Usefulness of superparamagnetic iron oxide-enhanced T1-weighted echo-planar MR imaging for assessment of positive enhancement in hepatic hemangioma

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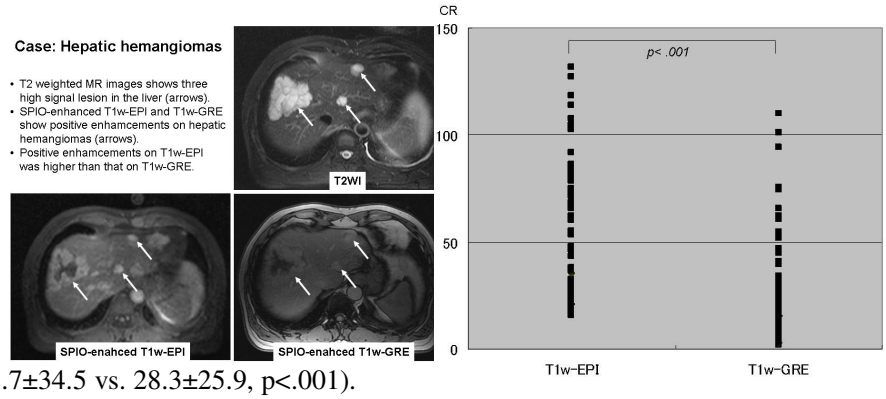
Purpose: The purpose of this study is to clarify the usefulness of superparamagnetic iron oxide (SPIO)-enhanced T1-weighted echo-planar MR imaging (T1w-EPI) in diagnosis of hepatic hemangioma, with the focus on the finding of positive enhancement, compared with SPIO-enhanced conventional T1-weighted gradient-echo MR imaging (T1w-GRE).

Material and Methods: The subjects were consecutive 31 patients with 58 hepatic hamgniomas who underwent SPIO-enhanced MRI for evaluation of hepatic nodule from January 2005 to January 2006. The diagnosis of hepatic hemangioma was made on the basis of typical radiological findings and follow-up radiological examinations. MR imaging was performed by 1.5 T MR scanner (Siemens Magnetom Sonata). T1w-EPI was obtained by single-shot EPI sequence during breath holding. The imaging parameters of T1W-EPI were set as follows: repetition time ms/echo time ms=642/8.2; matrix=128×128; flip angle=90; EPI factor=256; field of view=35cm; section thickness=5mm; slice number=19; total acquisition time=25sec; average=2; iPAT=2. T1-weighted gradient-echo MR images were obtained by FLASH sequence during breath holding. The imaging parameters of T1W-GRE were set as follows: repetition time ms/ (double)echo time ms=125/2.44 (4.76); matrix=256×256; flip angle=90; field of view=35cm; section thickness=8mm; slice number=15; total acquisition time=25sec; average=1. These SPIO enhanced T1-weighted MR images were obtained 4-6 minutes after administration of 0.8 μmol/kg of ferucarbotran. The signal intensities of normal hepatic parenchyma (SI_{liver}) and hepatic hemangioma (SI_{hema}) were measured. Lesion-liver contrast ratio (CR) were calculated; $CR = (SIl_{hema} - SI_{liver}) / SI_{liver}$. The mean of CR on T1w-GRE and that on T1w-EPI were compared. A non-parametric test based on the Wilcoxon statistic was used.

Results: The mean of CR on SPIO enhanced T1w-EPI was statistically higher than that on SPIO-enhanced T1w-GRE (mean ±standard deviation: 58.7±34.5 vs. 28.3±25.9, p<.001).



Conclusion: Addition of SPIO-enhanced T1-weighted echo-planar MR imaging was useful for assessment of positive enhancement in hepatic hemangioma.