Editorials

Carotid artery stenosis

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Carotid artery stenting is not yet ready to replace endarterectomy

Carotid endarterectomy is currently the most effective intervention to prevent stroke in patients with recent symptoms of carotid stenosis.1 2 It also prevents future stroke in younger patients (under 75 years) who have not yet had symptoms, as long as the risk of stroke and death from surgery is not more than 3%.3 4

Patients naturally prefer carotid artery stenting to open surgery, but stenting has not been shown to be acceptably safe in clinical trials. Carotid endarterectomy has been in widespread use for more than 50 years, but carotid artery stenting is a more recent development. In the linked systematic review (doi:10.1136/bmj.c467), Meier and colleagues assessed the short term safety and intermediate term efficacy of carotid endarterectomy versus carotid artery stenting. They found that the short term (30 day) hazards of stroke and death after stenting in recent trials of symptomatic patients have improved but are not yet as good as those seen after surgery.5 In the intermediate term, the two treatments did not differ significantly for stroke or death (hazard ratio 0.90, 95% confidence interval 0.74 to 1.1).

In the most recent trial included in the systematic review, the International Carotid Stenting Study (ICSS), surgery was significantly less likely than stenting to cause stroke, myocardial infarction, or death (5.1% *v* 8.5%; odds ratio 0.57, 0.39 to 0.85). A subgroup analysis in five centres found more new ischaemic brain lesions after stenting (46% *v* 14%; odds ratio 5.2, 2.6 to 10.5), and about half of these new lesions were still present on follow-up scanning six weeks later.6

Results from the remaining trial in symptomatic people, CREST (Carotid Revascularisation Endarterectomy versus Stenting Trial) are expected in 2010. An interim systematic review recommends that patients should continue to be stented only within the context of a clinical trial.7

Longer term follow-up (two to 10 years) after successful carotid artery stenting and carotid endarterectomy indicates that the procedures are equally effective in preventing stroke. Arterial restenosis seems to be more likely after stenting, but it is rare to develop associated symptoms.

A learning curve exists for stenting, and a consensus of European stenting specialists reported that experience with at least 150 procedures was needed before the operator could be considered safe. Several earlier trials analysed in this article do not compare like with like—some stenters had very little experience, but surgeons generally had much more. As time has passed, results of stenting have improved and the gap in results has narrowed, but currently it

is recommended that only people with experience should perform carotid artery stenting and train others, and that they should do so within the confines of clinical trials.[8]

Although people who perform stenting are now more experienced and the devices have improved, practical difficulties still make stenting hazardous for symptomatic patients. Emboli from symptomatic plaques are common and "embolic protection devices"—expensive umbrella-like catheter systems—were developed to trap emboli released during stenting and balloon angioplasty. Considerable skill and judgment are needed to pass a catheter beyond the symptomatic plaque and position the device, because more emboli are released until the device is safely in place and open. Despite their name, there is no level 1 evidence that the widespread use of these devices is definitely beneficial. They were optional in the German SPACE trial, where results of carotid artery stenting and carotid endarterectomy were similar, and although they were eventually made compulsory in the French EVA3-S trial, they were not shown to offer any additional stroke protection. It would take a trial of many thousands of patients in whom EPDs could be used to determine whether they were of definite benefit.

As trial data accumulate carotid artery stenting still looks hazardous for symptomatic patients. The attraction of using stents rather than surgery in asymptomatic patients (no symptom, no incision) is obvious, but the balance between early risk and longer term benefit is unclear. For asymptomatic patients undergoing carotid endarterectomy, a procedural risk of stroke or death above 3% would be unacceptable because the longer term net benefit (6% absolute risk reduction for stroke over the next five years) would be lost.[3]

Worldwide, many more carotid artery stenting and carotid endarterectomy procedures are performed in patients who have not yet had symptoms than on those with symptoms and results from large registries have recently been published suggesting similar short term hazards of procedure related stroke and death (2.9%, 2.4% to 3.4%) in patients under 80 years of age.[9] Stenting an asymptomatic plaque might be more appropriate than open surgery, but evidence is needed. The current Asymptomatic Carotid Surgery trial, ACST-2, is comparing stenting and surgery in a randomised trial of at least 5000 patients.[10]

The natural course of carotid arterial disease is changing, and data from surgical trials of 10-20 years ago may be less relevant today[1] [2] because aspirin and other antithrombotic drugs are routinely prescribed (especially in symptomatic patients), blood pressure control is better, and lipid lowering treatments are effective. The SPARCL trial and the Cholesterol Treatment Trialists' Collaboration found that high doses of statins reduced vascular events including ischaemic stroke by around 30%.[11] [12] Good medical management leads to longer survival, and—although heart attack and stroke are still common causes of death—the remaining risk of stroke may be further reduced by appropriate carotid intervention.

The case for stenting symptomatic carotid stenosis has not been proved, and when intervention by experienced operators is planned and both procedures are feasible, then randomisation between carotid endarterectomy and carotid artery stenting is still ethical. The asymptomatic carotid stenotic plaque may prove more appropriate for stenting, but only time and a large randomised controlled trial will tell.

Notes

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Footnotes

- Research, doi:10.1136/bmj.c467

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