Minimally invasive coronary artery bypass grafting decreases hospital stay and cost

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
Coronary revascularisation for significant left anterior descending (LAD) lesions.

Type of intervention
Treatment.

Economic study type
Cost-effectiveness analysis.

Study population
Male and female patients due to undergo coronary revascularisation of a significant LAD coronary artery lesion.

Setting
Hospital. The economic study was conducted at the University of Virginia Health Sciences Center, Charlottesville, Virginia, USA.

Dates to which data relate
Effectiveness and resource use data related to the period between January 1995 and July 1996.

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

Link between effectiveness and cost data
The costing was undertaken prospectively on the same patient sample as that used in the effectiveness study.

Study sample
28 patients were included in the study, nine of whom had undergone either MICABG without CPB or CABG with CPB for a LAD lesion. Ten patients were selected randomly from the entire database of patients who had undergone PTCA. There were 5 male and 5 female patients in the PTCA group with an average age of 67 years. The MICABG group was made up of 8 male and 1 female patients with an average age of 57 years. 5 male and 4 female patients (average age 59 years) were enrolled in the CABG group. Power calculations were not used to determine sample size. One patient in the MICABG group was successfully converted to the CABG group. One patient, who did not respond to PTCA, eventually underwent CABG. This patient was excluded from the analysis.

Study design
The study was a retrospective single-centre cohort study. The follow-up period was limited to 6 months after discharge. No patients were lost to follow-up.

**Analysis of effectiveness**
The analysis of the clinical study was based on treatment completers only. The patient who did not respond to PTCA and who eventually underwent CABG was excluded from the analysis. The primary health outcomes used in the study were operative mortality and morbidity, number of patients who underwent reoperation within 3 months post-procedure, and total length of stay.

**Effectiveness results**
There was no operative mortality or morbidity in any group. Only 2 patients (PTCA) had to undergo another operation within 3 months. The average length of stay post-procedure was significantly reduced for both the MICABG and PTCA groups when compared with that of the CABG group (2.71 +/- 0.26, p=0.009; 2.62 +/- 0.54, p=0.006; 4.83 +/-0.46, respectively). There were no statistically significant differences between the MICABG and PTCA groups. Total length of stay was 2.70 (+/- 0.26) for MICABG, 3.60 (+/- 0.82) for PTCA and 4.78 (+/- 0.44) for CABG. These differences were not statistically significant.

**Clinical conclusions**
MICABG is a safe and effective alternative for LAD revascularisation. Its use is supported in patients who have single-vessel disease either in the LAD or RCA distribution and who are at risk for PTCA or who have experienced restenosis after PTCA.

**Modelling**
No modelling was undertaken.

**Measure of benefits used in the economic analysis**
The measures of benefits used were operative mortality and morbidity, and post-operative length of stay.

**Direct costs**
Total hospital costs were reported although it was not specifically stated which costs had been included. Costs were not discounted due to the short period of analysis (less than 1 year). Quantities and costs were not reported separately. The quantity/cost boundary adopted was that of the hospital. The estimation of quantities and costs was based on actual data. The price data refer to the period 1995-1996.

**Statistical analysis of costs**
Total hospital costs were determined and compared using analysis of variance. Significant differences were reported for p < 0.05.

**Indirect Costs**
No indirect costs were included.

**Currency**
US dollars ($).

**Sensitivity analysis**
No sensitivity analysis was reported.

**Estimated benefits used in the economic analysis**
There was no operative mortality or morbidity in any group. Average length of stay post-procedure was significantly reduced for both the MICABG and PTCA groups when compared with that of the CABG group (2.71 +/- 0.26, p=0.009; 2.62 +/- 0.54, p=0.006; 4.83 +/- 0.46, respectively). There were no statistically significant differences between the MICABG and PTCA groups.

**Cost results**
Total hospital costs for both the PTCA group ($9,113 +/- 3,039, p=0.02) and the MICABG group ($10,129 +/- 1,014, p=0.0028) were significantly lower than those for the CABG group ($17,816 +/- 1,043). There were no statistically significant differences between the MICABG and PTCA groups.

**Synthesis of costs and benefits**
Cost and benefit measures were not combined in a cost-effectiveness ratio.

**Authors' conclusions**
MICABG is a safe and effective alternative for LAD revascularisation and offers a practical solution to the increased costs and morbidity associated with standard CABG. However, the final role of MICABG is still unclear. The long-term patency rates for MICABG will determine its overall efficacy.

**CRD COMMENTARY - Selection of comparators**
The rationale for the choice of the comparators was clear.

**Validity of estimate of measure of benefit**
The measure of benefit is likely to be valid, although there may be a case for using utility measures such as quality-adjusted life years (QALYs). It would have been advisable to report all p-values even when they were not significant.

**Validity of estimate of costs**
More details about which costs were included in the study and how they were valued would have assisted in assessing the generalisability of results to other settings. Sensitivity analysis should have been conducted to assess the robustness of the results. Such an analysis might have reversed the result of no significant cost difference between the MICABG and PTCA groups.

**Other issues**
The results of this study should have been compared with the results of previously published studies in order to assess their generalisability. The analysis of the clinical study needs to be based on intention-to-treat.

**Implications of the study**
The final role of MICABG is still unclear. The long-term patency rates for MICABG will determine its overall efficacy. Further research on this issue is needed.

**Source of funding**
None stated.
Bibliographic details

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Other publications of related interest


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