Visualization of stress fractures of the foot using PET-MRI: a feasibility study.

Abstract:
Diagnosis and treatment of stress fractures still remains to be a clinical and radiological challenge. Therapeutic options vary from conservative treatment to surgical treatment without a clear treatment concept. Recently the combination of PET and MRI has been introduced, aiming a superior diagnostic accuracy in clinical practice. Therefore the aim of our study was to analyse whether PET-MRI would be a feasible technique to recognize stress fractures of the foot and to analyse if our conservative treatment plan leads to a good clinical outcome. Therefore, 20 patients with suspected stress fractures of the foot and ankle underwent plain radiography and (18)F-Fluoride PET-MRI. Two blinded readers assessed in consensus both imaging techniques for the presence of stress fracture, stress reaction or osteoarthritis. Patients with stress fractures or stress reactions in the foot and ankle area underwent our conservative treatment plan, with immobilization in a VACO®ped cast for 6 weeks under partial weight bearing on forearm crutches. The benefit of our conservative therapeutic concept was evaluated by the patients on the basis of VAS and FAOS scoring systems before and after treatment. 8 out of 20 patients underwent conservative treatment after diagnosis of either a stress fracture.
fracture or a stress reaction of the foot and ankle area. PET-MRI identified four stress fractures and seven stress reactions. In all cases, no pathological findings were present on plain X-ray. FAOS and VAS significantly improved according to the patients’ records. PET-MRI seems to be a useful modality to diagnose stress fractures and stress reactions of the foot and ankle area, especially when conventional modalities, such as plain radiographs fail. Conservative management is a promising therapeutic option for the treatment of stress fractures. To rule out the benefits compared to a surgical treatment plan, further studies are needed.