Whole-body MRI including diffusion-weighted imaging (DWI) for patients with recurring prostate cancer: Technical feasibility and assessment of lesion conspicuity in DWI.

Abstract:
To evaluate the principal methodological aspects of whole-body magnetic resonance imaging (MRI) including diffusion-weighted imaging (DWI) with background suppression using a time-optimized protocol for restaging of prostate cancer patients in a technical feasibility study. Seventeen patients underwent MRI at 1.5T from the base of the skull to the proximal thigh using axial T1-weighted (T1w), T2w short-tau inversion recovery (STIR), and DWI (b-values: 50 and 500 s/mm²) and sagittal T1w and T2w STIR of the spine. Apparent diffusion coefficient (ADC) values of liver, spleen, kidney, muscle, and bone were measured. Image quality in DWI was assessed by using a scale from 0-9. Contrast-to-noise ratios (CNRs) of lymph node and bone metastases were determined in T1w, T2w STIR, and DWI. Bone metastases were further subclassified according to their Hounsfield units (HU) in computed tomography (CT). Mean acquisition and mean room times were 66:20 and 75:21 minutes, respectively. ADC values of normal organs showed good concordance with reported data. Good to excellent image quality was observed for DWI (mean scores 7.41-8.00) with the exception of the neck (mean score 4.76). CNR of DWI (b-value 50 s/mm²) for lymph node metastases was clearly superior.
compared to all other sequences. For bone metastases T1w performed significantly better for sclerotic lesions (HU > 600), DWI (b-value 50 s/mm²) for nonsclerotic lesion (HU < 300). In patients with recurrent prostate cancer a whole-body MR protocol including DWI is technically robust. Due to the high CNR of DWI compared to T1w and T2w STIR, detection of malignant lesions should be facilitated by DWI, except for sclerotic bone metastases. J. Magn. Reson. Imaging 2011; 33:1160-1170. © 2011 Wiley-Liss, Inc.