Title	**Evaluation of cervical cancer and normal cervix based on intravoxel incoherent motion imaging model-preliminary experience**
Author(s)	**Lee, EYP; Yu, X; Chan, Q; Khong, PL**
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EVALUATION OF CERVICAL CANCER AND NORMAL CERVIX BASED ON INTRAVOXEL INCOHERENT MOTION IMAGING MODEL-PRELIMINARY EXPERIENCE

PURPOSE/INTRODUCTION: We aim to investigate the differences between cervical cancer (CC) and normal cervix (NC) using intravoxel incoherent motion imaging (IVIM). SUBJECTS AND METHODS: Six patients with CC were prospectively recruited to undergo pre-treatment IVIM and routine MRI on a 3.0-T MRI. IVIM was performed using 13 b-values (0-1000 sec/mm2) and analysis was based on bi-exponential model, in which the tissue diffusion coefficient (D), perfusion fraction of tissue (f) and pseudodiffusion coefficient (D*) were derived. The region of interest (ROI) was manually drawn over the entire tumour on T2-weighted images, and transferred to the IVIM parametric maps. Using a similar method, where NC was identifiable, 5 equal sizes ROIs were placed and the mean value was taken. Tumour volume was manually traced on T2 images. The significant differences between benign and malignant tissue were compared using Mann-Whitney U test. Pearson correlation was used to evaluate the relationship between the IVIM indices and tumour volume. Statistical significance was assumed at $p<0.05$. RESULTS: There were 6 data sets for CC and 4 data sets for NC. In two patients, no normal cervix was identifiable due to large tumours. CC had significantly lower D when compared to NC (0.92±0.16 vs. 1.5±0.02 mm2/s, p=0.010) and also a lower D* (71.74±6.99 vs. 93.12±12.54 mm2/s, p=0.019). Though f was higher in CC, the difference was not significant (0.19±0.04 vs. 0.15±0.01, p=0.114). No correlation was found between the IVIM parameters and tumour volume. DISCUSSION/CONCLUSION: CC had lower D because of the increased cellularity and tortuosity of the extracellular matrix. Our results were concordant with the ADC values shown in CC and NC using moderate to high b-values [1]. Even when using numerous b-values, the results remained robust and the selection of b-values did not influence the diagnostic differentiation between CC and NC. By applying the IVIM model, we were able to evaluate the microcirculation induced by capillary network in CC and NC and demonstrating significant difference between the two tissues. The lower D* in CC could be related to the tortuosity of the neo-vascularity, which impeded the velocity of the blood flow but in turn may contribute towards the increased blood volume, f, though this was not statistically significant. This preliminary study showed that IVIM parameters were different in CC and NC, which could aid in diagnostic differentiation and understanding the physiological variations between benign and malignant cervical tissue.