Can Diffusion weighted MR Imaging differentiate Spinal Infection from Malignancy?

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Purpose: To determine the ability of diffusion weighted MR (DWMR) in differentiating spinal infection from malignancy

Method: 27 adult patients (mean age 44.9 years) and 7 children (mean 5.4 years) with suspected spinal infection or malignancy had DWMR performed on a 1.5T system. Sagittal and axial FSE T1 weighted and sagittal fat saturated diffusion weighted EPI images (single shot TR/TE 10000/97, 128X128 matrix, b=0,500,1000 s/mm^2 in three directions) were performed. Regions of interest using soft tissue masses, normal and abnormal bone marrow were identified and the apparent diffusion coefficients (ADC) were calculated for each region of interest. ADC was calculated using the equation ADC=-1/(b1-b2) x ln(S1/S2).The mean ADC for normal bone, infection, and malignancy were compared using the two tailed Student t test.

Results: 29 tuberculous lesions were detected in 20 patients, 5 pyogenic infective lesions in 2 patients and 35 malignant lesions in 12 adults (12 myeloma, 6 lymphoma, 17 metastases). Site of spinal lesions: cervical in 4, thoracic in 47, and lumbar in 32 lesions. 12 soft tissue masses associated with tuberculosis and 2 masses associated metastases noted. ADC of TB (1.23+/- 0.46X10$^{-3)}$, pyogenic or other infections (1.19+/- 0.23X10^{-3}), malignant lesions (0.91+/-0.33^{-3}) were significantly higher than normal bone marrow ADC (0.40+/-0.32X10^{-3} , 0.65+/-0.19X10^{-3}, 0.29+/-0.20-3, 0.55+/-0.17X10^{-3}) (p=0.033, 0.002). The ADC of malignancy was significantly lower than that of TB (p=0.001) and all infections (p=0.001).

Conclusions: Diffusion weighted MR is useful for differentiating spinal infection from malignancy.