Cost reduction by combined carotid endarterectomy and coronary artery bypass grafting


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
Simultaneous carotid endarterectomy and bypass grafting in patients requiring coronary artery bypass grafting with significant carotid stenosis.

Type of intervention
Treatment.

Economic study type
Cost-effectiveness analysis.

Study population
Patients requiring first-time coronary artery bypass with significant carotid stenosis.

Setting
Hospital. The economic study was conducted in California, USA.

Dates to which data relate
Effectiveness data were collected between February 1977 and May 1994. Resource use data and related dates were not reported. The dates of cost data were not explicitly stated. The fiscal year was not specified.

Source of effectiveness data
Effectiveness data were derived from a single study.

Link between effectiveness and cost data
Costing was undertaken retrospectively on a small sub-sample of the patient sample used in the effectiveness analysis.

Study sample
Power calculations were not used to determine the sample size. A total of 100 patients were included in the combined group (median age 68.1 years, 68% male), 146 patients in the isolated endarterectomy group (median age 69.4 years and 58% male) and 503 patients selected randomly from a group of more than 3000 patients were included in the coronary bypass group (median age 63.6 years and 76% male).

Study design
This was a retrospective cohort study. The number of study centres was not specified. The duration of follow-up was not reported. No loss to follow-up was reported.
Analysis of effectiveness
The principle (intention to treat or treatment completers only) used in the analysis of effectiveness was not explicitly specified. The main health outcomes used in the analysis were hospital mortality and morbidity (permanent stroke), and number of complications (perioperative myocardial infarction, bleeding necessitating reoperation, leg wound infection, respiratory insufficiency, renal failure, low cardiac output syndrome, neck hematoma and neck infection). The groups were different in terms of a number of demographic, historical, and physical examination findings.

Effectiveness results
Hospital mortality was 4% for the combined CABG+CEA group, as compared to 3.4% for the CABG group and 0 for isolated CEA. Incidence of permanent stroke was 0 in the combined group, 1.2% in the CABG group and 0.7% in the CEA group. The combined group did have a higher rate of renal failure than the CABG group, but the rates for other complications were lower than in the isolated groups, although not significantly so.

Clinical conclusions
The results of this study do not provide any evidence of a consistent trend for higher complication or mortality rates than for those undergoing isolated procedures.

Measure of benefits used in the economic analysis
No summary benefit measure was identified in the economic study, and only separate health outcomes were reported.

Direct costs
Costs were not required to be discounted. Quantities were not reported separately from the costs and cost components were not fully reported separately. Direct health service costs were considered, namely: operating room personnel and equipment, ICU, pharmacy, laboratory services, respiratory therapy, central services, radiology, cardiac rehabilitation, vascular laboratory, cardiology/EKG, and nutritional supplements. The source of cost data was a computer database. The cost analysis was performed from the perspective of hospital and reimbursing agency. The costs for 5 patients from each group with average lengths of stay were selected at random and averaged. The Medicare DRG 107 hospital reimbursement was also considered by the authors. The dates of the price data were not explicitly reported.

Indirect Costs
Not considered.

Currency
US dollars ($).

Sensitivity analysis
No sensitivity analysis was performed.

Estimated benefits used in the economic analysis
Not applicable.

Cost results
Hospital costs were $4,896 in the CEA group, $10,959 in the CABG group and $11,089 in the combined group, with savings of $4,776 (30%) and Medicare hospital reimbursement was $8,575, $23,071 and $23,071 respectively, with savings of $8,575 (27.1%). The total cost for the CEA group was $11,580 and $28,381 for the CABG group versus
$29,884 for the combined group, resulted in $10,077 (25.3%) saving for DRG107.

**Synthesis of costs and benefits**
A synthesis was not performed since the combined procedure was the weakly dominant strategy (with almost equal effectiveness and fewer costs).

**Authors' conclusions**
In appropriate patients, a combined procedure is cost-effective, eliminating a second surgical procedure and the cost of post-operative stay (3.7 +/- 2.4 days) associated with isolated carotid endarterectomy. Risk of permanent stroke or death is not increased.

**CRD COMMENTARY - Selection of comparators**
The reason for the choice of the comparator is clear.

**Validity of estimate of measure of effectiveness**
The internal validity of the estimates of effectiveness was weakened due to the retrospective nature of the study.

**Validity of estimate of measure of benefit**
Since the study did not identify an overall measure of benefit it can be regarded as a cost-consequence study.

**Validity of estimate of costs**
Quantities were not systematically reported separately from the costs and cost items were not fully reported separately. The most important drawbacks of the cost analysis were its retrospective nature and the fact that the cost calculations were performed on only a small sub-sample of that used in the effectiveness analysis.

**Other issues**
In view of the lack of a prospective design, sensitivity analysis, and statistical analysis of the costs, the study results should be treated with some caution. The issue of generalisability to other settings or countries was not addressed.

**Bibliographic details**

**PubMedID**
8642819

**Other publications of related interest**

**Indexing Status**
Subject indexing assigned by NLM

**MeSH**
Aged; Carotid Stenosis /economics /surgery; Combined Modality Therapy /economics; Coronary Artery Bypass /economics; Coronary Disease /economics /surgery; Cost Savings /statistics & numerical data; Endarterectomy, Carotid /economics; Female; Hospital Costs /statistics & numerical data; Humans; Male; Retrospective Studies

**AccessionNumber**
21996000725