

Reduced Field-of-View Diffusion-Weighted Magnetic Resonance Imaging of the Prostate at 3 Tesla: Comparison With Standard Echo-Planar Imaging Technique for Image Quality and Tumor Assessment

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Abstract

Objective: The purpose of this study was to compare image quality and tumor assessment at prostate magnetic resonance imaging (MRI) between reduced field-of-view diffusion-weighted imaging (rFOV-DWI) and standard DWI (st-DWI).

Methods: A total of 49 patients undergoing prostate MRI and MRI/ultrasound fusion-targeted biopsy were included. Examinations included st-DWI (field of view [FOV], 200 × 200 mm) and rFOV-DWI (FOV, 140 × 64 mm) using a 2-dimensional (2D) spatially-selective radiofrequency pulse and parallel transmission. Two readers performed qualitative assessments; a third reader performed quantitative evaluation.

Results: Overall image quality, anatomic distortion, visualization of capsule, and visualization of peripheral/transition zone edge were better for rFOV-DWI for reader 1 ($P \leq 0.002$), although not for reader 2 ($P \geq 0.567$). For both readers, sensitivity, specificity, and accuracy for tumor with a Gleason Score (GS) of 3 + 4 or higher were not different ($P \geq 0.289$). Lesion clarity was higher for st-DWI for reader 2 ($P = 0.008$), although similar for reader 1 ($P = 0.409$). Diagnostic confidence was not different for either reader ($P \geq 0.052$). Tumor-to-benign apparent diffusion coefficient ratio was not different ($P = 0.675$).

Conclusions: Potentially improved image quality of rFOV-DWI did not yield improved tumor assessment. Continued optimization is warranted.