

Primary study of apparent diffusion coefficient in the diagnosis of prostate cancer recurrence after endocrinotherapy

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Purpose: Endocrinotherapy is just a palliative treatment for prostate cancer (Pca) and some tumors will recur in a few months or years. Early and accurate diagnosis of Pca recurrence is very important. Previous study has proved that ADC is useful in the discrimination of cancerous and non-cancerous tissues. The purpose of our study is to investigate the difference of ADC values between recurrent and non-recurrent prostate cancer after endocrinotherapy.

Methods: This study recruited twenty-eight Pca patients (age range 53-79 years, mean 67.3 ± 4.7 years) who received endocrinotherapy for 5 to 20 months. They were divided into two groups: recurrence group and non-recurrence group. The recurrence was diagnosed according to the objective criteria presented by EORTC (European Organisation for Research and Treatment of Cancer) for Pca recurrence and was proved by MRI. DWI was performed at a 1.5-T scanner (GE Twinspeed) using single-shot diffusion-weighted echo-planar imaging (TR 3000 ms, TE 50 ms, field of view 24×24 cm, matrix size 96×96 , section thickness 6 mm, no intersection gap, b-values = 0, and 800 s/mm^2). ADC maps were obtained using the manufacturer's software (Fig 1). Student *t*-test was applied to assess their difference.

Results: On diffusion-weighted images, the recurrent regions showed remarkable hyperintensive signal. But in the prostate without recurrent Pca, no obvious local hyperintensive signal was detected and the prostate appeared relative homogeneous. The ADC values of 31 ROIs in recurrent regions and 56 ROIs in non-recurrent regions were measured. The average ADC values of all measured regions in recurrent and non-recurrent regions were $1.12 \pm 0.14 \times 10^{-3} \text{ mm}^2/\text{s}$ and $1.65 \pm 0.24 \times 10^{-3} \text{ mm}^2/\text{s}$, respectively. Statistically significant difference was detected between them ($t=9.32, P<0.01$)(Fig 2).

Conclusion ADC can provide the information of tumor recurrence. DWI may be a feasible tool in the diagnosis of prostate cancer recurrence after endocrinotherapy.

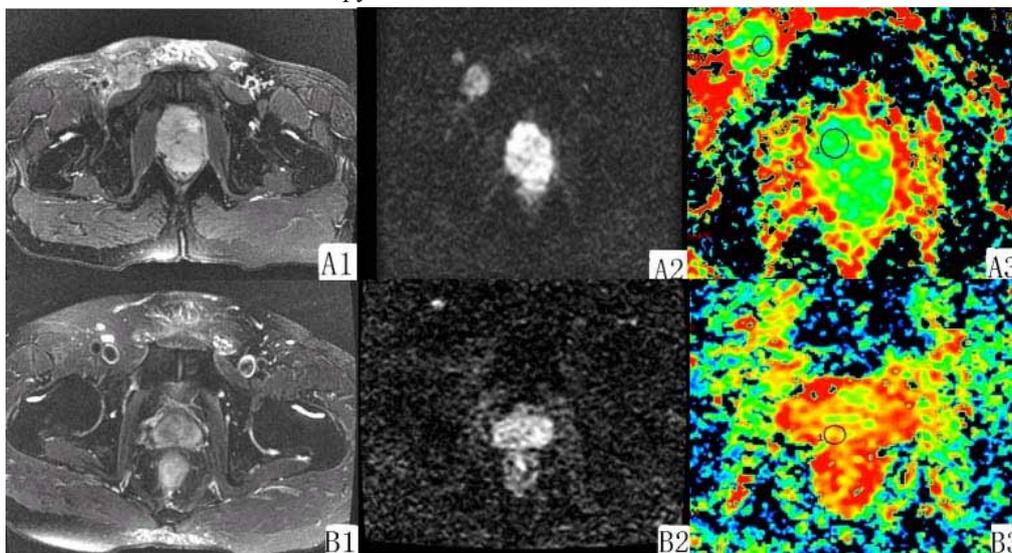


Fig 1: (A1-A3) Pca recurred after 8 months endocrinotherapy. The prostate enlarged and metastatic lymph node could be found in right groin on T2W (A1) and DW (A2) images. ADC values in ROIs that sampled recurrent cancer and lymph node were $1.09 \times 10^{-3} \text{ mm}^2/\text{s}$ and $0.97 \times 10^{-3} \text{ mm}^2/\text{s}$, respectively.

(B1-B3) No evidence of Pca recurrence was detected after 12 months endocrinotherapy. ADC value in ROI which was placed on the former Pca region was $1.81 \times 10^{-3} \text{ mm}^2/\text{s}$

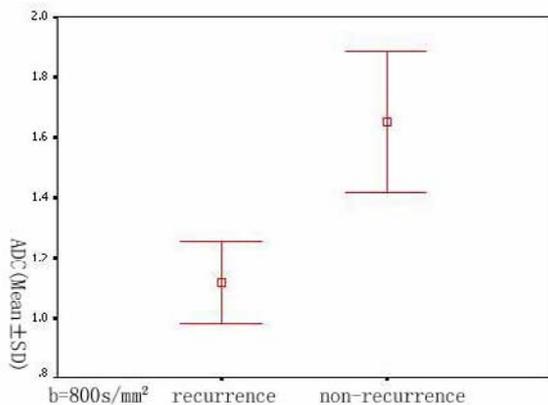


Fig 2: Comparison of ADC values in recurrent and non-recurrent regions when b-values were 800 s/mm^2 .