

Three-Tesla MR elastography for noninvasive assessment of hepatic fibrosis: comparison with diffusion-weighted and gadoxetic acid-enhanced MR imaging

Hee Sun Park, Young Jun Kim, Hae Jeong Jeon, Sung Il Jung

Konkuk University School of Medicine, Korea.

yjkim@kuh.ac.kr

PURPOSE: To evaluate the feasibility of magnetic resonance elastography (MRE) at 3T for the assessment of hepatic fibrosis based on aspartate aminotransferase to the platelet ratio index (APRI), and compare that with diffusion-weighted MR and gadoxetic acid-enhanced MR imaging.

MATERIALS AND METHODS: MR elastography, diffusion weighted MR, and gadoxetic acid-enhanced MR images on 3-Tesla was obtained in 42 consecutive patients (28 men, 14 women; age range, 19–75 years). MRE was performed with modified, phase-contrast, gradient-echo sequences, and the mean stiffness values were measured on the elastograms in kilopascals. Apparent diffusion coefficient (ADC) of the liver was measured using diffusion weighted MR. On gadoxetic acid enhanced MR, contrast enhancement index (CEI) was calculated as signal intensity (SI)_{post}/SI_{pre}, where SI_{post} is liver-to-muscle SI ratio on hepatocytes phase images and SI_{pre} is liver-to-muscle SI ratio on nonenhanced images. APRI was obtained in all patients. Correlation between APRI and three MR parameters (MRE, ADC, and CEI) was assessed. Each MR parameters was compared between chronic liver disease group and non-chronic liver disease group.

RESULTS: Liver stiffness showed strong positive correlation with APRI [Spearman correlation coefficient (r) = 0.773, p < 0.0001], while ADC and CEI showed weak or prominent negative correlation (r = -0.28 and -0.321, respectively). In chronic liver disease group, only liver stiffness showed strong correlation with APRI (r = 0.731, p < 0.0001). Liver stiffness, ADC value, and APRI was significantly different between chronic liver disease group and non-chronic liver disease group (p < 0.05) while CEI was not significantly different between the two groups.

CONCLUSION: MRE at 3-Tesla could be a feasible noninvasive method and is better than diffusion weighted or gadoxetic acid enhanced MR, for the assessment of hepatic fibrosis.