**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 angioplasty was compared with thrombolysis and a policy of no intervention for patients with acute myocardial infarction (MI).

**Type of intervention**
Treatment.

**Economic study type**
Cost-effectiveness analysis.

**Study population**
The study population was a hypothetical cohort of 10,000 patients with acute MI. The patients were divided into four groups depending on their clinical presentations.

1. Patients with cardiogenic shock.
2. Other patients examined more than 6 hours after the onset of symptoms, without 1 mm ST-segment elevation in 2 contiguous electrocardiographic leads, who were considered ineligible for revascularisation and would have no intervention.
3. Patients with specific risk factors for bleeding who would be ineligible for thrombolysis but eligible for angioplasty.
4. Candidates for thrombolysis who were considered eligible for either thrombolysis or primary angioplasty.

**Setting**
The setting was secondary care. The economic analysis was conducted in the USA.

**Dates to which data relate**
The efficacy and cost data were taken from studies published between 1995 and 1998. The price year was 1993.

**Source of effectiveness data**
The effectiveness data were derived from published and unpublished studies, and an analysis of Kaiser Permanente data. In addition, an expert panel of 7 cardiologists was assembled to review the evidence collected.

**Modelling**
The evaluation used a decision analytic model to combine the costs and the outcomes of events. A decision tree showing possible clinical policies for a hypothetical population of patients with acute MI was reported.
Outcomes assessed in the review
The outcomes were the numbers of deaths, survivors and nonfatal disabling strokes. These were assessed for each of the three clinical policies, i.e. primary angioplasty, thrombolysis and no intervention.

Study designs and other criteria for inclusion in the review
The study designs and criteria for inclusion were not explicitly reported. The author stated that the data and assumptions used in the evaluation were published in the original report (see Other Publications of Related Interest).

Sources searched to identify primary studies
Not reported.

Criteria used to ensure the validity of primary studies
Not reported.

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

Number of primary studies included
Two primary studies were referenced. One of these studies was the original report (see Other Publications of Related Interest).

Methods of combining primary studies
Not reported.

Investigation of differences between primary studies
Not reported.

Results of the review
The numbers of deaths, survivors and nonfatal disabling strokes were reported for each of the three clinical policies.

For primary angioplasty, there were 982 deaths, 9,018 survivors and 16 nonfatal disabling strokes.

For thrombolysis, there were 1,034 deaths, 8,966 survivors and 25 nonfatal disabling strokes.

For no intervention, there were 1,269 deaths, 8,731 survivors and 17 nonfatal disabling strokes.

Methods used to derive estimates of effectiveness
An expert panel of 7 cardiologists was used to review the evidence collected by the review.

Estimates of effectiveness and key assumptions
Not reported.

Measure of benefits used in the economic analysis
The evaluation used three measures of benefit in the economic analysis. These were the numbers of lives saved, life-
years saved and quality-adjusted life-years (QALYs) saved. The source of the utility or quality adjustment weights used to estimate the QALYs was not reported. In addition, the author did not provide details of the valuation method used in the primary studies.

**Direct costs**
The following direct costs (US$ in thousands) were included.

The cost of the initial intervention was $6,500 for primary angioplasty, $8,100 for thrombolysis, and "not applicable" for no intervention.

The cost of the initial hospital stay was $102,000 for primary angioplasty, $107,000 for thrombolysis, and $108,000 for no intervention.

The cost of reinfarction and procedures in the subsequent 12 months was $30,000 for primary angioplasty, $30,000 for thrombolysis, and $29,000 for no intervention.

The future health costs for the survivors were $585,000 for the primary angioplasty group, $581,000 for the thrombolysis group, and $553,000 for the no intervention group.

The resource use and prices were not reported separately. It was not stated whether the cost data were based on the charges or costs. There were no details of the sources used to estimate the costs. In addition, the author did not report what direct medical services and procedures were included in the cost estimates, or the composition of the long-term costs.

The author noted that a model was used to estimate the cost of primary angioplasty. This took into consideration the facilities at the hospital, staff organisation, and the annual number of people with MI that were discharged. No further information on the model was provided. All the costs were reported at 1993 prices. The costs were discounted at a rate of 3% per year over 10 years.

**Statistical analysis of costs**
Not reported.

**Indirect Costs**
The indirect costs were not reported.

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

**Sensitivity analysis**
Not reported.

**Estimated benefits used in the economic analysis**
The estimated benefits were reported as the numbers of lives saved, life-years saved and QALYs saved.

For primary angioplasty relative to no intervention, there were 287 lives saved, 4,310 life-years saved and 4,183 QALYs saved.

For thrombolysis relative to no intervention, there were 235 lives saved, 3,626 life-years saved and 3,442 QALYs saved.
For primary angioplasty relative to thrombolysis, there were 52 lives saved, 684 life-years saved and 741 QALYs saved.

Both the number of life-years saved and QALYs saved were not discounted.

**Cost results**
The costs of each clinical policy after 12 months were $138,000 for primary angioplasty, $145,000 for thrombolysis, and $137,000 for no intervention.

