



Nuclear Imaging for Suspected Osteomyelitis in Patients with Diabetes Mellitus

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Short Communication

Patients with diabetes mellitus experience foot problems. Their lifetime risk for foot ulcer is as high as 25% [1]. Risk factors for amputation are previous ulceration, neuropathy, foot deformity and vascular stenosis [2]. Patients with foot ulcers have in 80% neuropathy. Diabetic patients with ulcers have impaired healing due to decreased blood flow and local infections. Pain sensation and perception of pressure are impaired, leading to anatomic deformities and skin lesions. Clinicians should rule out neuropathy with tests for vibration sensation, monofilament pressure sensation and pinprick test for superficial pain or temperature sensation. Signs of peripheral artery disease should be examined and test like Doppler examination or ankle brachial index should be ordered. In case of erythema, tenderness or presence of pus, infection could be present. Osteomyelitis should be ruled out in case of positive probe to bone test, elevated ESR or large ulcer size (2 cm x 2 cm) [3]. Hematogenous sources, contiguous ways or direct inoculation are the three reasons for osteomyelitis development. Hematogenous osteomyelitis is monomicrobial versus contiguous osteomyelitis which could be polymicrobial or monomicrobial. Suspected osteomyelitis in diabetic foot could be approached with plain radiographs, CT scan, MRI scan or nuclear imaging. Radiographs have low sensitivity and specificity (14% and 70%) [4]. MRI has high sensitivity and will reveal edema early in the course of the infection [5]. CT scan could be performed in case of metallic hardware. Nuclear studies are useful for searching of acute infection. The three phase bone scan, gallium bone scan and tagged white blood cell scan are the most common test which are used to evaluate suspected osteomyelitis. *The three phase bone scan* is performed with technetium 99m, which is absorbed in high bone turnover areas (blood flow phase, 15 minutes after administration and 4 hours after injection - osseous phase). If bone inflammation is present, the gamma camera will reveal high uptake in all three phases. The sensitivity of the test is 95% in case of having normal radiographs [6]. False negative results could be seen early in the course of acute osteomyelitis. *Gallium scans* are based on the ability of gallium 67 to react with lactoferrin and other acute phase proteins. This nuclear method is more sensitive and specific than three phase bone scans [7]. False positive scans are after fractures or neoplastic diseases present. Gallium scanning must be performed 24 hours after the injection. *Tagged white blood cell scan*: Patients WBCs are with tracer tagged (technetium 99m, gallium 67 or indium 111) and returned. Images are checked 24 hours later. The tagged cells will be seen at inflammation sites. This test has similar sensitivity with the other nuclear tests. Specificity is decreased if radiographs are abnormal and the test should be preferred for distal extremities and not for vertebral areas. Nuclear tests are important imaging methods for diagnosing osteomyelitis. Noninfectious inflammatory bone conditions like degenerative joint diseases, Paget diseases, tumors, surgery and recent trauma are limitations and should be taken into account.

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