Urgent carotid endarterectomy for patients with unstable symptoms: systematic review and meta-analysis of outcomes

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CRD summary
This review concluded that patients with unstable neurologic presentations were at higher risk of complications if operated on urgently. The limited search, lack of details on review methodology, small size and unknown quality of the included studies, and questions over the way in which the review objective was framed, mean that the authors’ conclusions are unlikely to be reliable.

Authors' objectives
To determine the effectiveness of urgent carotid endarterectomy in patients with crescendo or repeated transient ischaemic attack or unstable stroke.

Searching
MEDLINE, EMBASE, and the Cochrane Library were searched for articles from 1980 to 2008. Search terms were reported and reference lists were screened.

Study selection
Studies of urgent (surgery within one week) carotid endarterectomy for unstable stroke (e.g. progressive stroke, stroke in evolution, fluctuating stroke, or stroke with fluctuating neurological deficit) or crescendo or repeated transient ischaemic attack in patients with lesions due to atherosclerosis were eligible for inclusion. Studies had to report the 30-day death and stroke rate, record the number of operations based on indication (crescendo transient ischaemic attack or progressive stroke), and report data in sufficient detail to allow the extraction of results for patients of interest. Studies that used extracranial or intracranial bypass to treat carotid disease were excluded. Control groups consisted of patients undergoing surgery for standard indications, such as a single transient ischaemic attack or minor stable stroke. Asymptomatic patients undergoing carotid endarterectomy were excluded from control groups.

The authors did not state how the papers were selected for the review, nor how many reviewers performed the selection.

Assessment of study quality
The authors did not state that they assessed validity

Data extraction
Data were extracted on the number of patients undergoing carotid endarterectomy and the number of these patients who subsequently had a stroke or died, separately for the unstable stroke or crescendo transient ischaemic attack groups and control groups. Odds ratios (ORs) and 95% confidence intervals (CIs) were calculated.

The authors did not state how many reviewers performed the data extraction.

Methods of synthesis
Mantel-Haenszel fixed-effect models were used to estimate the summary odds ratios and 95% confidence intervals from studies that reported data separately for crescendo transient ischaemic attack or progressive stroke groups and that included a control group. Studies with no events in any of the groups were excluded from the meta-analysis. Heterogeneity was assessed using the $\chi^2$ and $I^2$ statistics. A narrative synthesis was used to combine the studies that were not included in the meta-analysis.

Results of the review
Thirty-eight studies with data for 43 patient groups (697 patients undergoing carotid endarterectomy) were included in the review and 16 of these were suitable for meta-analysis.
The proportion of patients with crescendo transient ischaemic attack who experienced a stroke following carotid endarterectomy was 6% and 3.2% of patients died following carotid endarterectomy (16 studies, n=353). The proportion of patients with progressive stroke who experienced a stroke following carotid endarterectomy was 10.5% and 6.5% of patients died following carotid endarterectomy (23 studies, n=276). Results from studies that combined patients with crescendo transient ischaemic attack with those with progressive stroke reported a combined rate of stroke or death following carotid endarterectomy of 34% (four studies, n=68).

The risk of stroke or death following carotid endarterectomy was significantly greater in those with crescendo transient ischaemic attack compared with those with stable symptoms (OR 5.6, 95% CI 3.3 to 9.7; seven studies; 206 patients with crescendo transient ischaemic attack and 3,367 with stable symptoms) and in those with unstable stroke compared with those with stable symptoms (OR 5.5, 95% CI 3.5 to 8.6; 11 studies; 135 patients with unstable stroke and 5,437 patients with stable symptoms). There was no evidence of heterogeneity for either analysis (p>0.3).

Authors' conclusions
Patients with unstable neurologic presentations were at higher risk of complications if operated on urgently. Clearer definitions would help more precise patient selection to avoid inadvertently operating on patients with an unacceptably high risk of poor outcome.

CRD commentary
The review question was not clearly defined. Some inclusion criteria were defined, but others had to be deduced based on the details of which studies were excluded. The literature search was adequate for published studies, but specific attempts were not made to locate unpublished studies and it is unclear whether any language restrictions were applied. It is therefore possible that relevant studies may have been missed. Details of the review process were not reported and so it is not possible to determine whether appropriate steps were taken to minimise bias and errors. Study quality was not formally assessed and details on the included studies were limited; the validity and generalisability of the included studies is unclear. Methods used to pool studies appeared to be appropriate and heterogeneity was assessed. The included studies compared carotid endarterectomy in patients with unstable symptoms with carotid endarterectomy in those with stable symptoms, rather than comparing the effects of carotid endarterectomy with no intervention or with another intervention in patients with unstable symptoms. It is therefore unclear whether the increased risk of stroke or death was related to the carotid endarterectomy intervention or to their condition.

The limited search, lack of details on review methodology, small size and unknown quality of the included studies, and questions over the way in which the review objective was framed, mean that the authors' conclusions are unlikely to be reliable.

Implications of the review for practice and research
Practice: The authors stated that crescendo transient ischaemic attack and unstable stroke attracted an increased operative risk, but the operation might be justified because the natural history and prognosis for patients was significantly worse than for a minor event. Careful selection of patients should be paramount.

Research: The authors did not state any implications for research.

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Record Status
This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.