FIRST IN MAN OBSERVATIONS WITH SIMULTANEOUS 18F-FDG PET AND MR IMAGING IN PERIPHERAL ARTERY DISEASE USING A WHOLE-BODY INTEGRATED SCANNER

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Background: Advanced non-invasive vascular imaging simultaneously combining positron emission tomography (PET) with magnetic resonance imaging (MRI) has recently been made possible.

Aim: This observational study attempted to identify patients with peripheral artery disease (PAD) at risk for vascular events using integrated 18-FDG PET / MRI.

Methods: Inherent co-registration of simultaneously acquired 18-FDG PET and contrast enhanced MR imaging was performed in 10 patients with PAD of the superficial femoral artery (SFA) in a whole-body PET/MRI scanner (Biograph mMR, Siemens Healthcare, Erlangen, Germany) and compared to histopathology of plaque specimens obtained by post-imaging atherectomy at the site of symptomatic stenosis.

Results: MR contrast uptake at the level of the symptomatic stenosis assessed on T1-w images was significantly higher as compared to the contralateral SFA (mean 1.77 ± 0.19 vs. 1.57 ± 0.15; p-value = 0.04). Throughout the study population, different patterns of vascular 18F-FDG uptake were observed as based on a qualitative assessment. Comparing histopathology with FDG-PET imaging showed that TBR was non-significantly increased in fibrous plaques lesions and decreased in more calcified lesions yielding a moderate overall correlation.

Conclusion: Our results show that simultaneous PET-MRI of atherosclerotic SFA plaques is feasible. The synergistic value may pertain to non-invasively deriving insights into the pathobiology and activity of atherosclerotic plaque.