Cost effectiveness of thrombolytic therapy with tissue plasminogen activator as compared with streptokinase 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
Thrombolytic therapy with tissue plasminogen activator versus streptokinase for acute myocardial infarction.

Type of intervention
Treatment.

Economic study type
Cost-effectiveness analysis and cost-utility analysis.

Study population
Patients with acute myocardial infarction undergoing thrombolytic therapy.

Setting
Hospital. The economic study was carried out in the USA in co-operation with several international institutes.

Dates to which data relate

Source of effectiveness data
Synthesis of studies.

Modelling
A Cox proportional-hazards model was used in estimating long-term health outcomes.

Outcomes assessed in the review
Life years saved.

Study designs and other criteria for inclusion in the review
The estimate for clinical outcomes was based on the results of the GUSTO (Global Utilization of Streptokinase and Tissue Plasminogen Activator for Occluded Coronary Arteries) randomised trial study that compared four thrombolytic strategies by estimating 30-day mortality rates. The authors of the present paper carried out an observational study to estimate life expectancy based on the survival rates of the GUSTO study by using the Duke Cardiovascular Disease Database.
Sources searched to identify primary studies
Not stated.

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

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

Number of primary studies included
One randomised clinical trial and an observational study were combined.

Methods of combining primary studies
The observational study provided information on the long-term clinical outcomes based on projections on the short-term survival rate estimates of the randomised trial study.

Investigation of differences between primary studies
Not stated.

Results of the review
The study estimated a life expectancy of 15.27 years for patients treated with streptokinase and a life expectancy of 15.41 years for patients treated with t-PA.

Measure of benefits used in the economic analysis
Life years gained and Quality Adjusted Life Years (QALYs). Patients’ utility was measured by telephone interviews one year after treatment.

Direct costs
All the costs were discounted. Some costs and quantities were reported separately. One-year and long-term direct health service costs were used. Initial hospitalisation costs were calculated in two ways: from the Duke Transition One cost-accounting system and from Medicare DRG reimbursement rates. Thrombolytic agent costs were calculated from the Drug Topics Red Book average of 1993 wholesale prices and from the average drug costs in 16 randomly selected hospitals in the GUSTO study. Follow-up hospitalisation costs were estimated from Medicare DRG reimbursement rates for North Carolina. Physicians’ fees for initial and follow-up hospitalisation were calculated from the Medicare fee schedule for North Carolina. The authors assumed that pharmacy handling and preparation costs and drug-administration costs were equal for the two regimens. It was also assumed that there were no cost differences between the two treatment groups after one year.

Statistical analysis of costs
P-values and medians were reported for quantities of resources used.

Currency
US dollars ($).
Sensitivity analysis
One-way sensitivity analyses were carried out on differences in one-year survival rate, differences in long-term survival rate, cost differences in the first year, cost differences after one year and on the risk of stroke, to test the incremental cost-effectiveness ratio of thrombolytic therapy with t-PA to streptokinase. The authors also examined the impact of quality of life weights on the cost-effectiveness ratio and conducted subgroup analyses.

Estimated benefits used in the economic analysis
The incremental life years gained were calculated to be 0.14 for patients treated with t-PA versus patients treated with streptokinase. The results were discounted at a rate of 5%.

Cost results
The incremental cost was calculated to be $2,845 for thrombolytic therapy with t-PA against thrombolytic therapy with streptokinase. All the costs were discounted at a rate of 5%.

Synthesis of costs and benefits
The incremental cost-effectiveness ratio per life years gained was $32,678. An analysis on utility weights revealed that the incremental cost-utility ratio per QALY gained was $36,402. Subgroup analyses showed that the incremental cost-effectiveness ratio was above $50,000 for subjects 40 years of age with anterior myocardial infarction and for subjects up to 60 year of age with inferior myocardial infarction.

Authors' conclusions
The authors concluded that thrombolytic therapy with tissue plasminogen activator (t-PA) was a favourable, cost-effective alternative to thrombolytic therapy with streptokinase, especially for older patients and for patients with anterior myocardial infarction.

CRD Commentary
This cost-effectiveness study assumed that there were no cost differences between the two treatment groups after one year. It also assumed that the hazard of death after one year did not depend on the two thrombolytic agents. These assumptions, however, were not based on any evidence. More data about the long-term effects on costs and benefits would be particularly useful as the incremental cost-effectiveness ratio in the study turned out to be sensitive to changes in both the differences in long-term survival rate and the cost differences after one year.

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