BeamSAT

There has been no effective method to predict ischemic intolerance to temporary internal carotid artery occlusion during carotid artery reconstruction. Pencil beam pre-saturation (BeamSAT) pulse suppresses the flow signal of target vessel in magnetic resonance angiography (MRA). Applying this method, Tanaka et al., constructed “ICA-selective MRA” images. The aim of the study was to identify patients at risk for ischemic intolerance by ICA-selective MRA.

By evaluating flow of anterior communicating artery, A1 portion of anterior cerebral artery with ICA-selective MRA, and posterior communicating artery with conventional MRA, they investigated associations of these collateral flow patterns with ischemic intolerance and the decrease of regional cerebral oxygen saturation (rSO2).

Fifty-eight patients who underwent CEA/CAS were included. Six of 7 patients without Acom flow and Pcom flow demonstrated ischemic intolerance, while all patients (n = 51) with Acom and/or Pcom flow demonstrated tolerance. The accuracy of this prediction model according to Acom and Pcom flow patterns for ischemic intolerance was 0.98 (p = 0.01, binomial test). The decrease of rSO2 after ICA occlusion was significantly larger in patients without Acom flow and Pcom flow (12.0±6.0%) than in those with Acom flow and Pcom flow (3.0±3.1%, p < 0.01) and in those with Acom flow but no Pcom flow (2.4±5.2%, p < 0.01).

These findings support the importance of Acom flow as a collateral route. ICA-selective MRA enables an excellent prediction of ischemic intolerance to temporary ICA occlusion during CEA or CAS. This method provides valuable information regarding the probability of an ischemic complication 1).