

Susceptibility Weighted Imaging: A New Tool in Identifying Prostate Cancer and Calcification

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PURPOSE: High-resolution Susceptibility weighted imaging (HR-SWI) is sensitive for showing blood products, venous vasculature, and calcifications and has been reported as a promising tool for assessing brain tumor characterization noninvasively. However, there's few studies on SWI in the prostate diseases so far. The purpose of this study was to investigate the value of HR-SWI in distinguishing prostate cancer from benign prostatic hyperplasia and detecting calcification.

METHOD and MATERIALS: Eleven patients with prostate cancer and twenty-six cases with benign prostatic hyperplasia proved by biopsy were scanned on a 3.0T MR and a 16 rows CT scanner. HR-SWI, conventional MRI and CT were performed on all patients. The MRI and CT findings, especially HR-SWI s, were analyzed and compared. The hospital review board approved the study, and informed consent was obtained in all cases.

RESULTS: In 11 patients with prostate cancer, SWI showed low signal in tumor zone in 7 cases; however, in 26 cases with benign prostatic hyperplasia and/or prostatitis, no low signal was found in prostate on SWIs. CT showed calcification in 5 cases in the prostate outside of the tumor zone, which were all detected by SWI demonstrated with dot-like low signal.

CONCLUSIONS: SWI is not only helpful in the differential diagnosis between prostatic cancer and benign prostatic hyperplasia and prostatitis but also sensitive in detecting calcification within prostate.

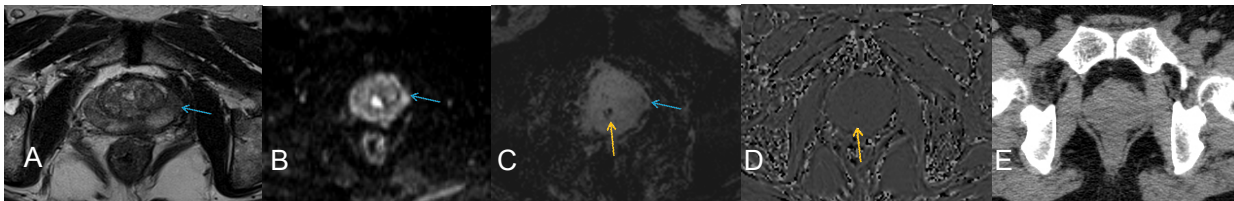


Fig. 1. A 55 years-old male with prostatic cancer proved by biopsy. T2WI show hypo-intensity in the left peripheral zone and heterogenous signal intensity in the central zone of prostate (A) (blue arrow), which is demonstrated with high signal on diffusion-weighted image (B) (blue arrow). SWI shows a dot-like low signal in the left peripheral zone (blue arrow) and central zone of prostate (yellow arrow) (C), which is low signal on phase image (D) (yellow arrow). CT doesn't find any calcification in the prostate (E).

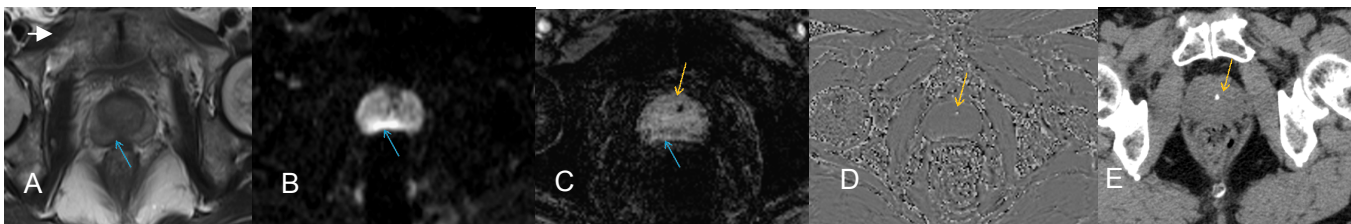


Fig. 2. A 71 years-old male with prostatic cancer proved by biopsy. T2WI shows hypo-intensity in the right peripheral zone of prostate (A) (blue arrow), which is demonstrated with high signal on diffusion-weighted image (B) (blue arrow). SWI doesn't find low signal in the tumor, but shows a dot-like low signal in the area anterior to the tumor (C) (yellow arrow), which is high signal on phase image (D) (yellow arrow). CT proves the calcification in the same area (E) (yellow arrow).

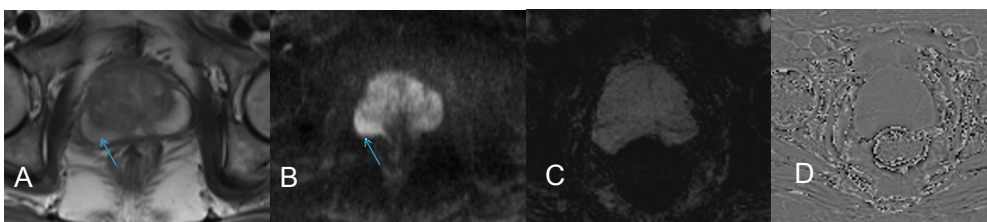


Fig. 3. A 72 year-old male with benign prostatic hyperplasia and prostatitis proved by operation. T2WI demonstrates heterogenous signal intensity in the central zone and mild hypo-intensity in the right peripheral zone of the prostate (A) (blue arrow). DWI shows mild hyper-intensity in the right peripheral zone of prostate (A) (blue arrow). SWI shows homogenous signal intensity both in the central and peripheral zone of the prostate (A) .

References: 1.Haacke EM,et al. AJNR 2009;30:19 - 30.

2.Hardman RL, et al.J Magn Reson Imaging. 2011;33(4):902-7.