Mortality, reinfarction, left ventricular ejection fraction and costs following reperfusion therapies for acute myocardial infarction


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
Primary coronary angioplasty versus intravenous streptokinase (1.5 million units intravenously in 1 hour) in patients with acute myocardial infarction.

Type of intervention
Treatment.

Economic study type
Cost-effectiveness analysis.

Study population
Patients with symptoms of acute myocardial infarction.

Setting
Hospital. The economic study was carried out in the Netherlands.

Dates to which data relate
The follow-up information related to the effectiveness data was collected in October 1994. The data for resources used were collected during the same periods that for the effectiveness data (not clearly reported). Prices used were from 1992.

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

Link between effectiveness and cost data
The costing was undertaken retrospectively on the same patient sample as that for the effectiveness analysis.

Study sample
Power calculations were not reported as determining the sample size. 301 patients were included, aged less than 76 years. The intervention group comprised 152 randomly allocated patients and the comparator group numbered 149.

Study design
The study was a randomised controlled trial, carried out in a single centre (however, some patients underwent readmission at different sites and these data were included in the study). The mean duration of follow up was 31 months.
(range: 15 to 50 months). The unit of randomisation was the patient. No loss to follow up was reported. Blinding was applied in the assessment of patients' outcomes: data on ejection fractions were analysed by nuclear medicine specialists blinded to the clinical data.

**Analysis of effectiveness**

The analysis was based on intention to treat. The primary health outcomes used were mortality rate (cardiac related), fatal and non-fatal recurrent myocardial infarction and left ventricular ejection fraction, this last outcome being measured using a multiple-gated equilibrium method after the in vivo labelling of red cells with 99mTc-pertechnetate using a gamma camera with a low energy, all purpose, parallel-hole collimator. The global ejection fraction was calculated by a computer using the PAGE program. Groups were shown comparable with respect to general characteristics and prognostic features (history of infarctions).

**Effectiveness results**

Seven patients (5%) randomised to the intervention group died from a cardiac cause. Seventeen patients (11.4%) randomised to streptokinase died for the same reason, \( p=0.03 \). The rate of recurrent myocardial infarction was 3.3% and 19.5%, respectively, \( p<0.0001 \). The relative risk of the combination of cardiac death and non-fatal reinfarction of streptokinase patients compared to angioplasty patients was 4.3 (95% CI: 2.2 - 8.3). The left ventricular ejection fraction was calculated twice (at discharge and during follow up), with 98% of survivors being assessed on the first occasion and 95% on the second. The ejection fractions were 48 (+/-12%) and 43 (+/-13%), in the same order as before and with \( p=0.0025 \) (no significant differences were found between measured ejection fractions, for either group, between the first and second times of measurement).

**Clinical conclusions**

Patency of the infarct-related coronary artery was strongly related to clinical outcome and this explains the improved clinical outcome after angioplasty compared to thrombolytic therapy. In addition, the presence of multi-vessel disease, a history of previous myocardial infarction and the location of the infarction were important determinants of clinical outcome.

**Measure of benefits used in the economic analysis**

No summary benefit measure was identified in the economic study, and only separate clinical outcomes were reported.

**Direct costs**

Costs were not discounted and quantities were not reported separately from the costs, although cost items were reported separately. The costs measured were operating costs (hospital days, diagnostic or therapeutic procedures and medications) and costs of follow up assessment. The boundary adopted was not explicitly specified. The estimation of (unit) costs was based on the institutions' own standard and average prices. The source for unit costs was the hospital administration data. 1992 prices were used. There was an adjustment to costs in order to correct for the increased costs of procedures during the night or the weekend.

**Statistical analysis of costs**

Differences between group means were tested by a two tailed Student's t test.

**Indirect Costs**

Not included.

**Currency**

Dutch guilders (Dfl).
Sensitivity analysis
No sensitivity analysis was performed.

Estimated benefits used in the economic analysis
Not applicable.

Cost results
The total cost for the intervention was Dfl30,670 per patient and Dfl30,382 per patient for the comparator (insignificant statistical difference was found).

Synthesis of costs and benefits
The cost per survivor for the intervention was Dfl33,299, whereas for the comparator the figure was Dfl35,092. The cost per event-free survivor was Dfl34,028 for the intervention group against Dfl43,114 for the control group.

Authors’ conclusions
The benefits of primary angioplasty compared to thrombolytic therapy with intravenous streptokinase are sustained during follow-up without an increase in costs.

CRD COMMENTARY - Selection of comparators
A justification was given for the choice of the comparator. You, as a database user, should consider whether this is a widely used health technology in your own setting.

Validity of estimate of measure of effectiveness
The estimates of the effectiveness results are likely to be internally valid due to the use of a randomised controlled design.

Validity of estimate of costs
The resource quantities used were not reported separately from the costs. However, adequate details of methods of cost estimation were given. The costs were not reported as being discounted despite the fact that the costs of follow up assessment (beyond one year) were incorporated into the costs of treatment.

Other issues
The issue of generalisability to other settings or countries was not addressed.

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Bibliographic details

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Other publications of related interest
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MeSH
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