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IV-1

Cerebral Blood Volume and Perfusion Rate Mapping with Contrast Enhanced Gradient Echo EPI

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Purpose: To assess regional cerebral blood volume and perfusion rate with MR imaging

Materials and methods: Eight normal volunteers and 2 patients with suspicious brain infarct had taken MR imaging after bolus injection of double dose (0.2 mMol/kg) gadolinium. Gradient echo EPI was used with TR/TE=1500/65 msec, flip angle=90o, matrix size=256x128, and FOV=20x40 cm. 100 sequential images were obtained. Time-signal intensity curve was plotted, and converted to time-concentration (ΔR2) curve. Relative cerebral blood volume was obtained with integration of Δ R2 curve of each pixel by pixel. Perfusion rate was determined by obtaining maximum slope of Δ R2 curve and time to reach maximal slope. rCBV and perfusion rate mapping were done with gray scale. Volume of major artery, gray and white matter was evaluated with ROI method.

Result: On volume maps, major arteries showed high signal intensity with four to six times higher than gray matter signals. Gray/white matter ratio ranged from 1.8 to 3.11. On perfusion rate images, similar degree of signal intensities were produced as volume maps.

Conclusion: Perfusion MRI with volume map and rate images is safe and convenient method which can be performed with other conventional MR technique. Clinical application to determination of vascularity in brain tumors and acute cerebral ischemia is expected.