Is medical treatment for angina the most cost-effective option?

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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
Surgical and medical management in angina pectoris.

Type of intervention
Treatment.

Economic study type
Cost-effectiveness analysis.

Study population
A hypothetical cohort of 100 patients with angina pectoris.

Setting
Primary care (medical management) and secondary care (surgery). The economic analysis was carried out at the University of Glasgow Health Economics Unit, Glasgow, Scotland.

Dates to which data relate
Effectiveness data relate to studies reported between 1983 and 1994. Resource data were derived from 1994 sources. The price year was not stated.

Source of effectiveness data
Angina medical treatment figures were based on a review of previously completed studies.

Modelling
A model (not specified) was used to determine the costs and benefits of surgical and medical treatment of angina pectoris.

Outcomes assessed in the review
The clinical outcomes assessed in the review were:

(a) mortality rates after 5, 7 and 10 years;

(b) operation rate at 5, 7 and 10 years;

(c) non-fatal MI rate at 5 years;

(d) drug management at 1 year;
(e) impact of aspirin;
(f) impact of simvastatin; and
(g) quality of life data.

**Study designs and other criteria for inclusion in the review**
Meta-analyses of RCTs and RCTs were identified. The review inclusion criteria appeared to be restricted to trials in which patients with stable coronary heart disease were randomly assigned to CABG surgery or medical treatment.

**Sources searched to identify primary studies**
Not stated.

**Criteria used to ensure the validity of primary studies**
Not stated.

**Methods used to judge relevance and validity, and for extracting data**
Not stated.

**Number of primary studies included**
5 studies were included, the principal data being derived from a meta-analysis of 7 RCTs.

**Methods of combining primary studies**
The first four clinical outcomes were derived from a meta-analysis. The remaining outcomes were based on individual RCTs. Weighting was applied to quality of life data from published generic health status measures.

**Investigation of differences between primary studies**
Not stated.

**Results of the review**
(a) mortality rates after 5, 7 and 10 years were (CABG, medical management), (10.2%, 5.8%), (15.8%, 21.7%) and (26.4%, 30.5%) respectively;

(b) operation rate: 94% of those assigned to surgery would be operated on in the first year, 5% of those randomized to medical treatment would be operated on each year for 5 years, and 2-3% thereafter;

(c) non-fatal MI rate at 5 years would be 24.4% (CABG) and 30.7% (medical);

(d) drug management at 1 year: 19.5% of the CABG group and 66.1% of the medical group were on beta blockers, 25.5% (CABG) and 18.8% (medical) were taking antiplatelet agents, 20.9% (CABG) and 19.7% (medical) were on digitalis, and 12.2% (CABG) and 15.5% (medical) were on diuretics;

(e) aspirin reduced non-fatal MI by 39% in the first 5 years;

(f) simvastatin reduced all-cause mortality by 30% after 5 years;

(g) quality of life: mild activity restriction was 95% of normal and moderate to severe was valued at 80% of normal.
These were used as the principal effectiveness inputs to the model.

Measure of benefits used in the economic analysis
Life-years gained and quality-adjusted life years (QALYs) were the measures of benefit in the economic analysis. Quality adjusted survival data were obtained from another study and combined with weighting to reflect less than perfect quality-of-life. The authors’ assumptions were used in estimating mild as well as moderate to severe activity restriction figures as a percentage of that considered normal.

Direct costs
Direct costs were discounted at 6% per annum. Direct costs included: CABG cost, non-fatal MI cost, simvastatin, aspirin, beta-blockers, digitalis, diuretics, and out-patient clinic costs (literature, 1994). Costs were viewed from the perspective of a hospital. The price year was not stated. Drug costs were assumed to be static.

Statistical analysis of costs
Not performed.

Currency
US dollars ($). No conversion was performed.

Sensitivity analysis
No sensitivity analysis was performed.

Estimated benefits used in the economic analysis
Surgery compared with medical treatment led to a gain of 10 life-years per 100 patients over a five year period. Life-year gains were reduced to 2 by the addition of a statin to medical therapy. Patients at higher risk gained greater absolute benefit from surgery, but in no group did life-years gained per 100 patients exceed 7.

Cost results
The total intervention costs per 100 patients were not explicitly stated although estimations from graphs within the study show that, at 5 years, surgery cost $1.2 million, medical plus aspirin cost $400,000, and medical plus aspirin plus statin cost $750,000. At 10 years surgery cost $1.37 million, medical plus aspirin cost $700,000, and medical plus aspirin plus statin cost $1.25 million. (Note: These estimates all contain varying proportions of drug and follow-up costs, myocardial infarction costs, and operation costs.)

