Percutaneous transluminal coronary angioplasty and endarterectomy were both effective for carotid stenosis

CAVATAS Investigators. **Endovascular versus surgical treatment in patients with carotid stenosis in the Carotid and Vertebral Artery Transluminal Angioplasty Study (CAVATAS): a randomised trial.** Lancet. 2001 Jun 2;357:1729-37.

QUESTION

In patients with carotid stenosis, is percutaneous transluminal coronary angioplasty (PTCA) with balloon catheters or stenting (endovascular treatment) more effective than conventional carotid endarterectomy?

DESIGN

Randomized (allocation concealed*), unblinded,* controlled trial with follow-up at 1, 6, 12, 24, and 36 months.

SETTING

22 centers in Europe, Australia, and Canada.

PATIENTS

504 patients (mean age 67 y, 70% men) with stenosis of the common carotid artery, carotid bifurcation, or internal carotid artery for whom it was unclear whether endovascular treatment or endarterectomy was the best treatment. Exclusion criteria included disabling stroke or angiography showing thrombus within the region of the treatable artery or severe intracranial carotid artery stenosis beyond the skull base. Follow-up was > 99%.

INTERVENTION

Patients were allocated to endovascular treatment (n = 251) or to endarterectomy (n = 253). Endovascular treatment included aspirin or another antiplatelet agent for ≥ 24 hours before treatment, systemic heparin during and for ≥ 24 hours after treatment (unless contraindicated), and PTCA with balloon catheters (after 1994, stenting was allowed if considered necessary by the radiologist). Endarterectomy was done according to each center's normal routine. Both groups received antiplatelet therapy to the end of follow-up.

MAIN OUTCOME MEASURES

Nondisabling and disabling stroke (stroke defined as stroke with symptoms lasting > 7 d) and all-cause mortality.

MAIN RESULTS

Analysis was by intention to treat. The groups did not differ for nondisabling stroke {P = 0.83}†, disabling stroke {P = 0.66}†, or all-cause mortality {P = 0.35}† (Table).

CONCLUSION

In patients with carotid stenosis, percutaneous transluminal coronary angioplasty and conventional carotid endarterectomy did not differ for rates of stroke or death.

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*See Glossary.

†P values calculated from data in the article.

Percutaneous transluminal coronary angioplasty (endovascular treatment) vs endarterectomy for carotid stenosis‡

Outcomes	Endovascular treatment	Endarterectomy	RRR (95% CI)	NNT
Nondisabling stroke at 30 d	3.6%	4.0%	9% (–114 to 62)	Not significant
			RRI (CI)	NNH
Death or disabling stroke at 30 d	6.4%	5.9%	8% (–45 to 110)	Not significant
Death or disabling stroke at 3 y	14.3%	14.2%	0.8% (–34 to 54)	Not significant

‡Abbreviations defined in Glossary; RRR, RRI, NNT, NNH, and CI calculated from data in article.

COMMENTARY

The well-designed Carotid and Vertebral Artery Transluminal Angioplasty Study (CAVATAS) of endovascular and surgical treatment for carotid artery stenosis is the first to complete enrollment. It was designed as an exploratory trial and should be interpreted as such. No difference in the primary outcome—time to death or disabling stroke—was detected, but the study was small. Confidence intervals were broad so results could be consistent with a 47% reduction or a 64% increase in hazard with endovascular treatment compared with endarterectomy. This range of uncertainty may not provide much guidance to clinicians and patients.

In the absence of a detected difference in the primary outcome, differences in secondary outcomes could help guide treatment decisions. 2 secondary adverse events occurred more commonly in those treated with endarterectomy: cranial nerve palsy and hematoma. However, bradycardia and hemodynamic instability are common complications of endovascular therapy (1), and their occurrence is not reported in the trial. Furthermore, a small difference in risk for stroke or death is likely to overwhelm a large difference in these secondary outcomes when weighting patient preferences.

The risks associated with endarterectomy in CAVATAS were greater than those in previous trials. Selection criteria may account for this difference. Patients enrolled in CAVATAS were judged by the treating physicians to be equally suitable for both endarterectomy and endovascular treatment. Such an inclusion criterion is likely to be interpreted variably and could result in exclusion of the lowest-risk patients, who might be considered better candidates for endarterectomy, the more established therapy.

Who should be a candidate for endovascular treatment of a carotid stenosis? This question is not answered by CAVATAS. The study suggests that certain patients are better candidates for endovascular treatment, but how to identify them remains a mystery. Perhaps the best current candidate for endovascular treatment of carotid stenosis is one participating in a randomized trial, several of which are ongoing.

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Reference

1. **Qureshi AI, Luft AR, Sharma M, et al.** Stroke. 1999;30:2086-93.

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