

Tc-99m MDP bone Scintigraphy in the Diagnosis of Stress Fracture of the metatarsal bone mimicking oligoarthritis

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Abstract

The case of a 21 year old male patient with a stress fracture of metatarsal bone is presented. Patient was misdiagnosed and treated for three weeks as having reactive oligoarthritis caused by genital mycoplasma. Initial plain radiography was negative for bone fracture. Bone scintigraphy diagnosed stress fracture of the second metatarsal bone of the left foot. Plain radiography became positive three weeks later, showing the callus formation in the proximal part of second metatarsal. This case underlines the role of bone scintigraphy as the diagnostic test of choice in the early diagnosis of stress fracture.

Keywords: stress fracture, bone scintigraphy, plain radiography, oligoarthritis

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Introduction

Stress reaction and stress fractures represent a spectrum of soft tissue and bone injuries that occur in response to

abnormal repetitive stress applied to healthy bone (1). Repetitive sub maximal stress creates the imbalance between bone resorption and bone replacement. If stressful activities continue the accelerated intracortical remodeling may progress to a stress fracture. Early diagnosis of stress fractures is important for appropriate treatment, low risk of complications, and a return to pre-disease activity.

Case report

A 21-year old male military recruit presented with pain and edema of the left foot. He had a two week history of swelling and pain in his left foot during some intensive military training. There were no history of back pain, urogenital or digestive infections, conjunctivitis or skin and mucosal lesions. Bone fracture was ruled-out by physical examination and the normal findings on plain radiography at presentation. Ultrasonography of the left foot did not find the destructive changes of metatarsophalangeal joints. Erythrocyte sedimentation rate, full and differential blood count, C- reactive protein and the routine laboratory tests were within normal range; rheumatoid factor was negative. Physical examination of musculoskeletal system revealed metatarsophalangeal arthritis with coexisting tendinitis of the left foot. *Chlamydia trachomatis* was isolated from the urethral discharge. Bone scintigraphy demonstrated a focal lesion in the tarsus bone and diffusely increased tracer uptake in the second metatarsal of the left foot, with no other abnormal focus in joints and with sacroiliac joint index within normal range (Figure 1). Although bone scan was suggestive of stress fracture, the clinical presentation of arthritis and the other findings were likely to represent the reactive oligoarthritis caused by genital mycoplasmae. The patient was treated by 10-day antibiotics therapy and avoided exercise for two weeks. In spite of normal findings on plain radiography at presentation (Figure 2 A), a repeat

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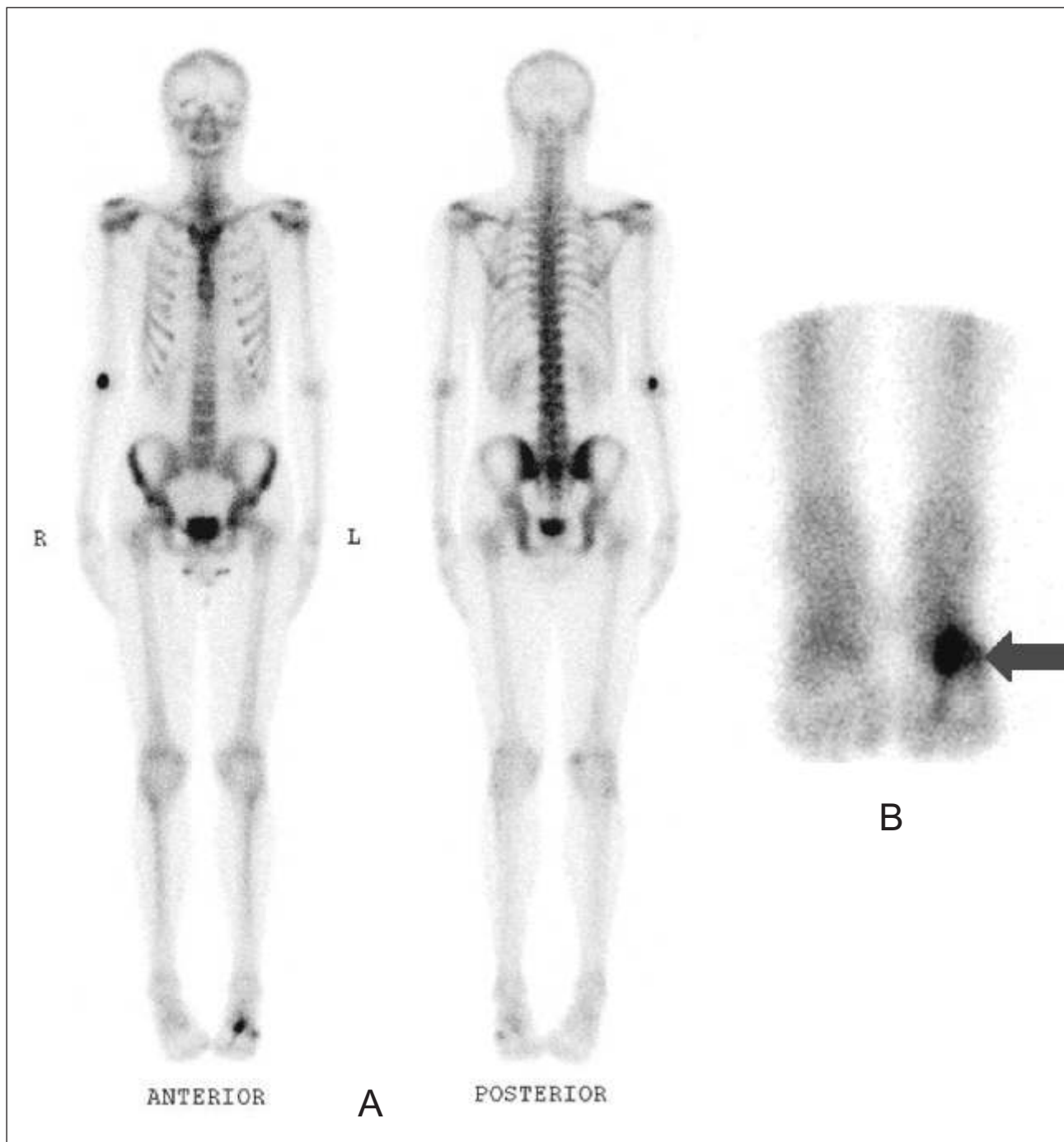


