A Novel Imaging Method for Osteochondral Lesions of the Talus—Comparison of SPECT-CT With MRI

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Background: Magnetic resonance imaging (MRI) is the current standard in noninvasive diagnostics of osteochondral lesions (OCLs) of the talus. Single-photon emission computed tomography–computed tomography (SPECT-CT) is a new technique that displays different imaging qualities. The influence of the aforementioned diagnostic information on treatment decision making in talar OCLs is not known.

Purpose: The aim of the study was to evaluate SPECT-CT in comparison with MRI for image interpretation and decision making in OCLs of the talus.

Study Design: Case series; Level of evidence, 4.

Methods: Magnetic resonance imaging and SPECT-CT of 25 patients (average age, 32 years; range, 18-69 years) were analyzed by 3 independent orthopaedic surgeons blinded to the study. Raters had to analyze images for predefined criteria of cartilage, subchondral bone plate, and subchondral bone, including bone marrow edema on MRI and scintigraphic activity on SPECT-CT. For MRI alone, SPECT-CT alone, and their combination, the treatment decision had to be defined.

Results: In comparison with MRI alone, treatment decision making changed in 48% of the cases with SPECT-CT alone and 52% with SPECT-CT and MRI combined. While cartilage showed good correlation for interpretation between MRI and SPECT-CT, the subchondral bone plate and subchondral bone showed substantial differences. Poor intrarater correlation highlighted the different information provided by the 2 imaging techniques. Poor interrater correlation showed a high heterogeneity in the treatment decision making of OCLs.

Conclusion: Compared with MRI, SPECT-CT provides additional information and influences the decision making of OCL treatment. For thorough diagnostic evaluation in OCLs, performing both MRI and SPECT-CT is recommended. Further clinical investigation is needed to see if SPECT-CT in addition to MRI results in improved treatment outcomes.

Keywords: osteochondral lesion; talus; MRI; SPECT-CT; therapy; subchondral bone

Osteochondral lesions (OCLs) of the talus most often affect young, sports-active patients. These lesions are frequently reported in patients with sports injuries such as ankle sprains, chronic ligament instability, and fractures.17 Patients have persistent pain, swelling, and blocking of the joint but also a reduction of sports activity and quality of life. Osteochondral lesions may develop into jointwide osteoarthritis and therefore may be considered focal osteoarthritis.24

Therapeutically, upon failure of nonoperative treatment, the surgeon may choose between a broad variety of reconstructive techniques.17,30 These include excision, debridement, curettage, retrograde drilling, anterograde drilling, microfracturing, autologous chondrocyte implantation, matrix autologous chondrocyte implantation, cancellous bone grafting, osteochondral autologous transplantation/mosaicplasty, autologous matrix-induced chondrocytogenesis, and others. Reported results vary depending on techniques and authors, and success rates range from 0% to 100%.30 As is common to medicine in general, the choice of the right surgical OCL treatment is substantially based on the diagnostics used. In talus OCL,