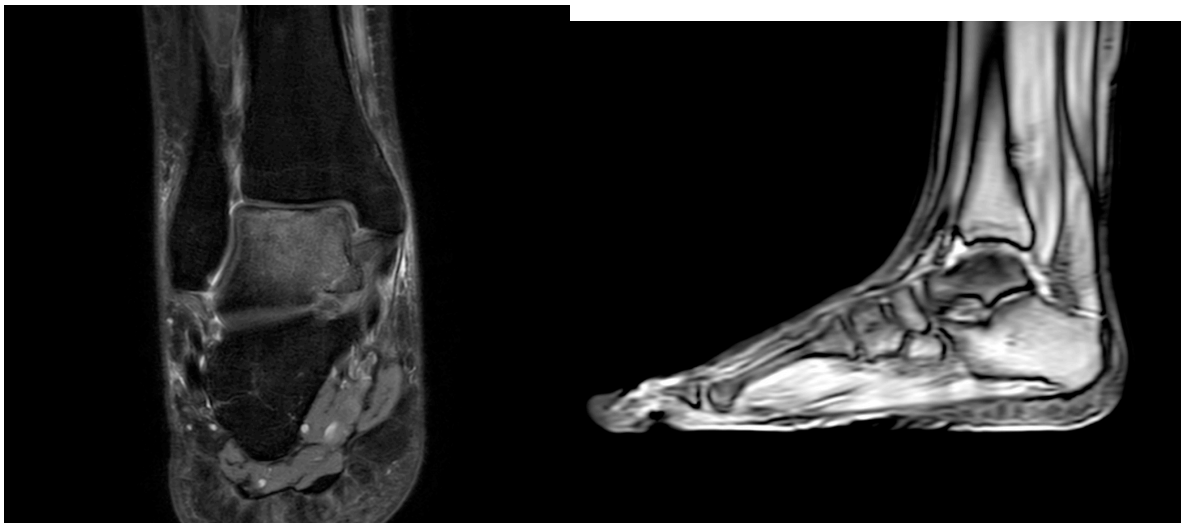
CASE 62

56 Y old woman, was getting up from crouched position noted sudden onset of pain in the R foot. PMH: NAD. Inflammatory markers negative. Treated as soft tissue injury. Unresolved pain for over 6 wks and pain on weight bearing. MRI



? Differential Diagnosis

Diagnosis TRANSIENT OSTEOPOROSIS OF TALUS WITH SUCCHONDRAL STRESS REACTION

INTRODUCTION

Bone marrow edema has many causes and has been increasingly diagnosed because of increase use of MRI for foot conditions. The differential diagnosis can be quite extensive including trauma, osteochondral defects, neoplasia, biomechanical stress, inflammation, infection, neuropathy, osteonecrosis, metabolic or rheumatic conditions, degenerative disease and congenital or a tarsal coalition.

DEMOGRAPHIC

Average age 54

Sex: 2/3 rd in Females

The average duration of symptoms prior to presentation was 22 weeks

The most common bone affected was the talus (56%).

More than one bone was affected in 8 (44%) patients

On follow up over 2 years: some [mainly female] may develop generalised osteoporosis.

TYPES OF BONE OEDEMA

1. **Localised lesions:** Most commonly bone marrow edema is traumatic in etiology. This traumatic marrow edema occurs in predictable locations and tends to resolve gradually based on the severity, extent, and treatment of the injury. MRI after an inversion injury at the ankle frequently shows bony contusions involving the medial malleolus and anterior talus, and an eversion injury often manifests as localised bone marrow edema in the distal fibula.
2. **Diffuse bone oedema**: Complications of traumatic injury also may cause generalised bone marrow edema patterns, as is occasionally seen in reflex sympathetic dystrophy.
3. **Migratory osteoporosis:** is quite common after immobilisation. Another etiology of bone marrow edema is stress response related to altered mechanics. This entity may have an intimate relationship to traumatic injury, because shifting of weight bearing or a change in biomechanical axes as a response to the pain of injury can elicit such a stress response.
   Recent study [1] documented a pattern of patchy bone marrow edema predominating in the ankle, hindfoot, and midfoot on ankle MRI examinations after periods of immobilization. This pattern of marrow edema is specifically subcortical or subchondral or subenthesial. The pattern is heterogeneous, diffuse, and appears like “clouded” bone, involving multiple bones of the ankle, hindfoot, and midfoot. The talus and calcaneus were most frequently involved, with variable involvement of the

distal tibia, the cuboid and the cuneiforms

Ankle bone marrow edema has been reported on MRI images **of asymptomatic individuals related to altered stress;** it has been described as multifocal, not associated with distribution of pain, and without periosteal reaction. Immobilization studies have confirmed Wolff's law (mechanical stress determines form and function of bone mass), demonstrating loss of bone mineral, resorption of calcium, and decreased glucose metabolism that is reversible after return of stress.

Transient bone marrow edema in the foot and ankle is an uncommon condition that should be distinguished from early avascular necrosis, stress fracture, or bone bruise [4]. The diagnosis is based on the clinical presentation of pain with weight bearing without a history of trauma, combined with typical findings on magnetic resonance imaging. The etiology is not known, but recent case reports have suggested a possible link to systemic osteoporosis. This study examined the relationship between transient bone marrow edema of the foot and ankle and low systemic bone mineral density.

TREATMENT

Recently [2] investigated the benefit of treatment with bisphosphonates and immobilization in a walking boot Vs with immobilization in a boot alone.

The mean time to resolution of pain in patients treated with a walker alone was 25 weeks.
The treatment with bisphosphonates led to a more rapid resolution of pain in 13 weeks.

REFERENCES

1. Foot & Ankle International/Vol 2007. 28;4:463-71
2. Foot Ankle Spec. 2016 Jun;9(3):218-26.
3. Foot Ankle Int. 2007 Apr;28(4):463-71.
4. Foot Ankle Int. 2011 May;32(5):S508-12.