

MRI diffusion-weighted (DW) and perfusion-weighted imaging (PWI) have been reported to be sensitive for stroke detection. In this study quantitative analysis is done. Forty patients were evaluated using single shot echo planar imaging (EPI). Contrast-to-noise ratio (CNR) and signal-to-noise ratio (SNR) of ischemic regions were measured for DW-EPI, FLAIR-EPI, isotropic DWI and apparent-diffusion-coefficient (ADC) images. The isotropic DWI has the highest CNR and is the most sensitive to acute stroke, followed by DW-EPI. However the DW-EPI source image with diffusion gradient along at least one direction should also be evaluated. The PWI images were analyzed using post processing of relative cerebral blood volume (rCBV), mean transit time (MTT), and comparing signal vs. time plot. The dynamic range of the MTT is limited by the repetition time (TR) of 1.8 s of the acquisition. The rCBV is the most sensitive if there is no significant perfusion at ischemic regions. The ROI signal vs. time curve is very useful in confirming ischemia with various severity. From the measured normal patient perfusion images, the signal difference between base and maximum enhancement ranges from 30 to 90 (relative intensity), and the time difference of maximum enhancement is around 0-3.6 s, depending on the vascular territory and patient. When combined with appropriate image post processing and analysis, EPI diffusion and perfusion imaging is becoming an excellent choice for routine clinical stroke evaluation.

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