Valutazione costi-efficacia della terapia trombolitica nell'infarto miocardico acuto con attivatore tissutale del plasminogeno o con streptochinasi: la realtà italiana [Evaluation of the cost-effectiveness of thrombolytic therapy in acute myocardial infarct using tissue plasminogen activator or streptokinase: the Italian perspective]

Lorenzoni R, Fattore G, Gensini G

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
Methods of thrombolytic therapy (with tissue plasminogen activator and streptokinase) in the treatment of acute myocardial infarction.

Type of intervention
Treatment.

Economic study type
Cost-effectiveness analysis.

Study population
The Italian population with acute myocardial infarction was considered.

Setting
Hospital. The economic study was performed in Italy.

Dates to which data relate
The data for the effectiveness analysis were from 1993. The data on costs were derived from the official price (Italian national) formulary of 1996.

Source of effectiveness data
The evidence for the final outcomes was based on a single study.

Link between effectiveness and cost data
The costing was undertaken retrospectively on a patient sample representative of the Italian population of patients with myocardial infarction.

Study sample
The study sample included patients divided in 4 subgroups: 10,622 patients up to 75 years, 1,759 patients older than 75, 3,837 patients with anterior AMI and 8,544 patients with non-anterior AMI.

Study design
The study was designed as a randomised trial. The study sample was based on the Italian GISSI-2 trial which included patients with myocardial infarction representative of the Italian population.

**Analysis of effectiveness**
Whether the analysis of the clinical study was based on intention to treat or treatment completers only was not reported. The average mortality per 1,000 patients at 30 days after the treatment was considered. This was obtained by modifying the mortality rate for any cause as defined by the American GUSTO trial to take into account the different age and disease distributions of patients with myocardial infarction in the Italian population.

**Effectiveness results**
The average mortality per 1,000 patients in the general population with myocardial infarction at 30 days using streptokinase was 73 patients and using tPA was 63 patients. The subgroup of patients over 75 years of age had an average mortality of 206 with streptokinase and 193 with tPA. The subgroup of patients up to 75 years of age had an average mortality of 55 with streptokinase and 44 with tPA. The two subgroups of patients with anterior and non-anterior IMA had an average mortality of 105 and 53 with streptokinase and 86 and 47 with tPA, respectively. Confidence intervals and P-values for the clinical outcomes were not calculated.

**Clinical conclusions**
The use of tPA in patients with myocardial infarction reduces mortality with respect to the use of streptokinase. The use of tPA was also life saving in all the four subgroups of patients.

**Measure of benefits used in the economic analysis**
The outcome assessed was the number of lives saved in the general Italian population of patients with myocardial infarction and the four subgroups of patients.

**Direct costs**
Costs were measured from a health service perspective. The costs of drugs were considered. Discounting was not applied since the treatment period was only 30 days.

**Statistical analysis of costs**
Costs were not treated stochastically.

**Indirect Costs**
Not included in the analysis.

**Currency**
Italian Lira (L).

**Sensitivity analysis**
A one way sensitivity analysis was performed to take into account the variability in the data. This was obtained by varying the number of lives saved in the general population and in each of the four subgroups of patients.

**Estimated benefits used in the economic analysis**
The number of incremental lives saved per 1,000 patients in the general Italian population of patients with myocardial infarction by using tPA rather than streptokinase use was 10. In the subgroup of patients up to 75 years of age tPA
saved an additional 11 lives, 13 in the subgroup of patients older than 75. In the anterior IMA subgroup tPA saved an additional 19 lives compared with streptokinase. 6 additional lives were saved by using tPA in the non-anterior IMA subgroup.

Cost results
Streptokinase cost L100,600 million per 1,000 patients whereas tPA cost L1,524,300 million. This led to an incremental cost of L1,423,700 million. This corresponds to an incremental cost of 490,931 (applying the exchange rate 1 = L2,900). Costs were not discounted since the time horizon was only 30 days.

Synthesis of costs and benefits
Costs and benefits were combined by calculating the incremental cost per life saved. In the general population the tPA led to an incremental cost per life saved of L142,370 millions. In the subgroup of patients up to 75 years of age the tPA led to an incremental cost per life saved of L129,427 millions. The incremental cost per life saved was L109,515 millions in the subgroup of patients older than 75, L74,932 millions in the anterior IMA subgroup and L237,238 millions in the non-anterior IMA subgroup. The sensitivity analysis conducted by using the extreme values of the odds ratio with a 95% confidence interval led to the following results: in the subgroup of patients older than 75 and the non-anterior IMA subgroup the tPA strategy was dominated when the highest value of the odds ratio is considered.

Authors' conclusions
The substitution of streptokinase with tPA for thrombolytic therapy in acute myocardial infarction implies an average incremental cost of L150,000 millions per saved life. Since the effectiveness of tPA is quite low in the non-anterior IMA subgroup, the authors suggested that a protocol which considers the use of tPA in the anterior IMA subgroup only is more cost-effective than the exclusive use of tPA in all the subgroups of patients.

CRD COMMENTARY - Selection of comparators
The comparator is the most widely used alternative drug for thrombolytic therapy in acute myocardial infarction.

Validity of estimate of measure of benefit
The benefits were calculated in terms of lives saved at 30 days after the treatment. The time horizon is limited to 30 days. A longer follow up would take into account the adverse effects of the thrombolytic therapy. Thus, a measure of benefits in terms of life years gained would probably be more comprehensive.

Validity of estimate of costs
Only the costs of drugs were considered. The authors argued that the other costs differed only slightly between the two options. These costs would probably have a stronger impact on the analysis if a longer follow up was considered.

Other issues
The study extends the results of the GUSTO trial to the Italian population of patients with myocardial infarction requiring thrombolytic therapy. This is a good contribution to the generalisability of the results of a study which was originally based on the American population. A sensitivity analysis was performed by varying the odds ratio. This reinforces the external validity of the study.

Implications of the study
The analysis suggests that thrombolytic therapy with tPA in the Italian population of patients with acute myocardial infarction would save lives with a relatively low additional cost. Decision makers may consider this result as a starting point for a policy concerning the methods of treatment of patients with acute myocardial infarction. Further studies based on a longer follow up would contribute towards reinforcing the results of the analysis of the effectiveness of tPA.
compared with streptokinase in the Italian population of patients with acute myocardial infarction.

**Source of funding**
None stated.

**Bibliographic details**

**PubMedID**
9303862

**Indexing Status**
Subject indexing assigned by NLM

**MeSH**
Aged; Aged, 80 and over; Cost-Benefit Analysis; Humans; Italy; Myocardial Infarction /therapy; Streptokinase /economics /therapeutic use; Thrombolytic Therapy /economics; Tissue Plasminogen Activator /economics /therapeutic use

**AccessionNumber**
21997006979

**Date bibliographic record published**
31/05/1999

**Date abstract record published**
31/05/1999