

MR imaging and Three-dimensional H-1 MR spectroscopic imaging of benign lesion of prostatic peripheral zone: comparison with prostate cancer

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Introduction

The H-1 MR spectroscopic imaging findings add specificity to the MR imaging for distinguishing prostate cancer from BPH and chronic prostatitis[1]. The purpose of this study was to probe the value of combining MR imaging and three dimensional H-1 MR spectroscopic imaging in diagnosing benign disease of prostatic peripheral zone (PZ).

Materials and Methods

16 cases of benign disease of prostatic peripheral zone all proved pathologically or clinically, MR imaging and 3D ¹H MRSI were performed in each case. The shape, the volume and the signal intensity of the lesion were observed or measured in MR imaging, and the corresponding ratios of choline+creatine/citrate (Cho+Cre/Cit) were calculated on the basis of the MRSI metabolic map. The results were compared with 16 cases of prostate cancer which were proved by pathology of systemic biopsy.

Results

1. Most of benign lesion were nodular and well-defined lesion(69%). Prostate cancer presented mainly as patch-like lesion with nodular feeling and ill-defined (56%). The difference between two group were statistic significantly ($\chi^2=12.74, P=0.002$). 2. The average volume(1.96±1.92ml) of benign lesion were significantly less than that (4.34±2.74ml) of prostate cancer ($t=2.68, P=0.013$). 3. The signal intensity of most of benign lesion and most of prostate cancer were less than that of normal PZ and were closed to that of inner obturatoria muscle on T2 weighted imaging, and presented as iso-intensity comparison with that of normal PZ on T1 weighted imaging. There were no statistic difference between two group ($\chi^2=0.731, P=0.392$). 4. The average ratio (0.68±0.17) of Cho+Cre/Cit of benign lesion were significantly less than that (2.30±0.79) of prostate cancer ($t=7.54, P=0.000$).

Conclusion

Although the signal intensity difference on MR imaging between benign lesion and prostate cancer of prostatic PZ were similar, there were statistically difference of the shape, the volume on MR imaging and metabolic levels measured by 3D ¹H MRSI between two groups. Combined the results of MR imaging and 3D ¹H MRSI will play a important role in diagnosing benign lesion of prostatic PZ.

Reference

1Shukla-Dave A, Hricak H, Eberhardt SC, et al. Radiology 2004; 231:717-724

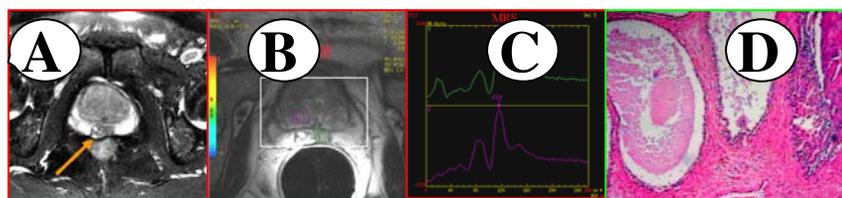


FIG.1. Palpation of nodule in the surface of prostate by digital examination of rectum in a 68-year-old man, Serum PSA level is 2.69. **A:** Axial T2-weighted (fast SE, 2,000/90) MR image shows foci inhomogeneous reduction of T2 signal intensity in the back of PZ. **B:** VOI of ¹H MRSI. **C:** Spectra of low T2 signal intensity foci (VOX 1) exhibit metabolic character of benign prostatic tissue with ratios of Cho+Cre/Cit was 0.62, which was similar to that of the spectra of central zone of BPH (VOX 2) . **D:** Pathology shows typical finding of mixed BPH. Hematoxylin-eosin; ×200.

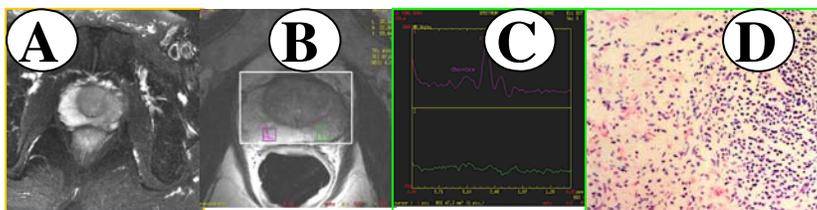


FIG.2. Serum PSA (14.42ng/ml) increase in a 68-year-old man with LUTS **A:** Axial T2-weighted (fast SE, 2,000/90) MR image shows diffuse inhomogeneous reduction of T2 signal intensity in left PZ. **B:** VOI of ¹H MRSI. **C:** Spectra of low T2 signal intensity of left PZ (VOX 2) exhibit metabolic atrophy with the level of citrate and choline decrease to the level of noise, and the spectra of the normal right PZ (VOX 1) was normal with the ratios of Cho+Cre/Cit was 0.32. **D:** Pathology shows prostatic atrophy and prostatitis. Hematoxylin-eosin; ×200.