Figure 1. Tc-99m MDP Bone scan, anterior whole body, posterior whole body and spot view of bilateral feet (from left to right) (A). Scans show a large focus of intensely increased radiotracer uptake at left mid-foot involving the navicular, middle cuneiform and second metatarsal bones. This is better visualized in the enlarged image marked by a red arrow (B).

plain radiography 3 weeks later clearly showed callus formation in the proximal part of second metatarsal of the left foot (Figure 2 B).

Discussion

Prolonged hiking or running by an untrained individual may cause a fatigue fracture of a metatarsal. Conventional radiographs are insensitive in the detection of

early-stage stress injuries (2,3). Bone scintigraphy has been an important imaging tool since the 1970s, because it is a more sensitive indicator of an early stress fracture than radiography. The sensitivity, specificity and accuracy of radiography compared to the bone scintigraphy as the gold standard, was reported to be 56%, 94% and 67% respectively (4). Radiography detects stress fracture late in the bone reaction process, at least two to three week after positive scintigraphy, as demonstrated in our case. Recent



Figure 2. Initial plain radiograph of left foot (A) is negative for bone fracture. A repeat examination after three weeks shows callus formation in the proximal part of the second metatarsal (B).

studies have reported that magnetic resonance (MRI) imaging provided more diagnostic information and was even more sensitive and should be used as the gold standard in the assessment of stress injuries of the bone (4-6). Our case supports the need to search for stress fracture in patients presenting with some symptoms and signs of arthritis, especially in the risk population. Advanced imaging studies such as bone scintigraphy and MR imaging will be needed to ensure an early diagnosis when the plain radiography fails.

References

1. Anderson WM, Greenspan A. Stress fractures. *Radiology* 1996; 199:1-12
2. Daffner RH, Pavlov H. Stress fractures: current concepts. *AJMRoentgenol* 1992; 159:245-252
3. Spitz DJ, Newberg AH. Imaging of stress fracture in the athlete. *Radiol Clin North Am* 2002, 40: 313-331
4. Kiuru MJ, Pihlajamaki HK, Hietanen HJ, Ahovuo JA. MR imaging, bone scintigraphy and radiography in bone stress injuries of the pelvis and the lower extremity. *Acta Radiol* 2002; 43(2): 207-12
5. Ishiabashi Y, Okamura Y, Otsuka H, Nishizawa K, Sasaki T, Toh S. Comparison of scintigraphy and magnetic resonance imaging for stress injuries of bone. *Clin J Sport Med* 2002; 43: 207-212
6. Sofka CM. Imaging of stress fractures. *Clin Sports Med* 2006. 25: 53-62