

Failed Thrombectomy in Acute Ischemic Stroke Return of the Stent?

Jens Fiehler, MD, PhD

See related article, p 958

Best currently available evidence for intracranial stenting (ICS) in intracranial atherosclerotic disease (ICAD) patients comes from secondary stroke prevention studies.^{1,2} However, these data do not allow any conclusion on the efficacy or safety of ICS in acute stroke patients. Chang et al³ present multicenter experiences with permanent ICS as rescue therapy after failed mechanical thrombectomy (MT) in patients with acute ischemic stroke in the carotid territory. In their study, MT failed in 148 of 591 (25%) patients with occlusions of the internal carotid artery or middle cerebral artery (M1). This rate exceeds the rate of poor recanalization of 8% to 18% as known from the large recent MT trials⁴⁻⁸ which at least in part might be explained by different incidence of ICAD in the trial populations.

In their study, Chang et al³ observed significantly better outcomes after rescue ICS than after traditional management without increasing symptomatic intracranial hemorrhage rate or mortality (modified Rankin Scale score of 0–2; 39.6% versus 22.0%; $P=0.031$). The decision for ICS was at discretion of the operator who obviously had a good judgment. To put these results into perspective, it is important to remind the reader of some previous observations.

More than 10 years ago, several groups published encouraging experiences with permanent ICS using self-expanding stents as primary treatment option in acute stroke cases in the carotid circulation.⁹⁻¹² Recanalization rates and outcomes of these single-arm series of mainly embolic stroke patients were promising but became obsolete after publication of the first experiences of MT with stent retrievers. Stent retrievers allowed superior results without the need for permanent stent placement and all its potential risks.

Chang et al³ revisited this approach for a different indication: rescue treatment after failed MT, presumably because of underlying ICAD. It does not surprise that their results in this complex and challenging condition are inferior to the above studies where permanent stenting was used as primary treatment in patients with embolic stroke in the majority of the cases. However, the results after ICS compare favorably with patients with failed recanalization after MT without further invasive

therapy. From previous studies of endovascular stroke treatment, we know that in the population with failed recanalization (Thrombolysis in Myocardial Infarction, 0–1), only ≈15% of patients achieve a good favorable outcome at day 90.^{13,14}

Acute stroke caused by in situ thrombosis at the site of ICAD differs from that caused by embolic occlusion and may not respond in the typical way to mechanical embolectomy procedures such as stent retriever embolectomy alone or manual aspiration embolectomy alone. A central problem is the chance of arterial reocclusion within minutes or hours after an initially successful recanalization. The angioplasty procedure without ICS widens the arterial lumen, but in several conditions, an additional mechanical scaffold is required for holding back the intimal flap and securing the intra-arterial flow. Unfortunately, there is no reliable way to discriminating these conditions from more benign residual stenoses.

This additional benefit of a stent is potentially minimized by the need for additional antiplatelet therapy that might increase the risk of reperfusion-related hemorrhage. This risk is known to be dependent on infarct size and the degree of perfusion impairment. In an own publication, we found even the use of the comparably aggressive treatment with glycoprotein IIb/IIIa antagonists to improve the outcome.^{15,16} Combined therapy of intravenous glycoprotein IIb/IIIa antagonists and half dose intra-arterial recombinant tissue-type plasminogen activator with additional percutaneous transluminal angioplasty/stenting seemed to improve neurological outcome in acute vertebrobasilar occlusion.

The article of Chang et al³ is the largest series after failed MT in the carotid circulation but not the first of its kind. It is well established that arterial occlusions related to ICAD are associated with a longer procedural time and poorer clinical outcome.¹⁷ Emergent intracranial angioplasty has been recently suggested as an effective treatment option for the management of underlying ICAD after MT. For example, Yoon et al¹⁸ reported a successful revascularization rate of 95% and a favorable outcome rate of 65% with this strategy. Kim et al¹⁹ compared 46 patients with acute stroke received emergent intracranial angioplasty with or without stent placement for intracranial atherosclerotic stenosis. Acute reocclusion was 28× more frequent among those with suboptimal angioplasty than among those without it.

In conclusion, acute ICS seems to be a valid option after failed MT for selected acute stroke patients with suspected ICAD. This method could be applied in 5% to 30% of MT treatments dependent on ethnicity and geographical location. It should be subject of prospective single-arm studies. If the results confirm the observations of Chang et al,³ a randomized trial is the next logical step.

The opinions expressed in this article are not necessarily those of the editors or of the American Heart Association.

From the Department of Diagnostic and Interventional Neuroradiology, University Medical Center Hamburg-Eppendorf, Germany.

Correspondence to Jens Fiehler, MD, PhD, Department of Diagnostic and Interventional Neuroradiology, University Medical Center Hamburg-Eppendorf, Martinistrasse 52, 20246 Hamburg, Germany. E-mail fiehler@uke.de

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