NEURORADIOLOGY

COMMENTARY

The neuroradiology highlights in this issue focus primarily on stroke intervention. Results of the EVA-3S trial came as a body blow to individuals such as myself, who are proponents of carotid stenting. The trial, which compared the outcome in symptomatic patients with atherosclerotic carotid artery disease undergoing carotid endarterectomy versus stenting, was published in NEJM in October. It was prematurely stopped as the results in the endarterectomy group were significantly better and it was felt that to carry on randomizing patients to stenting would be unethical. The conclusion is that in symptomatic patients who are otherwise fit for surgery, endarterectomy is the treatment of choice.

The second abstract (Maleux et al) also points to the dangers of stenting, this time highlighting that distal protection devices only give partial protection against embolic events. Using pre- and post-stenting diffusion-weighted images the investigators found new ischemic foci in over 40% of patients undergoing stenting. Again, the conclusion being that stenting should only be considered in patients either unable or unwilling to undergo endarterectomy.

Mechanical clot retrieval has been receiving a great deal of attention. One of the most widely used devices is the Merci retriever. In a small study, Kim et al report its relative safety in a broad cohort of patients including patients failing intravenous tPA and presenting outside the tPA window. With the development of safer devices along with evidence such as this paper (and larger studies, e.g. the MERCI I & MERCI II trials), mechanical clot lysis and/or retrieval are becoming acceptable therapies especially in patients with high scores on the NIH stroke scale.

The last abstract reinforces something that most of us already know: Vertebro-basilar occlusion is a bad disease. Patients who failed recannalization with intra-arterial tPA did poorly, as did patients who had coma lasting more than 4.5 hours. These patients need to be diagnosed quickly and managed aggressively.

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Mas JL et al, for the EVA-3S Investigators.
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ENDARTERECTOMY VERSUS STENTING IN PATIENTS WITH SYMPTOMATIC SEVERE CAROTID STENOSIS

BACKGROUND: Carotid stenting is less invasive than endarterectomy, but it is unclear whether it is as safe in patients with symptomatic carotid-artery stenosis. METHODS: We conducted a multicenter, randomized, noninferiority trial to compare stenting with endarterectomy in patients with a symptomatic carotid stenosis of at least 60%. The primary end point was the incidence of any stroke or death within 30 days after treatment. RESULTS: The trial was stopped prematurely after the inclusion of 527 patients for reasons of both safety and futility. The 30-day incidence of any stroke or death was 3.9% after endarterectomy (95% confidence interval [CI], 2.0 to 7.2) and 9.6% after stenting (95% CI, 6.4 to 14.0); the relative risk of any stroke or death after stenting as compared with endarterectomy was 2.5 (95% CI, 1.2 to 5.1). The 30-day incidence of disabling stroke or death was 1.5% after endarterectomy (95% CI, 0.5 to 4.2) and 3.4% after stenting (95% CI, 1.7 to 6.7); the relative risk was 2.2 (95% CI, 0.7 to 7.2). At 6 months, the incidence of any stroke or death was 6.1% after endarterectomy and 11.7% after stenting (P=0.02). There were more major local complications after stenting and more systemic complications (mainly pulmonary) after endarterectomy, but the differences were not significant. Cranial-nerve injury was more common after endarterectomy than after stenting. CONCLUSIONS: In this study of patients

with symptomatic carotid stenosis of 60% or more, the rates of death and stroke at 1 and 6 months were lower with endarterectomy than with stenting. (ClinicalTrials.gov number: NCT00190398 [ClinicalTrials.gov])

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Maleux G, Demaerel P, Verbeken E, Daenens K, Heye S, Van Sonhoven F, Nevelsteen A, Wilms G.

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CEREBRAL ISCHEMIA AFTER FILTER-PROTECTED CAROTID ARTERY STENTING IS COMMON AND CANNOT BE PREDICTED BY THE PRESENCE OF SUBSTANTIAL AMOUNT OF DEBRIS CAPTURED BY THE FILTER DEVICE

