Asymptomatic carotid artery stenosis (ACS) is common. Assuming a European population of around 500 million people, about 4 million have stenoses of 60–99%. About 1 million strokes occur each year, but only 5–10% (50–100 000) are attributable to carotid artery disease. By operating on all 4 million with ACS, we might prevent 4% of first-in-a-lifetime strokes, but the cost would be prohibitive. Carotid endarterectomy (CEA) would become the commonest vascular operation, more common than coronary bypass grafting (which is usually performed for symptoms or when significant danger is demonstrated on exercise testing). Although safer than CEA performed after stroke, the total morbidity and mortality following a policy of prophylactic CEA might eventually equal, or even exceed that of coronary surgery.

In a recent leading article in this journal, Robicsek reviewed the results of the Asymptomatic Carotid Artery Study (ACAS). In that study 1662 patients with 60–99% ACS were randomised to medical or surgical treatment. Patients and surgeons had been carefully chosen to minimise operative risk. After a mean follow-up of 2.7 years, a statistically significant result favouring surgery (for men only) was obtained. During the first year of follow-up, the risk of operation exceeded that of stroke. The overall risk of stroke (any stroke, not disabling stroke) was reduced in the surgical group from ~2% to ~1% per year. No higher risk sub-group could be identified, but only 5% patients entered had 90–99% stenosis. The conclusion, that “patients with >60% obstruction to the internal carotid flow should undergo carotid endarterectomy, even if they are asymptomatic, given experienced vascular surgical facilities with low morbidity and mortality rates” did not convince some of their own collaborators, but effectively closed the study.

At present, about 40% CEAs in the U.S. (and ~20% in Europe) are done for ACS, and, following ACAS, this may now increase, allowing pride in this well conducted, but “unreal” study, to reinforce surgeons’ prejudice that CEA should be used in these patients as a prophylactic procedure. The real measure of successful CEA would be a significant reduction in disabling strokes and deaths, the true end-points, and ACAS did not prove that these could be reduced by prophylactic CEA. Before ACAS, some insurance companies in the U.S. had refused to cover operations for ACS. Now insurance may be confined to covering operations undertaken in certain units, or performed by surgeons who have track records showing that they can perform the operation with <3% mortality and morbidity. For newly qualified vascular surgeons the most attractive procedures with which to build a track record are those for ACS.

It will never be possible to re-run the ACAS in the U.S. Millions of dollars were spent and a “statistically significant” result was obtained. But, in Europe, we can continue to evaluate operation for ACS. All surgeons need to be able to operate for asymptomatic, as well as symptomatic disease, but only when the risks of disabling stroke or death with medical treatment alone exceed those of operation. “Higher risk” groups need to be identified, not just by natural history studies (which often exclude patients appropriate for operation) but by randomised controlled trial. Estimating the numbers needed to obtain a “significant” result has been flawed and trials have
stopped prematurely. By recruiting large numbers, the European Carotid Surgery Trial (ECST)\textsuperscript{11} (and NAS-CET)\textsuperscript{12} succeeded in identifying a high risk group of symptomatic patients with 70–99% stenosis, in whom 3–4 prophylactic operations would prevent one disabling stroke. The results of ACAS showed that 85 operations were needed to avoid one non-disabling stroke; with a larger trial, it should be possible to find a smaller, higher risk group of patients in whom, at lower cost, disabling stroke could be prevented.

One trial of ACS is still recruiting patients. The Asymptomatic Carotid Surgery Trial (ACST) includes collaborating surgeons from Europe (and other countries).\textsuperscript{13} These surgeons have track records which are comparable with those obtained for ECST and NAS-CET, and have sufficient uncertainty about the value of prophylactic CEA to enable them to consider randomising patients to either appropriate best medical treatment (BMT) or BMT and surgery. Over 1200 patients have been entered into ACST during the first 3 years. At randomisation, the presence of potential ‘risk factors’ is noted; these include tight stenosis in Duplex, contralateral occlusion, soft plaque and brain scan infarction (CT or Magnetic resonance). Newer ultrasound techniques (Duplex, rather than continuous wave) are used to measure stenosis. ACST now has a greater number (and proportion) of patients with very tight stenosis (80–99%) than ACAS; (676 patients (55%) compared with 499 (30%)). Mean follow-up for patients in ACST is still less than 1 year, and many more will be needed to obtain a definitive result. Recruiting continues, and new collaborators are welcomed. The Data Monitoring Committee recently urged that recruitment should continue.

Over 3000 patients have now been entered in four asymptomatic trials,\textsuperscript{7–15} Although Hennerici \textit{et al.} expressed doubt about the population sample in ACAS,\textsuperscript{16} in all four trials the patients are similar for age (64–68 years), sex (60–73% men, except VA trial — all men), diabetes (21–30%), hypertension (60–64%), contralateral carotid occlusion (8–12%) and history of contralateral CEA (20–27%). It does now seem likely that some patients with ACS may benefit from prophylactic surgery. However, the ACAS results are of limited value when identifying individuals at risk of disabling stroke, or in planning a cost-effective policy for stroke prevention. Prejudice in favour of surgery will need to be confirmed by ACST identifying group(s) at higher stroke risk. This will only be possible if neurologists and surgeons support ACST, and recruit enough patients to produce a sensible result.

References

11. \textbf{EVENRO CAROTID SURGERY TRIALLISTS COLLABORATIVE GROUP.} MRC European Carotid Surgery Trial: Interim results for symptomatic patients with severe (70–99%) or with mild (0–29%) carotid stenosis. \textit{Lancet} 1991; 345: 1235–1243.

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