

3D MRSI evaluation of local recurrence of prostatic cancer in men who have undergone radical prostatectomy

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PURPOSE: To evaluate the ability of three dimensional magnetic resonance spectroscopy imaging to reveal local recurrence of malignancy in men who have had radical prostatectomy for prostatic adenocarcinoma.

MATERIALS AND METHODS: We performed prospective analysis of 30 men who had undergone radical prostatectomy (range of time since surgery, 11 months to 36 years; mean, 18 months) with clinical suspicion of recurrent prostatic cancer. 19 of the 30 men had elevated prostate-specific antigen (PSA) levels ($>$ or $=$ 0.4 ng/ml) and had a palpable prostatic bed module or induration. 8 of the 30 men had PSA levels less than 0.4 ng/ml but had a palpable prostatic bed nodule or induration. 3 of the 30 men had PSA levels higher than 0.4 ng/ml but had no palpable prostatic bed nodule or induration. Our imaging used a transrectal surface coil on a 1.5-T MR scanner. Sagittal and axial fat-saturated T2-weighted fast spin-echo as well as axial T1-weighted MR images of the prostatic bed were acquired in all patients. 3D-PROSE sequence was used to obtain the 3D MRSI data. Transrectal biopsy of the prostatic bed was directed by digital palpation or transrectal sonography in 27 patients with palpable nodule or induration.

RESULTS 14 of the 27 patients were proved local recurrence by biopsy. In 3D MRSI examination, 12 patients demonstrated high choline peak (>5 SNR) without detectable citrate and creatine peaks. The spectrum of the other 2 patients demonstrated high lipid peak without any other metabolite peaks. 13 of the 27 patients were proved absence of local tumor recurrence. 3 of them demonstrated high choline peak (>5 SNR) without detectable citrate and creatine peaks. The spectrum of the other 10 patients demonstrated metabolite atrophy ($n=6$) or high lipid peak ($n=4$) without any other metabolite peaks. Thus, considering the biopsy as golden standard, the sensitivity of 3D MRSI in revealing local recurrence of prostatic cancer was 85.7% (12/14), the specificity was 76.9% (10/13), the accuracy was 81.5% (22/27). The MRS appearance of metabolite atrophy had negative predictive value of 100% (6/6). The MRS appearance of high choline peak had positive predictive value of 80% (12/15). The high lipid peak in the spectrum reduced the sensitivity of MRS results.

CONCLUSION: 3D MRSI is a useful imaging tool to evaluate patients who have undergone radical prostatectomy and are suspected of having local recurrence of malignancy in the prostatic bed.

KEY WORDS: magnetic resonance spectroscopy; prostatectomy

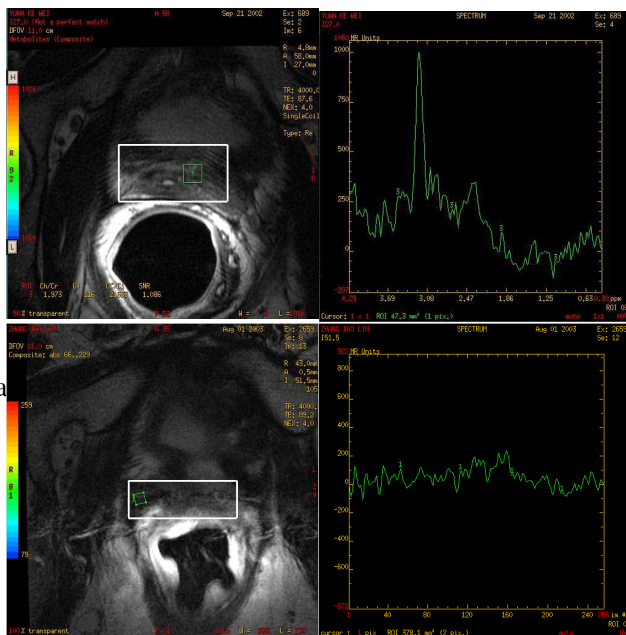


Fig.1 demonstrated high choline peak of the node in the prostatic bed which was proved to be local recurrence of the prostate adenocarcinoma.

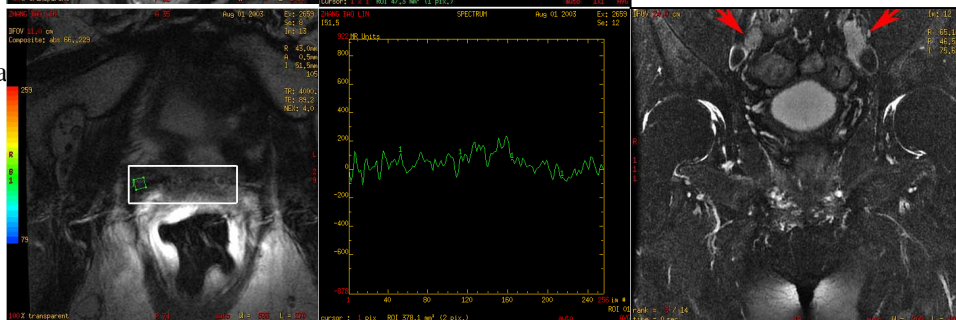


Fig.2 revealed metabolic atrophy of the nodule in the prostatic bed which indicated of absence local recurrence. MRI coronal T2WI demonstrated multiple lymph nodes metastasis along the pelvic vessels.