

Radionuclide diagnosis of osteomyelitis in diabetics with non-healing foot ulcers

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Introduction-Aim : Underlying osteomyelitis (OM) may complicate foot ulcers in diabetics and often leads to lower extremity amputation. Many patients lack clinical signs and symptoms (except the ulcer), and the clinical diagnosis of pedal OM is often difficult. Consequently, imaging plays an important role in establishing the correct diagnosis and directing treatment. The aim of the study was to assess the role of Tc99m-HMPAO-labelled leucocyte scan combined with Tc99m-MDP-bone scan in the diagnosis of pedal osteomyelitis in diabetics with non-healing foot ulcers.

Patients and methods : Thirty six diabetic patients with 42 non-healing foot ulcers (median duration of the ulcer: 2 months, range: 0.5-48 months; median ulcer diameter: 1.25cm, range: 0.5-5 cm; grade (Wagner) 1: 19 ulcers, grade 2: 21 and grade 3: 2 ulcers) and clinical suspicion of underlying OM were enrolled in the study. Plain film radiographs, three-phase Tc99m-MDP-bone scan (MDP) and Tc99m-HMPAO-labelled leucocyte scan (HMPAO-LS) of the feet were obtained in all patients. Spatially congruent bone/leucocyte findings were interpreted as positive for OM. Activity on leucocyte images without corresponding activity on bone images indicated soft tissue infection. Diagnosis was confirmed by long-term clinical and radiological follow-up or bone biopsy.

Results : Among the 42 pedal ulcers investigated, 22 foci of underlying OM were diagnosed (52.4%), while simple soft tissue infection was identified in the rest 20 (47.6%) cases. Combined MDP/HMPAO-LS was correctly localized infection to the bone in 21/22 cases and to the soft tissues in 19/20 cases. There was a false positive result in a case with coexisting Charcot arthropathy. In a patient with OM confirmed by bone biopsy, MDP/HMPAO-LS falsely suggested that the infection was confined to overlying soft tissues. The diagnostic accuracy of initial plain film radiography or MDP bone scan alone for diagnosing OM in diabetics with foot ulcers were only 52.4% and 61.9% respectively. The additional performance of HMPAO-LS improved the diagnostic accuracy of bone scan. The sensitivity, specificity and accuracy of combined MDP/HMPAO-LS were 95.4%, 95% and 95.2% respectively.

Conclusion : We conclude that OM is frequent in non-healing diabetic foot ulcers (52.4% of cases in our study). Plain film radiographs are often negative or inconclusive during early stages of OM. Bone scan alone is of limited value for diagnosing OM in the diabetic foot. Combined MDP/HMPAO-LS is an effective imaging modality to differentiate osteomyelitis from soft tissue infection in diabetics with non-healing foot ulcers.