

ESHNR 2011 Abstract 1:

Title:

Can perfusion sensitized MR diffusion weighted imaging discriminate between benign and malignant nodes for patients with head and neck squamous cell carcinoma?

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Objective:

To investigate fast (perfusion sensitized) and slow (true diffusion sensitized) apparent diffusion coefficient (ADC) measurements as discriminators of benign from malignant lymph nodes in patients with head and neck (H&N) squamous cell carcinoma (SCC).

Materials and Methods:

Seventeen patients with H&N SCC staged for nodal disease using anatomical MRI, contrast enhanced CT and ultrasound \pm fine needle aspiration gave informed consent for additional MR diffusion weighted imaging (DWI). Axial DWI was performed by short tau inversion recovery (STIR) echo planar imaging and trace weighted images obtained b 0, 50, 100, 300, 600 and 1000. Apparent diffusion coefficient (ADC) was calculated by mono-exponential fitting from non-necrotic sections of abnormal and contralateral normal nodes using all 6 b-values (ADC_{6b}); b0-50-100 (ADC_{fast}) and b300-600-1000 (ADC_{slow}). Values were compared between abnormal and normal nodes using the Mann Whitney test. The ability of ADC measures for differentiation between benign and malignant nodes was compared using receiver operating characteristic (ROC) area under curve (AUC) analysis.

Results:

Median ADC_{6b} , ADC_{fast} and ADC_{slow} for normal nodes was 0.97, 2.19 and $0.73 \times 10^{-3} \text{mm}^2 \text{s}^{-1}$ respectively. Correspondingly median ADC_{6b} , ADC_{fast} and ADC_{slow} for abnormal nodes was 0.91, 1.54 and $0.81 \times 10^{-3} \text{mm}^2 \text{s}^{-1}$. There was a significant difference of ADC_{fast} ($p=0.003$) but not for ADC_{6b} ($p=0.290$) or ADC_{slow} ($p=0.493$) between normal and abnormal tissue. ROC AUC was 0.62, 0.82 and 0.57 for ADC_{6b} , ADC_{fast} and ADC_{slow} respectively. An ADC_{fast} threshold of <1.61 has 73.3% sensitivity, 80% specificity for selection of malignant nodes.

Conclusions:

DWI ADC_{fast} (perfusion sensitised ADC) is reduced in malignant nodes allowing differentiation of malignant from benign nodes.