

Magnetic Resonance Imaging/Ultrasound Fusion Guided Prostate Biopsy for Patients with Small Lesions Suspicious for Cancer Revealed by Multiparametric Magnetic Resonance Imaging

Introduction and Objective: The accumulating evidence suggests an improved performance of MRI when modern sequences are used. Multiparametric MRI (mMRI) includes T1-and T2-weighted images, dynamic contrast, and diffusion weighting. The aim of this study was to demonstrate the efficacy of MRI/ultrasound fusion technique for targeting small suspicious lesion for prostate cancer revealed by mMRI.

Materials and Methods: A total of 20 men with less than 10 mm suspicious lesion revealed by multimodal 3-Tesla MRI were included in this study. Half of the patients had previous history of negative conventional biopsy. The median age, PSA value and prostate volume were 70 years, 7.4 ng/ml and 33 ml, respectively. Suspicious lesions were marked on the 3-dimensional (3-D) MRI and data were transferred and fused with the 3-D volume-rendered ultrasound images by using Urostation (Koelis, France). Two samples from suspicious area as well as 6 cores from conventional sextant sites were taken transrectally.

Results: Prostate cancer was detected in 19 of 20 patients (95%). All 19 patients with positive biopsy result revealed cancer in the suspicious lesions. One patient had small suspicious lesion in the anterior apex, which may be missed by inadequate needle placement (false negative case). No significant adverse events were observed.

Conclusions: MRI-ultrasound fusion biopsy technique revealed significant potential to target small suspicious lesions on mMRI. The location of each biopsy core taken could be accurately documented in 3-D images, which seems to enable tailored planning for the treatment of small focus of prostate cancer.