Maximum systolic velocity

Peak systolic velocity

Internal carotid artery hemodynamics (maximum systolic velocity and average velocity [Vmax , Vavg], average blood flow [Flowavg], and wall shear stress) were analyzed based on 4D flow MRI data. Cerebral infarction, defined as the occurrence of events, in 124 brain hemispheres was determined according to clinical symptoms and conventional Brain magnetic resonance imaging.

Statistical tests: The independent-sample T-test was used to evaluate differences in Internal carotid artery hemodynamics between infarcted and non-infarcted hemispheres. Binary logistic regression was performed to investigate the relationship between ICA hemodynamics and events. A P value < 0.05 was considered statistically significant.

Results: Sixty-one infarcted hemispheres (eight hemispheres with acute ischemic damage, 30 with chronic ischemic damage, and 23 with chronic hemorrhagic damage) had cerebrovascular events and 63 non-infarcted hemispheres did not. The hemodynamic parameters in the infarcted hemispheres (Vmax : P < 0.001; Vavg : P = 0.003; and Flowavg : P = 0.004) were significantly lower than those in the non-infarcted hemispheres. However, Vmax (P = 0.052), Vavg (P = 0.107), and Flowavg (P = 0.074) were not significantly different among hemispheres with acute ischemic lesions, chronic ischemic lesions and chronic hemorrhagic lesions. Vmax (odds ratio 3.033, 95% CI: 1.075-8.562) was independently associated with cerebrovascular events.

Data conclusion: Vmax may be a higher risk factor for cerebrovascular events in MMA patients.

Evidence level: 2 TECHNICAL EFFICACY STAGE: 3 [1)]

1)
Wang M, Yang Y, Zhang W, Zhou F, Zhang X, Zhang J, Zhang B. Risk Factors for Cerebrovascular Events in Moyamoya Angiopathy Using 4D Flow MRI: A Pilot Study. J Magn Reson Imaging. 2022 Nov 9. doi: 10.1002/jmri.28522. Epub ahead of print. PMID: 36349829.

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