x15x8mm clip was biopsied and sent for analysis, and the wound and surrounding tissue swab had to be treated with an antibiotic.

Pathologically, it was confirmed that it was a bone callus without admixture of neoplastic cells and the wound and surrounding tissue swab were sterile.

The patient was discharged with a diagnosis of left thigh stress fracture with anti-inflammatory medication prescription and recommendation for walking using crutches without weight bearing on left leg for a period of three months. After three months, the patient returned to our clinic without subjective problems, as presented in the x-ray image (Figure 2).

## DISCUSSION AND CONCLUSIONS

Stress fractures are characterised as overuse injuries of the bone and may be defined as a partial or complete fracture that results from repetitive application of stress or a loss of strength than that required to fracture bone in a single load [7]. Imbalance between the bone formation and resorption is a result of excessive repetitive load.

Such fractures may be one of two types: an insufficiency fracture or a fatigue fracture. Insufficiency fractures are the by-products of insufficient bone structure, while fatigue fractures result from overusing or overworking [8,9]. Femoral diaphysis stress fractures are classified as compression and tension fractures, and as displaced and non-displaced ones [10]. Compression fractures occur on medial femoral diaphysis and tension fractures occur at the lateral femoral diaphysis. Compression fractures are the most common ones and if non-displaced, can be treated non-operatively with non-weight bearing [11]. Tension fractures are associated with greater morbidity and are treated operatively.

The most important diagnostic study is a plain radiograph in two planes. However, in early stages, the sensitivity may be as low as 10%, rising to 30-70% at the follow-up [12]. The first radiographic feature is the „grey cortex sign“ an area of decreased density in the cortex [13]. Later, localised periosteal reactions are frequent indicators for stress fractures [14].

Most authors advise magnetic resonance imaging (MRI), as a number of studies have shown that MRI has high sensitivity and specificity. However even with MRI, it is, in some cases, difficult to differentiate the stress fractures from infections, bone infarctions or neoplastic lesions [15,16].

In contrast, bone scintigraphy has a relatively high sensitivity in the early stages, since a tracer uptake may be seen already at 6-72 h after the onset of symptoms [17]. However, because of its low specificity, we could not exclude the events with this method of differential diagnosis, by bone scanning alone. We therefore performed a biopsy and histological examinations. In some cases, a biopsy of the callus can affect fracture healing and may

be misinterpreted as a neoplastic proces [18].

We can conclude that symptoms of stress fracture can often mislead the clinicians, because they mimic other conditions, thus a high index of suspicion and awareness is required to reveal the true diagnosis of the condition. We have to emphasize the importance of early detection and management with a view to prevent complete fracture and bony displacement or, like in our case study, to avoid unnecessary explorations that may be painful and expensive. The most important factor is a frequent follow up with regular radiographic reviews and awareness of this rare form of fracture.

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