

Meta-analysis: Endovascular Therapy Improves Outcomes in Acute Ischemic Stroke

Key Points:

- Higher rate of favorable outcome seen with endovascular therapy vs. IV thrombolysis alone for acute ICA stroke
- Angioplasty/thrombectomy also shows more intracerebral hemorrhage, but no difference in mortality
- Subgroup of ICA terminus occlusion strokes may also benefit from endovascular therapy

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Monday, July 23, 2012

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Endovascular therapy improves neurologic outcomes compared with IV thrombolysis alone in patients with acute ischemic stroke from internal carotid artery (ICA) occlusion. And although angioplasty and thrombectomy cause more symptomatic intracerebral hemorrhage, this does not affect mortality, according to a meta-analysis published online July 17, 2012, ahead of print in *Stroke*.

Elad I. Levy, MD, of University at Buffalo, State University of New York (Buffalo, NY), and colleagues, pooled data from 28 studies with 969 patients who either received IV thrombolysis (n = 385) or endovascular therapy (n = 584)—alone or after IV lytic therapy—for acute stroke due to ICA occlusion. In the IV thrombolysis group, all studies used tPA except for one that used urokinase, and in the endovascular group, therapy consisted of angioplasty with or without stenting, and/or thrombectomy (mechanical and/or aspiration). No randomized trials or direct comparisons were included in the analysis.

Favorable outcomes (at 3 months in the majority of studies), based on modified Rankin Scale, Barthel Index, or NIH Stroke Scale, were improved in the endovascular group. Rates of symptomatic intracerebral hemorrhage, though, were higher in endovascular patients, while mortality beyond 3 months was similar between groups (table 1).

Table 1. Meta-analysis: Primary Outcomes

	IV Thrombolysis (n = 385)	Endovascular (n = 584)	OR (95% CI)	P Value
Favorable Neurologic/ Functional Outcome	24.9%	33.6%	0.66 (0.49-0.88)	0.004
Symptomatic Intracerebral Hemorrhage	4.9%	11.1%	0.42 (0.24-0.7)	0.001
Mortality	27.3%	32.0%	0.8 (0.6-1.06)	0.12

Subgroup analysis showed similar results in patients with cervical ICA occlusions (table 2).

Table 2. Primary Outcomes in Cervical ICA Occlusion Subgroup

	IV Thrombolysis (n = 338)	Endovascular (n = 193)	OR (95% CI)	P Value
Favorable Neurologic Outcome	26.3%	43.5%	0.46 (0.32-0.68)	< 0.0001
Symptomatic Intracerebral Hemorrhage	3.9%	11.4%	0.31 (0.15-0.63)	0.0011
Mortality	27.2%	26.4%	1.041 (0.7-1.56)	0.85

In patients with ICA terminus occlusion strokes, however, favorable outcomes were equivalent between IV thrombolysis patients and endovascular patients (19.2% vs. 28.5%; $P = 0.34$), as were intracerebral hemorrhage rates (23.1% vs. 9.9%; $P = 0.082$) and mortality rates (30.8% vs. 29.8%; $P = 0.91$).

In explaining the higher intracerebral hemorrhage rates with endovascular therapy, the authors noted that such treatment is often given beyond the accepted time frame for IV thrombolysis as well as after tPA failure. Nevertheless, "When considered together with our finding of a higher rate of favorable functional outcomes, [the study] suggests that an endovascular approach in treating strokes with ICA occlusion results in overall better clinical outcomes, when compared to systemic thrombolysis alone," they conclude.

Patients Often Considered Too High Risk

Study coauthor Maxim Mokin, MD, PhD, also of University at Buffalo, noted that in clinical practice, emergency room physicians and neurologists often prefer conservative management when they encounter patients with ICA occlusion. "These patients typically present with devastating neurological deficits, and some physicians consider any active treatment (either IV thrombolysis or catheter-based endovascular interventions) too high risk and futile," he told TCTMD in an e-mail communication. "The study tells us that all patients who suffer a stroke secondary to ICA occlusion who are not candidates for IV thrombolysis should be evaluated for endovascular therapy."

Dr. Mokin noted that the study did not include data on mortality rates in patients with intracerebral hemorrhage, so it is difficult to speculate as to how higher hemorrhage rates did not translate into higher mortality in the endovascular group. The finding "could be explained by lower mortality rates in endovascular patients without the hemorrhage," he added.

According to the literature, roughly 5% to 20% of acute ICA stroke patients are offered endovascular therapy, Dr. Mokin said, adding that in his own group's experience, a combination of treatment approaches including angioplasty and stenting is often required. In addition, "because many patients tend to have 'tandem' occlusions [in additional arteries], other treatments we tend to use include aspiration thrombectomy and more recently developed stent-retrieval technology," he said.

Specialist Training Necessary

Dr. Mokin noted that clinicians should have specialized training to deal with these complex patients. "Not every patient is a safe candidate for revascularization. If patients have a significant amount of brain tissue with irreversible damage, the risk of reperfusion hemorrhage can outweigh the benefit of treatment," he said. "Specialists with endovascular neurosurgical training should have experience with evaluation of acute stroke patients and also be familiar with modern stroke imaging technology to ensure patient safety."

A prospective study comparing both IV thrombolysis and endovascular treatment in patients with ICA occlusion should be the next step, Dr. Mokin noted, adding that regardless, "every patient with ischemic stroke who is found to have acute ICA occlusion should be evaluated by a neuroendovascular specialist."

Source:

Mokin M, Kass-Hout T, Kass-Hout O, et al. Intravenous thrombolysis and endovascular therapy for acute ischemic stroke with internal carotid artery occlusion: A systematic review of clinical outcomes. *Stroke*. 2012;Epub ahead of print.

Disclosures:

- Dr. Levy reports receiving research grant support/other research support (devices) and honoraria from Boston Scientific; research support from Codman and Shurtleff and ev3/Covidien; having ownership interests in Intratech Medical and Mynx/Access Closure; serving as a consultant for Codman and Shurtleff, ev3/Covidien, and TheraSyn Sensors; and receiving fees for carotid stent training from Abbott Vascular and ev3/Covidien.
- Dr. Mokin reports no relevant conflicts of interest.

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