The lifetime costs of each clinical policy were $724,000,000 for primary angioplasty, $726,000,000 for thrombolysis and $690,000,000 for no intervention.

The incremental 12-month costs were -$7,200 for primary angioplasty versus thrombolysis, and $8,300 for thrombolysis versus no intervention. The costs of primary angioplasty and no intervention were not compared.

The incremental lifetime costs were -$1,900 for primary angioplasty versus thrombolysis, and $36,000 for thrombolysis versus no intervention. The costs of primary angioplasty and no intervention were not compared.

These costs included some adverse events such as reinfarction and subsequent procedures. It was not reported which side-effects or adverse events were included in the analysis. The costs were for those hospitals that had cardiac catheterisation laboratories operating at full volume.

**Synthesis of costs and benefits**
The following cost-effectiveness ratios were reported.

The cost per life saved was $120,000 for primary angioplasty versus no intervention, and $150,000 for thrombolysis versus no intervention.

The cost per life-year saved was $11,000 for primary angioplasty versus no intervention, and $14,000 for thrombolysis versus no intervention.

The cost per QALY was $12,000 for primary angioplasty versus no intervention, and 15,000 for thrombolysis versus no intervention.

The cost-effectiveness ratios for primary angioplasty versus thrombolysis were not calculated, since angioplasty was associated with a net saving and gains in the numbers of lives saved, life-years saved and QALYs gained.

The author stated that the results showed primary angioplasty to be reasonably cost-effective in urban areas, where approximately 80% of the US population reside. However, the cost-effectiveness results only apply to those hospitals that already have fully supported cardiac catheterisation laboratories operating at high volumes. When low-volume estimates were used, primary angioplasty was associated with costs per QALY in excess of $100,000.

**Authors' conclusions**
Revascularisation procedures, including thrombolysis, percutaneous transluminal coronary angioplasty and stenting, were shown to have acceptable cost-effective ratios in hospitals with existing cardiac catheterisation laboratories. However, these procedures were found to be cost-ineffective in hospitals without catheterisation facilities. The author suggested that stenting may be cost-effective in association with angioplasty.

**CRD COMMENTARY - Selection of comparators**
The comparators used were justified on the grounds that they represented current practice for some patients in the author's setting. You should decide if the comparators, no intervention and thrombolysis, represent current practice in your own setting.
Validity of estimate of measure of effectiveness

The author did not report whether a systematic search and review of the literature had been undertaken. No information was provided on how the studies were identified, or on the methods used in the review process. The author reported the data selectively.

A Delphi panel of 7 cardiologists was assembled to derive estimates of effectiveness. However, the author did not state the process by which the physicians were selected, or how they influenced the parameters estimated for the model. There were insufficient details of the model used. For example, the structure of the model, whether it was validated in terms of structure, and the range of events included. The author did not report whether all the relevant side-effects and adverse events were included. Statistical or sensitivity analyses were not used to test the robustness of the results to the model structure or uncertainty in the data. These factors mean that it is not possible to assess the validity of the estimates of effectiveness, health benefits or costs.

Validity of estimate of measure of benefit

The summary measures of health benefit were the number of lives saved, life-years saved and QALYs gained. However, the author did not report either the methods or the data sources used to derive the utility or quality adjustment values for the estimation of QALYs. The estimation of the health benefits was reliant on the structure of the model and the effectiveness estimates used. It was not possible to assess the robustness or validity of the estimated benefits since there were no statistical or sensitivity analyses.

Validity of estimate of costs

The author did not report the perspective of the analysis, or indicate if the full range of costs were included in the evaluation. Some relevant costs appear to have been omitted from the analysis, such as the actual unit costs of constructing new catheterisation laboratories and hiring the appropriate medical personnel. You should decide if these omissions are likely to affect the author's conclusions when applied to your own setting. The costs and quantities were not reported separately. There was no sensitivity analysis of the prices.

The estimates of the costs were reliant on the model structure and the effectiveness estimates of effectiveness used. It was not possible to assess the robustness or validity of the estimated costs since there were no sensitivity or statistical analyses.

Other issues

The author did not make appropriate comparisons of his findings with those from other studies. The issue of generalisability to other settings was also not addressed. However, the author suggested that the use of stenting with angioplasty has improved the effectiveness of the procedure.

Implications of the study

The author recommended that the cost-effectiveness of the procedures be taken into consideration. The interventions evaluated have been show to have acceptable cost-effectiveness ratios in certain circumstances.

Source of funding

None stated.

Bibliographic details


PubMedID

10426873
Other publications of related interest

Indexing Status
Subject indexing assigned by NLM

MeSH
Angioplasty, Balloon, Coronary /economics; Cardiac Catheterization /economics; Cost-Benefit Analysis; Fibrinolytic Agents /economics; Hospital Costs; Hospital Departments /economics; Humans; Laboratories /economics; Myocardial Infarction /therapy; Myocardial Reperfusion /economics /methods; Stents /economics; Streptokinase /economics; Tissue Plasminogen Activator /economics; Value of Life

AccessionNumber
21999001593

Date bibliographic record published
30/06/2002

Date abstract record published
30/06/2002