Thrombus Permeability Is Associated With Improved Functional Outcome and Recanalization in Patients With Ischemic Stroke

In this study, the authors hypothesized that in acute ischemic strokes, more permeable intracranial arterial thrombi (as opposed to less permeable thrombi) could be associated with better clinical outcomes and improved response to intra-arterial therapy. The authors examined the attenuation increase on computed tomographic angiography (CTA) and void fraction, using combination of noncontrast computed tomography and CTA, as a surrogate for contrast penetration in thrombi and thrombus permeability, and correlated these to clinical outcomes. The study examined 184 patients from the Multicenter Randomized Clinical Trial of Endovascular Treatment for Acute Ischemic Stroke in the Netherlands (MR-CLEAN) study. To measure thrombus attenuation, CTA images were aligned by automated algorithm to noncontrast computed tomography. Regions of interest were constructed to measure the attenuation within the thrombus and contralateral artery. Thrombus perviousness was estimated by (1) the increase in the attenuation of the thrombus on the CTA when compared with the noncontrast computed tomography and (2) the thrombus void fraction (ratio of the thrombus void volume over the total thrombus volume). The primary outcome measure was favorable outcome at 90 days (modified Rankin Scale score, ≤2), and secondary outcomes included modified Rankin Scale, early recanalization, and final infarct volume. The median thrombus intensity increase was 7.6 HU (interquartile range, 0.30–17.4) for unfavorable outcome and 15.3 HU (interquartile range, 7.5–27.8) for a favorable outcome (P<0.001). The median void fraction was 4.2% (interquartile range, 0.2–10.5) for unfavorable outcome and 10.2% (interquartile range, 4.5–17.9) for favorable outcome (P<0.001). Sensitivity analyses showed that a thrombus was considered pervious when the intensity increase on CTA was larger than the threshold of 10.9 HU, with 64% specificity and sensitivity, and when the thrombus void fraction was 6.5% (66% specificity; 62% sensitivity). The odds ratio for favorable outcome of a patient with a pervious thrombus were 3.2 (95% confidence interval [CI], 1.7–6.4) for increased attenuation and 3.3 (95% CI, 1.7–6.3) for thrombus void fraction. Furthermore, thrombus perviousness was significantly associated with the final score on the modified Rankin Scale score, recanalization rates, and final infarct volume. These measures may, thus, prove useful for early prognostication and treatment selection of patients with acute ischemic stroke. See p 732.

Clinical and Procedural Predictors of Outcomes From the Endovascular Treatment of Posterior Circulation Strokes

The authors undertook this study given their concern that little data are available to guide optimal endovascular therapy in acute ischemic strokes of the posterior circulation. The authors analyzed data from 100 consecutive patients with posterior circulation strokes who underwent stent retriever thrombectomy or primary aspiration thrombectomy in selected US centers. Strokes included occlusions of the basilar artery, posterior cerebral artery, or V4 segment vertebrobasilar artery. The analysis focused on clinical and imaging predictors of clinical success and arterial recanalization. Patients included could be treated ≤24 hours after symptom onset. The Thrombolysis in Cerebral Infarction score of 2b to 3 defined successful recanalization; favorable 90-day outcome was defined as an modified Rankin Scale score of ≤2 and symptomatic intracranial hemorrhage as those with a worsening of the National Institutes of Health Stroke Scale score. The mean patient age was 63.5±14.2 years, mean admission National Institutes of Health Stroke Scale score was 19.2±8.8, and successful recanalization occurred in 80% of cases. The mortality rate during hospitalization was 30%, and 35% of patients had favorable 3-month outcome. Univariate predictors of outcome included higher baseline National Institutes of Health Stroke Scale for poor outcome (P=0.0004), shorter time from symptom onset to the start of the procedure (femoral puncture: mean time, 432 minutes versus 637 minutes in patients with poor outcomes; P=0.015), and successful recanalization with favorable 3-month outcome (P=0.0013). In multivariate analysis, predictors of favorable 3-month outcome included the start of the procedure within 6 hours (P=0.011) and recanalization within 6 hours (P=0.0039). Clinical and procedural outcomes were comparable between the 2 thrombectomy devices primarily used. These important data indicate that early (<6 hours) thrombectomy with either stent retrievers or aspiration thrombectomy for posterior circulation strokes leads to improved clinical outcomes and successful recanalization. It is hoped that these findings may be corroborated by the results of the ongoing Basilar Artery International Cooperation Study (BASICS), allowing for further evidence-based information to help guide clinicians in the management of this potentially devastating stroke. See p 782.
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