

The apparent diffusion coefficients (ADC) in normal prostate and prostatic cancer -compare single shot echo planner image (SS-EPI) with line scan diffusion image (LSDI)-

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INTRODUCTION

Diffusion weighted image (DWI) by single shot echo planner image (SS-EPI) on prostatic cancer is sensitive to motion artifacts. Line scan diffusion image (LSDI) is inherently insensitive to motion artifacts. The purpose of this study was to compare the apparent diffusion coefficients (ADC) of SS-EPI with that of LSDI in normal prostate and prostatic cancer.

MATERIALS AND METHODS

All studies were performed with a 1.5T superconducting system (SIGNA GE Medical System Milwaukee, WI).

1) BASIC STUDY : DWI of phantom (using diluted neutral detergent) was performed by SS-EPI and LSDI. Trace ADC map of the DWI by each methods was evaluated by different b factor (5200-1400).

2) CLINICAL STUDY : All studies were performed with TORSO coil. 20 prostatic cancers (≥ 10 mm) in 14 patients were included. Radical prostatectomy was performed to all patients within 2 months after MRI. T1-, T2-weighted image with fat saturation (T2-WI with FS) and ADC map by each methods were obtained. SS-EPI were obtained : TR/TE = 2000/85.7ms, flip angle=90, matrix = 128x128, FOV=220x220mm, slice thickness=5mm, b-factor=1000, 3 axis MPG, 10 NEX. LSDI were obtained : TR/TE=3520/50.4ms, flip angle=90, 1NEX, other condition were same. Trace ADC map of the normal prostatic tissue (peripheral zone : PZ and inner gland : IG) and prostatic ca. were evaluated by each methods.

RESULTS

1) BASIC STUDY : Mean of trace ADC map by SS-EPI were 2.211 ± 0.004 ($\times 10^{-3}$ mm²/s), that by LSDI were 2.123 ± 0.007 ($\times 10^{-3}$ mm²/s). There was no significant difference between SS-EPI and LSDI by t-test ($P < 0.01$).

2) CLINICAL STUDY : Normal PZ ADC was 1.85 ± 0.22 ($\times 10^{-3}$ mm²/s) by SS-EPI, 1.87 ± 0.25 ($\times 10^{-3}$ mm²/s) by LSDI. Normal IG ADC was 1.54 ± 0.23 ($\times 10^{-3}$ mm²/s) by SS-EPI, 1.58 ± 0.31 ($\times 10^{-3}$ mm²/s) by LSDI. There was no significant difference between SS-EPI and LSDI by t-test ($P < 0.01$). In two normal PZ, susceptibility artifact arised from air filled rectum.

Prostatic ca. ADC was 0.86 ± 0.33 ($\times 10^{-3}$ mm²/s) by SS-EPI, 0.91 ± 0.26 ($\times 10^{-3}$ mm²/s) by LSDI. One prostatic ca. ADC by SS-EPI was not calculated, because of susceptibility artifact arising from air filled rectum. All prostatic ca. ADC by LSDI were calculated without susceptibility artifact arised from air filled rectum.

CONCLUSION

There was no significant difference between ADC by SS-EPI and by LSDI. Prostatic ca. ADC and normal prostate ADC by LSDI was inherently insensitive to motion artifacts.

REFERENCES

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