PURPOSE: Protected carotid artery stent placement is currently under clinical evaluation as a potential alternative to carotid endarterectomy. The current study was undertaken to determine the incidence of new ischemic lesions found on diffusion-weighted MR imaging (DWI) in nonselected patients after protected carotid artery stent placement using a filter device and to determine the potential relationship between these new ischemic lesions and the presence or absence of a clear amount of debris captured by the neuroprotection filter device. MATERIALS AND METHODS: A nonrandomized cohort of 52 patients (40 men, 12 women) presenting with carotid occlusive disease underwent protected carotid artery stent placement using a filter device. DWI obtained 1 day before stent placement was compared with that obtained 1 day after stent placement. In addition, the macroscopic and microscopic analysis of debris captured by the filter device during the carotid stent placement procedure was assessed. RESULTS: Neuroprotected carotid stent placement was technically successful in all 53 procedures but was complicated by a transient ischemic attack in 3 patients (5.6%). In 22 patients (41.5%), new ischemic lesions were found on DWI, and in 21 filter devices (39.6%), a substantial amount of atheromatous plaque and/or fibrin was found. No clear relationship between the presence of debris captured by the filter device and new lesions detected by DWI was found (P = .087; odds ratio 3.067). CONCLUSION: Neuroprotected carotid artery stent placement will not avoid silent cerebral ischemia. Systematic microscopic analysis of debris captured by the filter device has no predictive value for potential cerebral ischemia after carotid artery stent placement.

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Kim D, Jahan R, Starkman S, Abolian A, Kidwell CS, Vinuela F, Duckwiler GR, Ovbiagele B, Vespa PM, Selco S, Rajajee V, Saver JL.

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ENDOVASCULAR MECHANICAL CLOT RETRIEVAL IN A BROAD ISCHEMIC STROKE COHORT

BACKGROUND AND PURPOSE: Our aim was to describe an expanded experience with endovascular mechanical embolectomy in a broad group of patients, including those not meeting entry criteria for the MERCI multicenter trials. METHODS: We performed an analysis of all patients with ischemic stroke treated with the Merci Clot Retrieval Device at a single academic center outside of the Mechanical Embolus Removal in Cerebral Ischemia (MERCI) trials. RESULTS: Twenty-four patients were treated with the device. Nine were MERCI trial ineligible: 4 received intravenous (IV) tissue plasminogen activator (tPA), 1 received IV tPA and was younger than 18 years of age, and 4 had time-to-treatment of longer than 8 hours. Mean age was 64 years (range, 14-89 years; 42% women). Median National Institutes of Health Stroke Scale (NIHSS) score was 21 (range, 11-30). Median symptoms-to-procedure-start time was 303 minutes (range, 85-2385 minutes). Recanalization (Thrombolysis in Myocardial Infarction, 2-3) was achieved in 15/24 (63%). In device-only patients, recanalization occurred in 10/16. In patients who failed IV tPA undergoing rescue embolectomy, recanalization was achieved in 4/5. Three patients unresponsive to device therapy received rescue intra-arterial tPA/abciximab; recanalization was achieved in 2/3. Recanalization was achieved in 3/4 patients in whom treatment was started longer than 8 hours after symptom onset. Asymptomatic hemorrhage occurred in 38%; symptomatic hemorrhage, in 8%. Three device fractures occurred; none worsened clinical outcome. In-hospital mortality was 17%; 90-day mortality, 29%. Good 90-day functional outcome (modified Rankin Scale, 2) was achieved by 25% (6/24). CONCLUSIONS: Endovascular mechanical embolectomy is an effective means of achieving revascularization in patients with acute ischemic stroke,

including patients with late treatment start and intravenous tPA failure. Device-based therapy achieved recanalization in nearly two thirds of patients and good clinical outcomes in one fourth, with symptomatic hemorrhage in less than one tenth.

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OUTCOME OF ACUTE VERTEBROBASILAR OCCLUSIONS TREATED WITH INTRA-ARTERIAL FIBRINOLYSIS IN 180 PATIENTS

BACKGROUND AND PURPOSE: To evaluate predictors of recanalization and a favorable neurologic outcome in patients with acute vertebrobasilar occlusion (VBO) treated with local intra-arterial fibrinolysis (LIF). METHODS: The multicentric data of 180 patients with acute VBO treated with LIF were retrospectively evaluated. The modified Rankin scale (mRS) was used to evaluate the neurologic status before LIF and at the time of discharge. Patient's sex, age, etiology of VBO, recanalization, symptom duration before LIF, and pretreatment mRS were correlated with posttreatment mRS. Multiple logistic regression analysis was used to identify independent variables for recanalization and neurologic outcome. RESULTS: The overall mortality was 43%. Complete recanalization was achieved in 99 (55%) patients and a partial recanalization in 35 (19%) patients, respectively. Recanalization was significantly associated with a favorable outcome ($P < .001$). The success of recanalization was negatively correlated with the volume of the thrombus ($P < .001$). No correlation was found between site and etiology of VBO and recanalization. Neurologic outcome correlated strongly with the pretreatment mRS ($P < .001$) and also with age ($P < .02$). Coma lasting less than 4.5 hours led to a positive trend toward a better outcome after univariate testing ($P < .001$). CONCLUSIONS: Success of recanalization and neurologic status before treatment predict neurologic outcome in patients with VBO. Thrombus volume has an adverse effect on the recanalization success