

Review: Endovascular treatment and carotid endarterectomy do not differ for carotid stenosis

Coward LJ, Featherstone RL, Brown MM. Safety and efficacy of endovascular treatment of carotid artery stenosis compared with carotid endarterectomy: a Cochrane systematic review of the randomized evidence. *Stroke*. 2005;36:905-11.

Clinical impact ratings: Hospitalists ★★★★★☆ Neurology ★★★★★☆☆

QUESTION

In patients with carotid stenosis, what are the risks and benefits of endovascular treatment compared with carotid endarterectomy?

METHODS

Data sources: Cochrane Stroke Group Specialized Register (September 2003), Cochrane Central Register of Controlled Trials (Issue 3, 2003), MEDLINE (1966 to October 2004), EMBASE/Excerpta Medica (1980 to October 2004), Science Citation Index (1981 to October 2004), conference proceedings, researchers in the field, and balloon catheter and stent manufacturers.

Study selection and assessment: Randomized controlled trials that compared carotid endovascular treatment with carotid endarterectomy in patients with symptomatic or asymptomatic carotid artery stenosis. Quality of individual studies was assessed for method of randomization, allocation concealment, intention-to-treat analysis, blinded outcome assessment, and follow-up.

Outcomes: Death or any stroke at 30 days; death or disabling stroke at 30 days, death or any stroke at 1 year; cranial neuropathy at 30

days; and death, any stroke, or myocardial infarction at 30 days.

MAIN RESULTS

5 trials ($n = 1269$) met the inclusion criteria. 75% of patients were symptomatic. Blinding of intervention or outcome was not present in any trial, but allocation concealment was adequate in all trials. Endovascular treatment reduced cranial neuropathy; groups did not differ for any other outcome (Table).

CONCLUSION

In patients with carotid stenosis, no difference exists in risks or benefits between endovascular treatment and carotid endarterectomy.

Source of funding: No external funding.

For correspondence: Dr. M.M. Brown, National Hospital for Neurology and Neurosurgery, London, England, UK. E-mail m.brown@ion.ucl.ac.uk.

Endovascular treatment vs carotid endarterectomy for carotid artery stenosis*

Outcomes	Number of trials (n)	Weighted event rates		RRI (95% CI)	NNH
		Endovascular	Carotid endarterectomy		
30-d death or any stroke	5 (1269)	8.3%	6.3%	29% (-13 to 91)	Not significant
30-d death or disabling stroke	3 (716)	5.5%	4.5%	19% (-36 to 123)	Not significant
1-y death or any stroke	3 (1057)	13.4%	13.3%	1% (-26 to 37)	Not significant
30-d death, stroke, or myocardial infarction	5 (1269)	8.1%	7.8%	4% (-28 to 50)	Not significant
				RRR (CI)	NNT (CI)
30-d cranial neuropathy	4 (1050)	0.5%	6.5%	96% (78 to 99)	17 (12 to 25)

*Abbreviations defined in Glossary; weighted event rates, RRI, RRR, NNH, NNT, and CI calculated from data in article using a fixed-effects model.

COMMENTARY

Endovascular therapy (carotid angioplasty and/or stenting) for carotid stenosis has great appeal. It is less invasive than carotid endarterectomy, has lower rates of cranial nerve injury, and may even be less expensive. The key question is whether endovascular therapy is as good as or better than carotid endarterectomy. Coward and colleagues found no difference in outcomes at 30 days (stroke or treatment-related death and stroke, any death, or myocardial infarction) or at 1 year (stroke or death).

It is discouraging to see the small number of patients included in randomized trials and thus the limited data. Only 3 of the included trials were multicenter studies. One of them, the WALLSTENT study, favored surgery (1). The SAPPHERE study was terminated because recruitment slowed after nonrandomized stent registries were established; however, carotid stenting was not found to be inferior to carotid endarterectomy (2).

Substantial heterogeneity and wide confidence intervals for the endpoints exist among the trials. Important differences between surgery and endovascular therapy may have been missed. Basic questions remain about who should do the procedure and how (e.g., the use of distal protection devices to "catch" embolic material) are unanswered. Trials and registries report complication rates that exceed national

guidelines (especially for patients with asymptomatic disease). No studies have yet reported long-term outcomes and rates of restenosis.

In addition, few data exist to guide decisions for the care of individual patients. Older symptomatic patients benefit from carotid endarterectomy, but do worse with endovascular therapy (3). However, endovascular therapy may be the only alternative in technically difficult cases (e.g., distal stenosis or stenosis from radiation injury).

Carotid endarterectomy is the standard and should remain so until clinical trial data firmly establish endovascular therapy as a safe and effective alternative.

Lawrence M. Brass, MD
Yale University School of Medicine
New Haven, Connecticut, USA

References

1. Alberts MJ, McCann R, Smith TP, et al. A randomized trial of carotid stenting versus endarterectomy in patients with symptomatic carotid stenosis: study design. *J Neurovasc Dis*. 1997;2:228-34.
2. Yadav JS, Wholey MH, Kuntz RE, et al. Protected carotid-artery stenting versus endarterectomy in high-risk patients. *N Engl J Med*. 2004;351:1493-501.
3. Hobson RW 2nd, Howard VJ, Roubin GS, et al. Carotid artery stenting is associated with increased complications in octogenarians: 30-day stroke and death rates in the CREST lead-in phase. *J Vasc Surg*. 2004;40:1106-11.