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Morphological dignosis using Magnetization Transfer Ratio Imaging by Phase Sensitive Method

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Purpose: Although MRI parameters are efficient in depicting knee joint deterioration, it is sometimes occurred to mis-read and mis-diagnose the common knee joint diseases. In this study, we employed magnetization transfer ratio (MTR) method to improve the diagnosis of the various knee joint diseases.

Materials and Methods: Spin-echo (SE) T2-weighted images (3400-3500/90100ms) were obtained in seven cases, FSE T2-weighted images (4500-5000/100108ms) were obtained in seven cases, gradient-echo (GRE) T2-weighted images (9/4.56/50flip angle, NEX 1) were obtained in 3 cases. In six cases, fat suppressionwas performed using a T2-weighted short T1/tau inverse recovery (STIR) sequence (TR/TE =2894-3215ms/70ms, NEX3, ETL9). For fat saturation, phase sensitive method was used to acquire the phase difference in time as a result of Larmor frequency differences.Calculation of MTR for individual pixels was performed on registration of unsaturated and saturated images. Each input image was obtained from the same dimensionality. Three-dimensional isotropic volume images and the MR tristimulus color mapping was employed.

Results: MTR images showed diagnostic images quality without noise to assess the patients' pathologies. The intensity difference between MTR images and conventional MRI was seen on the color bar. The profile graph on MTR imaging effect showed a quantitative measure of the relative decrease in signal intensity due to the MT pulse. To diagnose the pathologies of the knee joint, the profile graph data was shown on the image as a small cross.

Discussion and Conclusion: The present study indicated that MTR images in the knee joint were feasible. Investigation of physical change on MTR imaging enables to provide us more insight in the physical and technical basis of MTR imaging. MTR images could be useful for rapid assessment of diseases that we examine unambiguous contrast in MT images of knee disorder patients.

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