Synthesis of costs and benefits
For surgery versus medical plus aspirin the costs per life-year over 5 years were greatest for mild angina ($87,202) and smallest for poor left ventricular function ($39,624). The mean cost was $73,601. The costs per life-year over 10 years were greatest for mild angina ($28,828) and smallest for severe angina ($12,291). The mean cost was $24,694. Costs per QALY gains over 5 years were greatest for mild angina ($40,955) and smallest for poor left ventricular function ($25,194). The mean cost was $36,709. Costs per QALY gains over 10 years were greatest for mild angina ($22,438) and smallest for severe angina ($10,927). The mean cost was $19,665.

For surgery versus medical plus aspirin plus statin the costs per life-year over 5 years were greatest for mild angina ($207,477) and smallest for severe angina ($69,290). The mean cost was $229,077. Costs per life-year over 10 years were greatest for poor left ventricular function ($47,269) and cheaper with more lives saved for mild angina. Overall, surgery was cheaper with more lives saved. Costs per QALY gains over 5 years were greatest for mild angina ($53,700) and smallest for severe angina ($36,573). The mean cost was $55,156. The costs per QALY gains over 10 years were
greatest for poor left ventricular function ($47,329) and surgery proved to be the worse option with mild angina. Overall, medical plus aspirin plus statin was the cheaper treatment, and also saved more QALYs.

For medical plus aspirin plus statin versus medical plus aspirin the costs per life-year over 5 years were greatest for mild angina ($45,381) and smallest for poor left ventricular function ($21,357). The mean cost was $34,883. Costs per life-year over 10 years were greatest for mild angina ($19,172) and smallest for poor left ventricular function ($8,780). The mean cost was $14,547. Costs per QALY gains over 5 years were greatest for mild angina ($29,735) and smallest for poor left ventricular function ($15,358). The mean cost was $23,730. Costs per QALY gains over 10 years were greatest for mild angina ($15,068) and smallest for poor left ventricular function ($7,706). The mean cost was $11,951.

Authors' conclusions
The authors argue two possible scenarios acting as cost-effectiveness cut-off points (<$20,000 and $20,001-$40,000 per QALY gained) for preferred options over 5 and 10 year periods of treatment. In the first scenario, the authors recommend that, overall, medicine and aspirin should be the treatment given over 5 years, whilst over 10 years statins should be added. Overall in the second scenario, the addition of statin treatment is recommended for both the 5 and 10 year periods. The authors stated that such research should lead to further research to develop general treatment policies instead of rigid medical practice.

CRD COMMENTARY - Selection of comparators
The selection of comparators was justified.

Validity of estimate of measure of benefit
The measures of benefit will need to be treated with a degree of caution as potential variability in the data was not tested using sensitivity analysis. There is also a wide variety of views reported by clinicians concerning the relative benefits of surgery versus medical management, and which categories of patients would benefit most from either treatment.

Validity of estimate of costs
Details of synthesised costs (with benefits) were provided. However, specific total intervention costs were not made explicit to the reader, being presented in graphical form only.

Other issues
Comprehensive cost-effectiveness information around medical treatments for angina was provided within this paper. However, the authors note themselves that the results are sensitive to duration of follow-up and quality of life estimates, and that variations between countries and health care systems can have a dramatic impact on the results presented here. The authors used good quality studies to derive their data but the justification for their search strategy was not given. As such, it is not possible to determine if other important and more up to date studies were omitted.

Implications of the study
The authors note that their results should be used to stimulate further research and develop general policies for treatment rather than being used a rigid constraints on medical practice.

Source of funding
None stated.

Bibliographic details
Cleland J G, Walker A. Is medical treatment for angina the most cost-effective option? European Heart Journal 1997;
Other publications of related interest

Indexing Status
Subject indexing assigned by NLM

MeSH
Angina Pectoris /economics /mortality /therapy; Angioplasty, Balloon, Coronary /economics; Coronary Artery Bypass /economics; Coronary Disease /economics /mortality /therapy; Cost-Benefit Analysis; Humans; Quality of Life; Survival Rate; Treatment Outcome; Vasodilator Agents /economics /therapeutic use

AccessionNumber
21997000685

Date bibliographic record published
28/02/1999

Date abstract record published
28/02/1999