50 Landmark Papers

every

Vascular and Endovascular Surgeon Should Know
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Preface

The evolution of vascular surgery over the past decade has brought profound and rapid changes to our practice. Endovascular techniques are now our predominant intervention. Certainly, no field of modern surgery has experienced so many changes in such a brief period of time. Accordingly, we thought it would be worthwhile to capture those key articles establishing these changes in practice, bearing in mind that vascular surgery measures its success by the scientific method. We should proudly acknowledge that vascular surgeons have responded by changing training paradigms and mastering evolving technological advances.

We have assembled this volume of expert reviews remembering Henry Ford’s assertion that:

“I invented nothing new. I simply assembled the discoveries of other men behind whom were centuries of work ... Progress happens when all the factors that make for it are ready and then it is inevitable. To teach that a comparatively few men are responsible for the greatest forward steps of mankind is the worst sort of nonsense.”

Our aim is to provide the research that supports our current standards of practice. As there are many more than 50 studies which have impacted our specialty, we acknowledge this collection is neither exclusive nor definitive. In our opinion, however, the selected studies contain essential knowledge for all 21st-century vascular and endovascular surgeons.

Abstracts for the manuscripts and an author or expert review are provided. Our reviewers have assessed the impact of the paper on current practice. We thank our reviewers who have contributed their expertise selflessly.

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Beneficial Effect of Carotid Endarterectomy in Symptomatic Patients with High-Grade Carotid Stenosis


ABSTRACT

Background  Without strong evidence of benefit, the use of carotid endarterectomy for prophylaxis against stroke rose dramatically until the mid-1980s, then declined. Our investigation sought to determine whether carotid endarterectomy reduces the risk of stroke among patients with a recent adverse cerebrovascular event and ipsilateral carotid stenosis.

Methods  We conducted a randomized trial at 50 clinical centers throughout the United States and Canada, in patients in two predetermined strata based on the severity of carotid stenosis—30%–69% and 70%–99%. We report here the results in the 659 patients in the latter stratum, who had had a hemispheric or retinal transient ischemic attack or a nondisabling stroke within the 120 days before entry and had stenosis of 70%–99% in the symptomatic carotid artery. All patients received optimal medical care, including antiplatelet therapy. Those assigned to surgical treatment underwent carotid endarterectomy performed by neurosurgeons or vascular surgeons. All patients were examined by neurologists 1, 3, 6, 9, and 12 months after entry and then every 4 months. Endpoints were assessed by blinded, independent case review. No patient was lost to follow-up.

Results  Life-table estimates of the cumulative risk of any ipsilateral stroke at 2 years were 26% in the 331 medical patients and 9% in the 328 surgical patients—an absolute risk reduction (+/− SE) 17% +/− 3.5% (P less than 0.001). For a major or fatal ipsilateral stroke, the corresponding estimates were 13.1% and 2.5%—an absolute risk reduction of 10.6% +/− 2.6% (P less than 0.001). Carotid endarterectomy was still found to be beneficial when all strokes and deaths were included in the analysis (P less than 0.001).
Conclusions  Carotid endarterectomy is highly beneficial to patients with recent hemispheric and retinal transient ischemic attacks or nondisabling strokes and ipsilateral high-grade stenosis (70%–99%) of the internal carotid artery.

EXPERT COMMENTARY BY SAMUEL ERIC WILSON

We decided to include this article because it describes the clinical research that saved carotid endarterectomy (CEA) as the most effective treatment over the last 30 years for moderate to severe symptomatic carotid stenosis. In the 1980s, neurologists and internists became concerned about the results of CEA, particularly the varying indications for operation and reports of high levels of postoperative complications. One example of this skepticism is seen in the 1984 journal article in *Stroke* in which the author asks, “Carotid Endarterectomy: Does It work?”2 Recognizing the steep decline in CEA operations, vascular surgeons decided to demonstrate efficacy by defining clear cut indications for CEA3 and proceeding with three cooperative trials: an NIH-sponsored trial (NASCET),1 the VA Cooperative Study 309,4 and a European trial.5 All three trials showed such an unexpected, impressive reduction in ipsilateral stroke after CEA in moderate to severe symptomatic patients that a clinical alert was published in *Stroke* before the formal publication of NASCET results.6

As described in the abstract, the 659 patients who had a hemispheric transient attack, nondisabling stroke or retinal transient ischemic attack within 120 days of entry, and had 70%–99% stenosis were randomized to best medical treatment versus medical treatment and CEA. The cumulative risk for ipsilateral stroke at 2 years follow-up was 26% in the 331 medical patients and was decreased to 9% in the 328 surgical patients (\( p < 0.001 \)). The VA Cooperative Trial found that after one year there was a reduction in stroke or crescendo transient ischemic attacks in men from 19.4% in medically treated patients to 7.7% in CEA patients. (\( p = 0.011 \)).2 These studies, and others, established irrefutably the role of carotid endarterectomy in preventing stroke. A 2015 international systematic review found that 31 of 33 (94%) published guidelines for CEA in patients who had 50%–99% symptomatic stenosis recommended CEA.7

The benefit of CEA may be greater if an operation is performed soon after the transient ischemic event. A retrospective review of clinical outcome at the Mayo Clinic showed that CEA can be done with “acceptable risk in properly selected symptomatic patients within 2 weeks” of the transient ischemic attack.8

The appropriate use of CEA still has room for improvement. In the records of 3,167 CEAs done in four Canadian provinces, Kennedy et al. found adherence to strict criteria for appropriateness to vary from 78% to 46% and inappropriate use to be 10% overall.9
The precise role and methods of carotid stenting are currently under clinical investigation. The lesson of how comparative, randomized clinical trials established the value of CEA, if followed, will provide reliable future guidelines.

REFERENCES


Chapter 1  •  Beneficial Effect of Carotid Endarterectomy


