Carotid artery disease in octogenarians: endarterectomy or stenting?
Seretis K, Goudakos I, Vlachakis I, Anthimidis G, Papadimitriou D

CRD summary
The authors concluded that evidence failed to support the view that carotid angioplasty and stenting was safer than carotid endarterectomy for octogenarians with carotid stenosis. In view of the lack of properly controlled evidence and the methodological limitations of the review, in particular the limited search and lack of validity assessment, these conclusions did not appear reliable.

Authors' objectives
To evaluate the safety and efficacy of carotid endarterectomy (CEA) and carotid angioplasty and stenting (CAS) for octogenarians with carotid artery stenosis.

Searching
PubMed and Cochrane Central Register of Controlled Trials were searched. Search terms were reported. Reference lists of eligible studies were checked. Relevant general medical, neurological, radiological, surgical and neurosurgical journals were handsearched. The search was conducted up to May 2006 and was restricted to studies published from 1998 onwards in any language.

Study selection
Studies comparing outcomes among octogenarians or between octogenarians and younger participants (of either gender) after CEA or CAS for treatment of carotid artery stenosis were eligible for inclusion provided that they reported adverse events occurring within 30 days of treatment. Carotid artery disease could be symptomatic or asymptomatic, unilateral or bilateral. Studies of any “acceptable” endovascular or endarterectomy procedure were eligible. Adverse events of interest in the review included stroke (defined by published criteria), death, combined stroke/death and myocardial infarction (MI).

No study compared outcomes in the same population; all compared outcomes of a single treatment modality in octogenarians versus younger participants. Up to 59 per cent of participants in studies of CEA and up to 79 per cent in studies of CS were asymptomatic. In some of the studies of CAS cerebral protection devices were used. Not all of the studies reported MI as an outcome.

Two reviewers independently selected studies for inclusion, which were independently reviewed by a further two reviewers. Disagreements were resolved by consensus.

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

Data extraction
Data were extracted on the percentage of each group experiencing an event. Statistically significant (p<0.05) differences between the groups were reported. Individual study results were presented in tables. The authors stated neither how the data were extracted for the review nor how many reviewers performed the data extraction.

Methods of synthesis
Studies were combined in a narrative synthesis organised by intervention.

Results of the review
Fifteen studies were included in the review (n=36,919 procedures): three prospective (n=14,899) and twelve retrospective (22,020). Sample size ranged from 158 to 13,622. No studies were randomised.

Octogenarians versus younger participants
CEA 10 studies (n=34,886): one prospective; nine retrospective. There was no statistically significant difference in adverse event rates reported in octogenarians and non-octogenarians in most studies of CEA. Two studies reported significantly higher rates of adverse events among octogenarians: one prospective study (n=13,622) reported significantly higher rates of death, stroke/death combined and MI; and one retrospective study (n=3,430) reported a significantly higher death rate.

CAS five studies (n=2033): two prospective; three retrospective. One retrospective study (n=382) reported a significantly higher death rate in octogenarians. Four studies (two prospective and two retrospective, n=1,889) reported significantly higher rates of stroke and of stroke/death combined in the octogenarian group.

**Authors’ conclusions**
Evidence failed to support the view that CAS is safer than CEA for octogenarians with carotid stenosis.

**CRD commentary**
Although the stated objectives of the review referred to both safety and efficacy, in practice the focus was restricted to perioperative safety. The inclusion criteria were clear in most respects (although an "acceptable" procedure was not defined), but the search was limited. Only two databases were searched (one of which is restricted to RCTs). Journals searched were not named. No attempt was made to find unpublished articles. Some studies may have been missed and the review was prone to publication bias.

Steps were taken to minimise the risk of bias and error in study selection by having more than one reviewer make decisions independently, but it was not clear whether this also applied to data extraction. Few details were provided about the clinical or methodological characteristics of the included studies (for example, participant age, study design, follow up period). It did not appear that study validity was assessed. These factors made it difficult to evaluate the reliability of the findings reported.

The decision to combine the studies in narrative synthesis appears appropriate, but the use of procedures rather than participants as the unit of analysis increases difficulty in interpreting the results. Moreover, the results of prospective studies were not given prominence over retrospective studies. The limitations of the evidence were acknowledged in the text, including the lack of direct comparison of the interventions of interest, the poor design of primary studies and the potential for selection bias and publication bias. In view of the lack of properly controlled evidence and the methodological limitations of the review, in particular the limited search and lack of validity assessment, the conclusions did not appear reliable.

**Implications of the review for practice and research**
Practice: the authors stated that CEA should remain the first line option for treatment of octogenarians with carotid stenosis.

Research: the authors stated that risk factors for complications related to CAS in the elderly should be examined in order to improve patient selection for this procedure. CAS should be compared directly with CEA in this age group by means of RCTs.

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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.