



Carotid Stenosis Significantly Delays Reperfusion During Endovascular Treatment of Stroke in the IMS-III Trial

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Introduction

In patients undergoing interventional treatment for acute ischemic stroke (AIS), proximal arterial stenosis may hinder access to the arterial occlusive lesion (AOL), compromise inflow during the intervention and prolong events leading to cerebral reperfusion. We examined proximal arterial stenosis in the Interventional Management of Stroke (IMS)-III trial, hypothesizing that it would impede successful endovascular therapy for AIS and worsen outcomes.

Methods

We reviewed 369 patients from the prospective, randomized IMS-III trial who received both IV rt-PA and intra-arterial treatment for AIS. Degree of ipsilateral extracranial internal carotid artery (EC-ICA) stenosis was determined by pre-treatment digital subtraction angiogram. We compared those with EC-ICA stenosis <70% vs. patients with stenosis =70%; statistical significance was determined by T-test. Outcome measures included mean infarct volume (MIV), mean time to reperfusion, rates of symptomatic intracerebral hemorrhage (sICH), mean modified Rankin score (mRS) at 90 days, and the percentage of patients with mRS 0-2 at 90 days.

Outcomes	Percent of carotid stenosis		P value (T-Test)
	<70%	≥70%	
Mean to reperfusion (mins)	78.7	105.7	***p=0.002
Mean infarct volume (mL)	70.1	87.6	p=0.18
Symptomatic ICH	7.3%	2.7%	p=0.15
% mRS 0-2	43.5%	34.3%	p=0.15
Mean mRS at 90 days	2.9	3.3	p=0.10

Results

When compared to those with =70% stenosis, patients with <70% stenosis had a lower mean mRS at 90 days (2.9 vs 3.3, p=0.10), greater percentage of mRS 0-2 (43.5 vs 34.3%, p=0.15), smaller MIV (70.1 vs 87.6mL, p=0.18), shorter mean time to reperfusion (78.7 vs 105.7 minutes, p=0.002), and a higher rate of sICH (7.3 vs 2.7%, p=0.15).

Conclusions

In patients receiving combined IV/IA treatment for AIS within the IMS-III trial, ipsilateral EC-ICA stenosis of =70% significantly delayed reperfusion by an average of 26 min. This resulted in trends favoring larger infarct volumes with worse clinical outcomes despite a lower rate of sICH. This substantial treatment delay likely stems from a combination of difficult microcatheter access across the stenosis, the addition of intermediate steps to manage the stenosis (i.e. balloon angioplasty), and the restrictive effect of the stenosis on inflow in patients treated by thrombolysis.

Learning Objectives

- 1) Recognize the delay in reperfusion in endovascular stroke treatment with severe ipsilateral ICA stenosis.
- 2) Understand potential mechanisms for this therapeutic delay
- 3) Recognize the need for further study and technical improvement in treating AIS with severe ICA stenosis.