Who needs surveillance of the contralateral carotid artery
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Record Status
This is a critical abstract of an economic evaluation that meets the criteria for inclusion on NHS EED. Each abstract contains a brief summary of the methods, the results and conclusions followed by a detailed critical assessment on the reliability of the study and the conclusions drawn.

Health technology
Duplex ultrasound surveillance of the contralateral carotid artery to prevent occlusion and further stroke.

Type of intervention
Screening; secondary prevention.

Economic study type
Cost-effectiveness analysis.

Study population
Patient in a carotid duplex registry from 1984 to 1995 who had undergone carotid endarterectomy.

Setting
Out-patient follow up. The study was carried out in Boston, Massachusetts, USA.

Dates to which data relate
Effectiveness data related to the period 1984 to 1995. 1995 cost data was used. Resources were not reported.

Source of effectiveness data
Effectiveness data were based on a single study.

Link between effectiveness and cost data
Costing was undertaken retrospectively on the same patient sample used in the effectiveness study.

Study sample
324 patients were enrolled in the analysis. The group represented typical vascular patients: 55% were male, age range 37 to 88 years, (mean 65 years) and 48% were smokers. Coronary artery disease was present in 36% of the patients. Hyperlipidemia and diabetes were both reported in 22% of the patients. No power calculation was performed.

Study design
Cohort study. The length of follow up ranged from 1 month to 11 years (mean 30.3 months, median 22.6 months) The study was performed in a single centre.

Analysis of effectiveness
Analysis was based on intention to treat. The primary outcome in the analysis was the number of strokes prevented.

**Effectiveness results**
Postoperative carotid occlusion was detected in 13 patients. Only 5 of the 13 (38%) had critical stenosis identified before occlusion. Postendarterectomy duplex surveillance detected progression of contralateral carotid disease to 75% or greater stenosis at 5 years in 19.5% of the patients with initial stenosis less than 75%.

**Clinical conclusions**
Age and initial stenosis correlate with the ultimate progression to critical stenosis (75-99%). Patients aged 65 years and older had a 27% chance of progressing to critical stenosis or occlusion within 5 years: this represented a 69% increase over their younger counterparts. Furthermore, patients with a 50% to 74% stenosis on their initial duplex examination had a 39% chance of progressing to critical stenosis or occlusion, representing almost a fourfold increased risk relative to those with lesser degrees of initial stenosis. When the risk factors were combined the patients over 65 with 50-74% initial stenosis had a 49% risk of progression to critical stenosis or occlusion versus 15% for younger patients or those with initial stenosis less than 50% (p<0.0001).

**Measure of benefits used in the economic analysis**
The final health benefit of the duplex surveillance program was stroke prevented.

**Direct costs**
Costs and quantities were not analysed separately. Presumably prices data refer to 1995. The following direct medical costs were included: the cost of contralateral duplex scan examination, CEA in 1995, professional fees, direct cost of stroke (which included the cost of diagnosis, treatment and rehabilitation). No discounting was performed.

**Indirect Costs**
Lost productivity was calculated. Data seem to refer to 1995. No discounting was performed.

**Currency**
US dollars ($).

**Sensitivity analysis**
No sensitivity analysis was carried out.

**Estimated benefits used in the economic analysis**
The number of prevented strokes as a result of applying routine practice surveillance of contralateral carotid artery was used as estimated benefit. Postoperative carotid occlusion was detected in 13 patients. Only 5 of the 13 (38%) had critical stenosis identified before occlusion. Postendarterectomy duplex surveillance detected progression of contralateral carotid disease to 75% or greater stenosis at 5 years in 19.5% of the patients with initial stenosis less than 75%.

**Cost results**
Cost per carotid endarterectomy (CEA) was $9,884 in 1995. The cost of professional fees in the case of CEA was $2,000. The cost of unilateral duplex scan was $237, the cost of the treatment of stroke was $20,999, and the indirect cost of lost productivity was $20,000.
Synthesis of costs and benefits
One prevented stroke cost $185,795. When stratified by age the cost of each stroke prevented ranged from $130,860 to $392,562. To prevent a stroke age over 65 with initial stenosis 50-74% cost $130,860 and needed 646 follow-up years. If the initial stenosis was less than 25% the cost of prevention of one stroke was $392,562. To prevent one stroke if the initial stenosis was between 25-49% it would cost $218,806, and required 3296 follow-up years. The cost per stroke prevented if the initial stenosis was between 50-74% was $143,522 with 1027 follow-up years.

Authors' conclusions
Since examination of both carotid arteries doubled the examination time and costs, the authors concluded that the intensity of duplex surveillance should be varied according to the patient's age and initial degree of stenosis.

CRD COMMENTARY - Selection of comparators
The comparator chosen (no surveillance) was sensible as no other surveillance technique has been applied in the clinical practice.

Validity of estimate of measure of effectiveness
Effectiveness data were based on an 11 year cohort study and this may involve bias as routine clinical practices could have changed during the duration of the study.

Validity of estimate of costs
Only a few details were provided about costs. Resources were not reported separately from the prices. No discounting was performed.

Other issues
The routine surveillance practice may be differ in other countries, therefore the generalisability of the study may be limited.

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