Apparent diffusion coefficient value for Differentiating Tumors in Uterine Cervix at 3 Tesla

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BACKGROUND Apparent diffusion coefficient value for detection of cervical cancer has been reported in 1.5T MRI. We design this study to investigate the feasibility of using diffusion-weighted image (DWI) in 3T MRI for differentiating cervical cancers and normal uterine cervix.

MATERIALS AND METHODS Sixty consecutive patients with biopsy proven cervical cancers were examined using a diffusion-weighted echo-planar sequence in 3T MRI. The imaging parameters are TR/TE = 3390 ms/79 ms, field of view 350 mm x 320 mm, slice thickness 5 mm, acceleration factor 2, using b factors of 200, 600, and 1000 sec/mm^2. The DWI and T2-weighted images were co-registered for detailed anatomical localization. The ADC values of cervical cancers were compared with that of pathology proven normal cervical tissue from 30 control subjects. Student's t test was used to compare the mean ADC, and a P value ≤ 0.05 was determined to be statistically significant.

RESULTS Diffusion imaging in the Uterine Cervix is feasible with satisfactory image qualities and without major artifacts noticed. Fig. 1 showed the ADC image (in color) co-registered with the T2W image (in grayscale). The DWI showed improved contrast and sensitivity between the tumor and the normal tissue in b=1000 sec/mm^2, when compared with that in b=600 sec/mm^2 or 200 sec/mm^2 in all subjects with cervical cancers. The ADC values were significantly lower for tumor (81.53 +/- 17.65 x 10^{-5} mm^2/s) than that for the normal cervical tissue (119.67 +/- 10.85 x 10^{-5} mm^2/s, p<0.001), as shown in Fig 2.

CONCLUSION DWI of the uterine cervix at 3.0T is feasible, using an acceleration factor of 2, co-registered with T2W image for anatomy reference, proved to be diagnostically important. The ADC values were significantly lower for cervical cancers compared to that of the normal tissue. Using a high b value (b=1000 sec/mm^2), tumor was magnified with satisfactory normal tissue suppression.

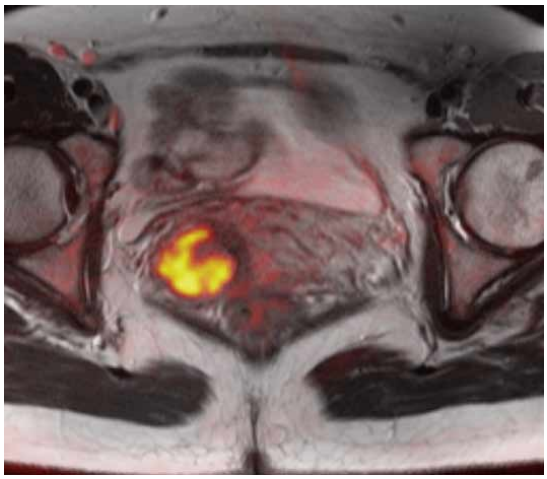

Fig1 the ADC image (in color) co-registered with the T2W image (in grayscale)

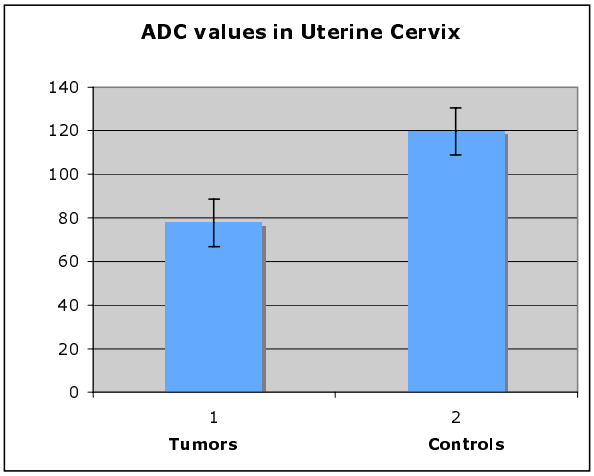

Fig 2: The ADC values in Tumour and Normal controls