Cost-effectiveness of minimally invasive cardiac operations

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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
Minimally invasive cardiac operations were compared to percutaneous transluminal coronary angioplasty (PTCA) with or without stenting, and coronary artery bypass grafting (CABG).

Type of intervention
Treatment.

Economic study type
Cost-effectiveness analysis.

Study population
The authors did not explicitly define the study population. Implicitly, the study population consisted of patients eligible for treatment with either PTCA/stenting or CABG.

Setting
The authors did not specify the care setting for the study. The procedures evaluated were typically undertaken in secondary or tertiary care in the United Kingdom.

Dates to which data relate
The cost data were collected from studies published between 1993 and 1999.

Source of effectiveness data
The study used estimates of effectiveness based on opinion.

Methods used to derive estimates of effectiveness
Authors assumptions were used to estimate the additional life years gained by minimally invasive cardiac procedures and CABG compared to PTCA/stenting. The authors reported that the assumed level of effectiveness for CABG was supported by the results of 1 published study.

Estimates of effectiveness and key assumptions
The authors assumed that minimally invasive cardiac procedures would increase survival by 0.05 years compared to PTCA/stenting, and that CABG would increase survival by 0.1 years compared to PTCA/stenting.

Measure of benefits used in the economic analysis
The economic analysis used life years gained as the measure of benefit.
**Direct costs**
The authors used direct medical costs published between 1993 and 1999 for initial and subsequent procedures associated with each of the interventions. The published costs reported were a mixture of charge, direct cost only and cost to charge ratio data. The authors reported their estimated average procedural costs and projected 5-year costs. However, they did not report how these costs were calculated from the data collected. The authors did not report whether other important items of direct cost were included or excluded from their calculations. The authors did not report whether the projected 5-year costs were discounted or what discount rate was used. Resource use and costs were not reported separately.

**Statistical analysis of costs**
No statistical analysis was conducted.

**Indirect Costs**
One of the published studies reported included indirect costs. However, the authors did not report whether or not these were the indirect costs of lost production.

**Currency**
US dollars ($). No currency conversions were reported.

**Sensitivity analysis**
No sensitivity analysis was conducted.

**Estimated benefits used in the economic analysis**
The analysis assumed that, over 5 years, minimally invasive cardiac procedures were associated with a gain of 0.05 life years compared to PTCA/stenting and that CABG was associated with a gain of 0.1 life years compared to PTCA/stenting.

**Cost results**
The authors reported the average procedural costs as $13,782 for PTCA/stenting, $16,082 for minimally invasive cardiac procedures, and $23,938 for CABG.

The authors reported the projected 5 year costs as $33,614 for PTCA/stenting, $39,224 for minimally invasive cardiac procedures, and $39,242 for CABG.

**Synthesis of costs and benefits**
The authors calculated the incremental cost per life year gained of minimally invasive cardiac procedures versus PTCA/stenting, and CABG versus PTCA/stenting, using the projected 5-year costs of the procedures. The authors did not report whether costs and/or outcomes were discounted. The authors estimated the incremental cost-effectiveness ratios as $112,200 for minimally invasive cardiac procedures compared to PTCA/stenting, and $56,280 for CABG compared to PTCA/stenting.

**Authors’ conclusions**
The authors concluded that the results of the analysis are likely to be imprecise and that a more definitive answer requires more accurate data.
CRD COMMENTARY - Selection of comparators
The authors suggested that the interventions included in the analysis (minimally invasive cardiac procedures, PTCA/stenting and CABG) represented the real life therapy choices faced by society and clinicians. Implicit in this suggestion is the assumption of a population of patients who could technically be treated by any one of the alternatives. You, as a user of this database should consider whether these are realistic options for the patient group treated in your setting. You should also consider whether there are other options, such as medical management, that might also be relevant.

Validity of estimate of measure of effectiveness
The authors made it clear that this was an exploratory analysis to describe the potential issues in the choice of procedure. In particular, they noted the lack of robust valid evidence to support the decision-maker in defining a treatment plan for people requiring cardiac surgery. The authors clearly stated that robust estimates of the relative effectiveness of the procedures were not available and recommended that further research using controlled trial designs is needed.

Validity of estimate of measure of benefit
The authors used life years gained as a first approximation of the potential benefit of the procedures. As with the evidence for effectiveness, the authors noted that further research is needed.

Validity of estimate of costs
The authors extracted costs from a number of published studies and databases. However, there was no indication that a systematic review was undertaken. The authors did not provide details of how these data were combined to estimate procedure costs or projected 5-year costs. Again, the authors recommended that further research is needed to test the results of this exploratory analysis.

Implications of the study
The authors recommended that, until more accurate data about the relative uses, costs and outcomes of minimally invasive cardiac procedures are available, a cautious approach to their use is justified.

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