

Immediate carotid endarterectomy reduced nonoperative stroke in severe asymptomatic carotid artery stenosis

Halliday A, Mansfield A, Marro J, et al. Prevention of disabling and fatal strokes by successful carotid endarterectomy in patients without recent neurological symptoms: randomised controlled trial. *Lancet*. 2004;363:1491-502.

QUESTION

In patients with severe carotid artery stenosis but no recent (≤ 6 mo) stroke or ischemia, is immediate carotid endarterectomy (CEA) more effective than indefinite deferral of any CEA for reducing perioperative mortality and morbidity and incidence of nonoperative stroke?

METHODS

Design: Randomized controlled trial (MRC Asymptomatic Carotid Surgery Trial [ACST]).

Allocation: Concealed.*

Blinding: Blinded (endpoint review committee).*

Follow-up period: Up to 5 years (mean 3.4 y).

Setting: 126 hospitals in 30 countries.

Patients: 3120 patients (mean age 68 y, 66% men) who had severe unilateral or bilateral carotid artery stenosis ($\geq 60\%$ diameter reduction on ultrasonography) but no stroke or ischemia in the previous 6 months, for whom both physician and patient were substantially uncertain whether to choose immediate CEA or deferral of any CEA until a more definite need for it was thought to have arisen. Exclusion criteria included known conditions that could preclude long-term

follow-up, previous ipsilateral CEA, expectation of poor surgical risk (e.g., because of acute myocardial infarction), and probable cardiac source of emboli.

Intervention: Immediate ($n = 1560$) or deferred ($n = 1560$) CEA.

Outcomes: A composite outcome of perioperative mortality (caused by stroke or myocardial infarction) and morbidity (stroke), and incidence of nonoperative stroke.

Patient follow-up: All patients were included in the life-table intention-to-treat analyses.

MAIN RESULTS

About 90% and 10% of patients in the immediate and deferred CEA groups, respectively, received ipsilateral CEA. At 5 years, the risk for the composite outcome as well as

that of nonoperative stroke was lower in the immediate CEA group than in the deferred CEA group (Table). The overall risk per CEA for perioperative stroke or death was 3.1%.

CONCLUSION

In patients with severe carotid artery stenosis but no recent (≤ 6 mo) stroke or ischemia, immediate carotid endarterectomy (CEA) was more effective than indefinite deferral of any CEA for reducing the net 5-year incidence of stroke.

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*See Glossary.

Immediate carotid endarterectomy (CEA) vs indefinite deferral of any CEA in severe carotid artery stenosis at 5 years†

Outcomes	Kaplan-Meier risk estimates		RRR (95% CI)
	Immediate CEA	Deferred CEA	
Composite outcome	6.4%	11.8%	46% (31 to 57)
Nonoperative stroke	3.8%	10.9%	65% (54 to 74)

†Composite outcome = perioperative mortality (caused by stroke and myocardial infarction) and morbidity (stroke). Other abbreviations defined in Glossary; RRR and CI calculated from data in article.

COMMENTARY

It is certainly clear that most patients with symptoms and $> 70\%$ carotid stenosis are better off with surgical than medical treatment. However, the data remain murky for asymptomatic patients, even with publication of the excellent ACST by Halliday and colleagues (1).

CEA is a nettlesome issue for internists, in part because the benefits of preventive "roto rooter" arterial cleaning seem obvious to many patients with carotid stenosis discovered in the course of a physical examination with subsequent testing. Before concluding that most asymptomatic patients with $\geq 60\%$ diameter reduction on carotid ultrasonography should be referred to vascular surgeons, I would suggest that the following patient care protocols merit serious and open-minded attention.

First, because it is critically important in decision making to know if the carotid lesion is truly asymptomatic, I would suggest that such patients be referred in the first instance to an experienced neurologist, rather than a surgeon. Second, because the experience of technologists performing ultrasonography varies widely, computed tomographic angiography or magnetic resonance angiography should confirm the stenosis before surgery is considered. Third, patients must recognize

that they face only a 2% annual stroke rate with medical care and that surgical morbidity and mortality is 3% among the most experienced surgeons. Fourth, the surgical experience and track record of the surgeon to whom a patient is referred should be readily available, because operative complications may exceed the low rates of optimum care in research centers by 1% to 2%.

Finally, some evidence (albeit anecdotal) suggests that the process of insidious carotid stenosis can be arrested and perhaps reversed by scrupulous control of risk factors. The jury is still out, but progression of carotid stenosis over time may be preventable, provided that the patient is strongly motivated and the doctor has excellent communication skills (2).

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References

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2. Furberg CD, Adams HP Jr, Applegate WB, et al. Effect of lovastatin on early carotid atherosclerosis and cardiovascular events. *Circulation*. 1994;90:1679-87.