A Novel Collateral Images Derived from Time-Resolved Dynamic Contrast-Enhanced Magnetic Resonance Angiography in Acute Ischemic Stroke.

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Background and Purpose We developed a new MR collateral imaging technique by using dynamic signals from time-resolved contrast-enhanced MR angiography (TR-MRA) named "Phase Map" and evaluated its ability to predict neurological outcome in patients with acute ischemic stroke due to occlusion of the internal carotid artery (ICA) and/or MCA (M1). Material and Methods.100 patients were finally included in this study. Endovascular therapy (EVT) was performed in 54 cases in 53 patients. Based on 6-point and 3-point scale MAC (Magnetic resonance Acute ischemic stroke Collateral) scoring system, Phase Map was graded by two experienced interventional neuroradiologists in consensus. The baseline NIHSS score, stroke risk factors, parameters of EVT, and Phase Map were assessed. Their association with good outcome was analyzed. Results: 51 patients had a good outcome at 3-month. In univariate analysis, younger age, lower initial NIHSS score, absence of hypertension, better collateral on Phase Map were associated with a good outcome. In multivariate analysis, only better collateral on Phase Map was an independent predictor of a good outcome on both 6-point and 3-point scale scoring systems (OR, 2.65; 95% CI, 1.64 –4.70; and OR, 6.60; 95% CI, 2.44 –21.85). 30 in 53 patients treated with EVT had a good outcome. In univariate analysis, lower initial NIHSS score, atrial fibrillation, better collateral score based on 3-point scale scoring system were associated with a good outcome. In multivariate analysis, only better collateral on Phase Map was an independent predictor of a good outcome (OR, 3.59; 95% CI, 1.39 –11.25).Conclusion: Better collateral on Phase Map derived from TR-MRA is a robust predictor of good outcome in patients with acute ischemic stroke.