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Stress and Insufficiency Fractures

These fractures often do not have a definite history of trauma and can be silent, missed and may mimic other entities ranging from infection to tumor. Diagnosing them accurately and understanding the clinical situation are both very important to ensure that they are treated correctly.

Stress Fracture: This is a fracture that occurs due to abnormal stress in normal bone. It is commonly seen in the weeks before the Mumbai Marathon in January, when runners often overdo their practice runs and land up with stress injuries and fractures (Fig. 1).

Insufficiency Fracture: This occurs due to normal stress in abnormal bone. The abnormal bone is usually osteoporotic or osteomalacic (Fig. 2) but sometimes may be weakened due to tumor infiltration or hematologic disease. One recently described insufficiency fracture is due to long term bisphosphonate therapy, typically seen along the tensile aspect of the proximal femur (Fig. 3).

Fig. 1: Stress fractures. Two examples. The first on the left is a patient with a stress fracture of the tibia with callus formation. The second on the right is a stress fracture of the 3rd metatarsal bone also called March fracture. Both occurred in runners.

At a glance

- Stress fractures occur due to abnormal stress to normal bone.
- Insufficiency fractures occur to normal stress to abnormal bone.
- Tumor and infection are the two differentials.

Fig. 2: Insufficiency fractures. Three examples. The first on the left is a patient with osteomalacia and a Looser's zone (another name for an insufficiency fracture in patients with osteomalacia) in the left proximal femur along the medial cortex. Note the widening of the physeal plates (green arrow), which is diagnostic of osteomalacia/rickets. The second patient on the right (upper panel) is a 66-years old with osteoporosis and a tibial insufficiency fracture, which was initially mistaken for tumor and had been referred for a biopsy, which was not necessary. The third patient on the right (lower panel) has a typical osteoporosis related insufficiency fracture of the right femoral neck.

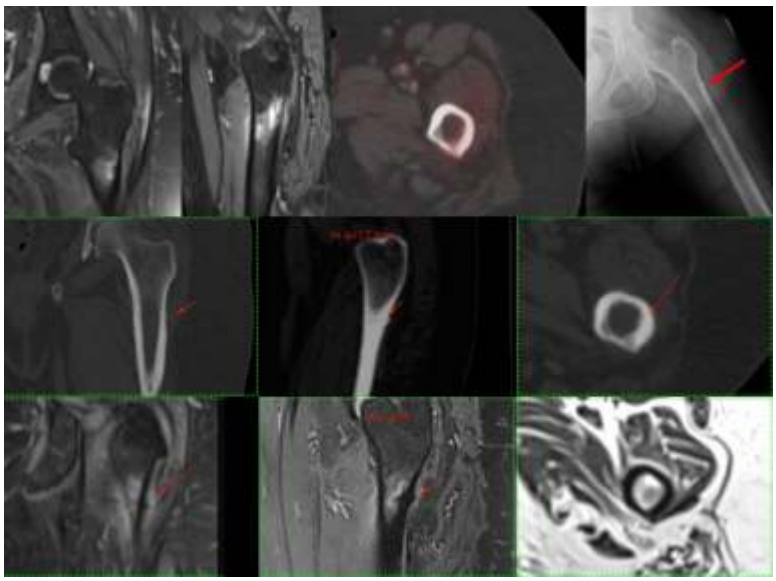

Fig. 3: Bisphosphonate induced insufficiency fracture. This is an 86-years old lady who presented with left hip pain. The classic bump along the lateral cortex of the proximal left femur (red arrow) which is diagnostic of this entity was missed and she underwent MRI and PET/CT and was referred for a CT guided biopsy, which was not necessary.

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