Comparison of SPECT-CT with MRI in Treatment Decision Making: Osteochondral Lesions of the Talus

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Introduction
Osteochondral lesion of the talus (OLT) is one of the most important causes of residual pain in the ankle, seen after ankle sprains, chronic ligament instability, and fractures. Most often affect young, sports-active patients. It is defined as the separation of a fragment of articular cartilage, with or without subchondral bone. Osteochondral lesions may be considered as focal osteoarthritis. The radiologic treatment decision making in osteochondral lesion of the talus is mainly based upon the stage of the disease: size, stability, and vitality of the lesion. Magnetic resonance imaging (MRI) is the current standard in noninvasive diagnostics of osteochondral lesions of the talus. Single-photon emission computed tomography–computed tomography (SPECT-CT) is a new technique that provides both morphologic (CT) and functional (SPECT) information on the OLT. This approach enables the clinician to assess early stages of OLT that are poorly detected by other imaging modalities. The aim of the study was to evaluate SPECT-CT in comparison with MRI for image interpretation and treatment decision making in osteochondral lesion of the talus.

Methods
Between September 2009 and July 2011, a total of 21 patients (5 females, 16 males) with a mean age of 34±11 years (range, 21–58 years). All patients underwent MRI and 99mTc HDP scintigraphy with planar and pin-hole and hybrid SPECT/CT imaging. SPECT/CT using a dual-head gamma camera and a low-power X-ray CT transmission system mounted on the same gantry (GE Infinia Hawkeye GE Medical Systems) is used for all nuclear medicine modalities. 99mTc HDP scintigraphy with planar and pin-hole and hybrid SPECT/CT images were acquired 4 hours after injection.

Results
Twenty one patients were evaluated with MRI and 99mTc HDP scintigraphy with planar and pin-hole, and hybrid SPECT/CT imaging. The types of OLT involved in this study were graded for MRI according to Hepple et al. Scintigraphic data were evaluated by the amount of deformity, stage of osteoarthritis, and level of activation measured on bone scans and SPECT/CT. Activation was assessed in 9 regions of interest. The decision of treatment was done according to these measurements.
Conclusion
The size, stability, and vitality of talar osteochondral lesion are the prognostic factors, that may serve as a basis for treatment decisions. Thus the choice of treatment depends on the diagnostic modalities used. Magnetic resonance imaging is the current standard. The SPECT-CT allows a 3-dimensional localization of scintigraphic osteoblastic activity in the area of interest, providing additional information about the involvement of the subchondral bone and the vitality of the osteochondral lesion, in combination with the anatomic resolution of a CT scan. We believe SPECT/CT is superior to MRI in providing anatomic and functional detail. For comprehensive diagnostic assessment evaluation in OLT, performing both MRI and SPECT-CT is recommended.