Primary angioplasty versus thrombolysis for acute ST-elevation myocardial infarction: an economic analysis of the National Infarct Angioplasty Project


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.

CRD summary
The objective was to assess the cost-effectiveness of primary angioplasty compared with thrombolysis for the treatment of acute ST-segment elevation myocardial infarction. The authors concluded that primary angioplasty was highly likely to be cost-effective at a threshold of 20,000 UK pounds sterling per quality-adjusted life-year gained. The cost analyses that were reported appear to have been satisfactory, but the original model publication will need to be consulted to fully assess the analysis.

Type of economic evaluation
Cost-utility analysis

Study objective
The objective was to assess the cost-effectiveness of primary angioplasty, compared with thrombolysis, for the treatment of acute ST-segment elevation myocardial infarction.

Interventions
Primary angioplasty was compared with thrombolysis.

Location/setting
UK/hospital.

Methods
Analytical approach:
The analysis was based on an updated version of a published model (Bravo Vergel, et al. 2007, see ‘Other Publications of Related Interest’ below for bibliographic details), with a lifetime horizon. The authors reported that a NHS perspective was adopted.

Effectiveness data:
- The short-term clinical data were from a statistical synthesis of 22 randomised controlled trials. The additional delay to treatment with angioplasty was from the National Infarct Angioplasty Project (NIAP). The long-term health outcomes were extrapolated, using the Nottingham Heart Attack Register. The main clinical endpoints were death and non-fatal myocardial infarction.

Monetary benefit and utility valuations:
The quality weights for various health states were from published studies.

Measure of benefit:
The measure of benefit was the number of quality-adjusted life-years (QALYs) gained.

Cost data:
The analysis considered the initial treatment costs (including drugs, consumables, and tests), the treatment costs in the follow-up period, and the long-term costs. These cost data were from 10 hospitals that were part of the NIAP and provided angioplasty (2,083 patients), and five hospitals that did not provide angioplasty (919 patients). Information was retrieved on initial treatment and follow-up for one year. The unit costs were generally from national sources. The
price year was 2006 to 2007. The incremental cost of angioplasty was calculated by regression analysis, using a variety of covariates, including mean age, ethnic group, previous coronary heart disease, and comorbidities.

Analysis of uncertainty:
The authors investigated the impact of treatment delay on primary angioplasty and the rate of revascularisations, in the sensitivity analysis. A probabilistic sensitivity analysis was conducted to assess the likelihood that the intervention was cost-effective at a threshold of £20,000 per QALY gained.

Results
The average cost of treatment in the hospitals providing primary angioplasty was £11,600, while the average cost of treatment in the hospitals not providing angioplasty was £10,700. The QALYs gained were 6.58 with angioplasty and 6.4 without.

The cost-effectiveness ratio was £4,520 per QALY gained and the probability of the intervention being cost-effective (at the threshold of £20,000) was 0.9.

When primary angioplasty required the transfer of patients between hospitals, it was dominated by thrombolysis, as it was more costly and less effective.

Authors' conclusions
The authors concluded that primary angioplasty was highly likely to be cost-effective at a threshold of £20,000 per QALY gained.

CRD commentary
Interventions:
The comparator was appropriate as it was the usual practice in the authors' setting. The intervention had been found to be more effective than the comparator in a number of trials.

Effectiveness/benefits:
The selection of the clinical data was barely reported since the objective was to update the existing model with new cost data. This model and its clinical inputs were described in another publication (Bravo Vergel, et al. 2007). The main outcome measure was QALYs. This was appropriate as they capture both quality and quantity of life improvements and allow comparisons to be made across various interventions.

Costs:
The authors reported the perspective and the relevant costs appear to have been included. The sources of the resource use data and unit costs were reported and appear to have been appropriate. The primary details of the cost analysis were reported. Care was taken to adjust the cost estimates for relevant cost modifiers. Few details were given on the derivation of the long-term costs and discounting, but this information was probably in the original model publication (Bravo Vergel, et al. 2007).

Analysis and results:
An appropriate incremental analysis was performed to determine the cost-effectiveness of primary angioplasty compared with thrombolysis. Some model parameters were varied in the sensitivity analysis, but not all the ranges were reported. The authors identified a number of further limitations to their analysis.

Concluding remarks:
The cost analyses that were reported appear to have been satisfactory, but the original model publication will need to be consulted to fully assess the analysis.

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Other publications of related interest

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