Review: Carotid endarterectomy modestly reduces ipsilateral stroke in asymptomatic carotid stenosis


Question
Does carotid endarterectomy (CE) reduce stroke in patients with asymptomatic stenosis?

Data sources
Studies were identified by searching MEDLINE (1966 to January 1998) using the terms carotid stenosis, endarterectomy, carotid, asymptomatic, clinical trial, and randomized controlled trial. The Cochrane Controlled Trials Register, Ottawa Stroke Trials Register, Current Contents (1995 to 30 January 1998), 3 journals (New England Journal of Medicine, JAMA, and Stroke), and bibliographies of relevant studies were reviewed, and experts and authors were contacted.

Study selection
Randomized controlled trials were selected if CE was compared with standard medical treatment and patients had confirmed asymptomatic carotid stenosis with no history of cerebrovascular disease; confirmed asymptomatic carotid stenosis with previous stroke or transient ischemic attack in the verteobasilar circulation or contralateral carotid territory; or previous contralateral CE.

Data extraction
Data were extracted in duplicate on patient and trial characteristics; study quality; degree of stenosis; use of antiplatelet therapy; and outcomes (perioperative complications [stroke or death], stroke ipsilateral to the qualifying stenosis, and all stroke) within 30 d of randomization.

Main results
5 trials (1215 patients in the CE groups and 1225 in the medical care groups) met the inclusion criteria. 74% of patients were men, mean age range was 64 to 74 years, and mean follow-up was 3.1 years. CE increased stroke and death in the 30-day perioperative period (P < 0.001) but overall reduced the combined end point of ipsilateral stroke plus perioperative complications (P = 0.005), all ipsilateral stroke (P < 0.001), and all stroke plus perioperative death (P = 0.007) (Table).

Conclusion
For patients with asymptomatic stenosis, carotid endarterectomy transiently increases the risk for stroke and death but overall reduces the combined end points of ipsilateral stroke plus perioperative stroke or death, all ipsilateral stroke, and all stroke plus perioperative death.

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Carotid endarterectomy (CE) vs medical care for patients with asymptomatic carotid stenosis

<table>
<thead>
<tr>
<th>Outcomes at mean 3.1 y</th>
<th>Weighted event rates</th>
<th>RRI (95% CI)</th>
<th>NNH (CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forest (1997)</td>
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<tr>
<td>Stroke</td>
<td>1.3%</td>
<td>0.3%</td>
<td>2.0%</td>
</tr>
<tr>
<td>Stroke plus death</td>
<td>4.4%</td>
<td>1.0%</td>
<td>9.4%</td>
</tr>
</tbody>
</table>

*IP = ipsilateral; PO = perioperative (within 30 d of randomization). Other abbreviations defined in Glossary; RRI, RRR, NNH, NNT, and CI calculated from data in article by using a fixed-effects model.

Commentary
The benefits of medical intervention should exceed the risks. If the intervention is surgical and the condition is asymptomatic, at least 2 criteria must apply: The risks of not operating must exceed the risks of the procedure (including the workup) plus the subsequent long-term risk, and the absolute benefits must justify the personal and societal costs, whether financial, psychological (pain, stress, or induced anxiety), or social (difficulty in meeting expectations or pursuing equity).

With almost 8000 patient-years of follow-up data from randomized trials, we can reasonably say that CE, if done at centers with established expertise, can reduce the risk for stroke in some patients with asymptomatic moderate or severe carotid stenosis. However, we still do not know which patients are likely to be helped or harmed.

Before having angiography or CE, patients with asymptomatic carotid stenosis should understand that without surgery the average risk for ipsilateral stroke is only 2%/y, that 40 to 50 patients will need operations to prevent 1 additional stroke at 3 years, that the risks and benefits in terms of disabling stroke are still unknown, and that CE will do more harm than good if perioperative complication rates are > 4%.

Tax or insurance payers should understand that the cost of CE per stroke prevented is at least U.S. $500 000 (1) and many times that of simpler (although still underused) approaches, such as the treatment of hypertension in persons > 70 years of age.

Further research is therefore needed to identify higher-risk patients with asymptomatic stenosis who may benefit substantially from CE (2). Efforts should target such patients, but the public health benefits of surgery for primary stroke prevention will remain small.

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References