Perfusion MR Imaging and SPECT in Acute Ischemic Stroke : Evaluation of Brain Tissue Outcome

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목적(Purpose): To predict the brain tissue outcome in acute cerebral ischemic stroke, we investigated the usefulness of relative cerebral blood volume (rCBV) measured by perfusion MR imaging and relative cerebral blood flow (rCBF) measured by SPECT.

대상 및 방법(Materials and Method): The rCBV and rCBF maps were obtained with dynamic contrast-enhanced $T2^*$-weighted perfusion MR imaging and ^{99m}Tc-HMPAO SPECT, respectively, in 11 patients with acute unilateral middle cerebral artery occlusion within 6 hours after onset. Follow-up CT or MR imaging was conducted 24 hours to 28 days after stroke onset. Multiple ROIs were placed in affected and contralateral corresponding MCA distribution on rCBV and rCBF maps to measure lesion-to-contralateral ratios. The rCBV and rCBF ratios were compared between regions with and without evolving infarction.

결과(Results): The mean rCBV ratios in infarcted and non-infarcted regions were 0.55 ± 0.25 and 0.93 ± 0.14, respectively ($p < 0.0001$). The mean rCBF ratios in infarcted and non-infarcted regions were 0.38 ± 0.20 and 0.69 ± 0.15, respectively ($p < 0.0001$). Cutoff value to discriminate between infarction and non-infarction was 0.71 for rCBV ratio and 0.54 for rCBF ratio. The correct classification rate between infarction and non-infarction was 84% by rCBV, 75% by rCBF, and 86% by combination of both parameters.

결론(Conclusion): The rCBV and rCBF of infarcted regions were significantly lower than those of non-infarcted regions. Measurement of rCBV and rCBF is useful to predict the brain tissue outcome in acute ischemic stroke within 6 hours after onset.