Apparent Diffusion Coefficients in Cervix Cancer

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Purpose: The potential significance of apparent diffusion coefficients (ADC) measured with MRI in characterization of cervix cancer is unknown. The purpose of this study was to determine if there was a difference between the ADC of normal cervical stroma compared with cervix carcinoma.

Methods: Thirteen patients with cervix carcinoma and 7 patients with a normal cervix were imaged using a 1.5T MRI system (Twinspeed Excite or Echospeed Lx, GEMS, USA) and a 4-element torso phased-array coil. Axial T2 weighted RARE imaging (TR/TE 3800/98ms, ETL 10, FOV 20cm, 4/1mm, 256x192) and diffusion weighted imaging was performed (EPI, BVal 600 s/mm^2, TR/TE 4000/105ms, FOV 20-30cm. 9/1mm, 16NEX, 128x128). ADC maps were generated using Functool 2 (Adv.Windows Workstation v4.0, GEMS, USA). For each patient the region of interest (ROI) encompassing the normal cervix or cervix carcinoma was defined by a radiologist experienced in pelvic MRI. Care was taken to avoid the endocervical mucosa and parametrium in drawing the ROI's. From each ROI a mean ADC value was recorded. A Mann-Whitney test was used to compare ADC values

Results: ADC values were significantly lower in cervix carcinoma than normal cervical stroma ($p<0.001$) (Fig 1). ADC values in normal stroma ranged from 1734 to 2167 with a median of 1845×10^{-6}mm^2/s. For cervix carcinoma ADC values ranged from 709 to 1772 with a median of 1174×10^{-6}mm^2/s. No significant difference in ADC was found between the 4 patients with adenocarcinoma and the 9 patients with squamous carcinoma of the cervix. No significant difference in ADC was found between mild, moderate and severe grade tumors.

Conclusion: ADC is low in cervix cancer compared to normal cervix. The reason for this is unknown but may be related to higher cellular density in cervix cancer. Although this data is preliminary it suggests that ADC has the potential to be used as a prognostic factor in cervix cancer.

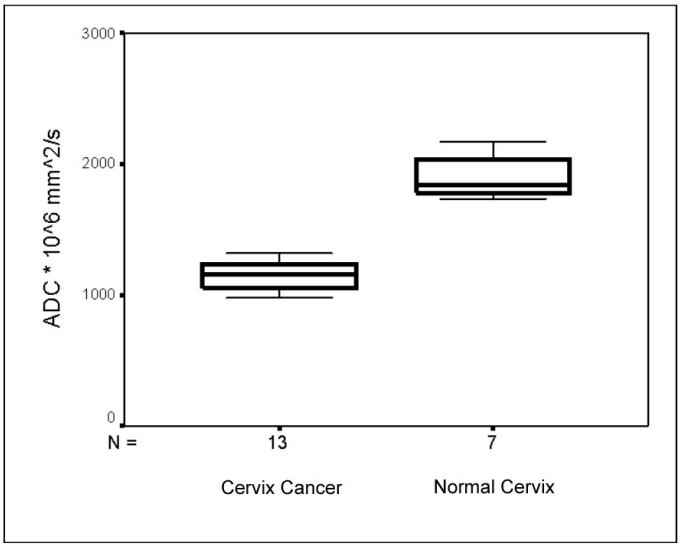

Fig 1. ADC in Normal Cervix & Cervix Carcinoma
Significantly lower ADC ($p<0.001$) is seen in cervix carcinoma compared to normal cervical stroma.

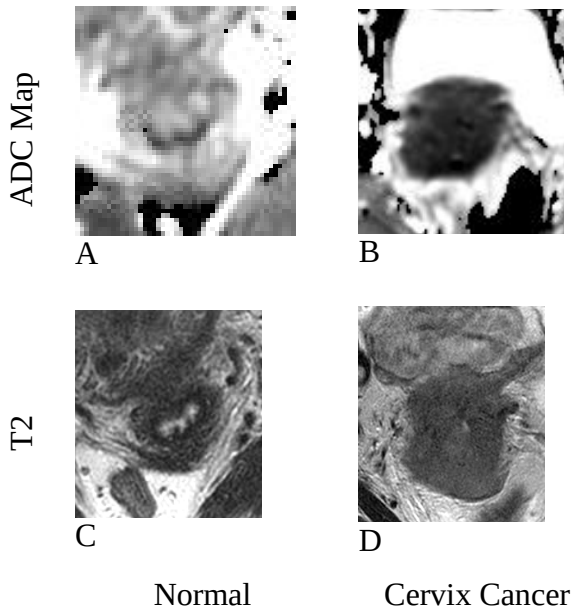

Fig 2. ADC Maps
ADC maps (A & B) are shown on the same grey scale. Note how the ADC is much lower (black) in the cervix cancer (B) compared with normal stroma (A). Corresponding T2 weighted images are shown in C & D