Is hospitalization after TIA cost-effective on the basis of treatment with tPA?
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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
The study examined the strategy of hospitalising patients for one day following a transient ischaemic attack (TIA) in order to increase the administration of intravenous (IV) tissue plasminogen activator (tPA) should a subsequent stroke occur during hospitalisation.

Type of intervention
Other (strategy to modify the treatment of stroke in patients who have experienced a TIA).

Economic study type
Cost-utility analysis.

Study population
The study population comprised patients who had experienced TIA and who did not have contraindications to IV tPA.

Setting
The setting was secondary care. The economic study was carried out in the USA.

Dates to which data relate
The effectiveness data for IV tPA related to 1995. The other effectiveness and natural history data related to 1995 to 2004. The date to which the resource use data referred was not reported. The price year was 2003.

Source of effectiveness data
The effectiveness data were derived from a review of published studies.

Modelling
A decision tree was used to calculate the cost-effectiveness of hospitalising patients for 24 hours following TIA compared with no hospitalisation. The authors assumed that a new stroke would be identified within one hour after onset in hospitalised patients and would then be treated with tPA. The model did not assess any other benefits of hospitalisation. The additional costs of one extra day of hospitalisation therefore incorporated only hotel costs.

Outcomes assessed in the review
The outcomes assessed included:

the effectiveness of tPA,

the incremental costs of an additional day of hospitalisation,
the 24-hour stroke risk following TIA,

the rates of tPA treatment following subsequent stroke,

the duration of arrival times for non-admitted patients, and

the incremental costs and quality-adjusted life-years (QALYs) associated with treating stroke with IV tPA compared with no treatment.

**Study designs and other criteria for inclusion in the review**
Study designs and inclusion and exclusion criteria for the review were not reported. The authors reported that a Markov model was used to assess the incremental costs and the number of QALYs gained based on 1,000 patients eligible for tPA treatment, with an annual discount rate of 5%.

**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**
The validity of the primary studies does not appear to have been assessed.

**Number of primary studies included**
The review included 3 primary studies for effectiveness data and 2 primary studies for cost data.

**Methods of combining primary studies**
The primary studies were combined in the decision model.

**Investigation of differences between primary studies**
Differences between the primary studies do not appear to have been accounted for in the analysis.

**Results of the review**
The 24-hour stroke risk following TIA was 4.2%.

The rate of tPA given was 8.2% among non-admitted patients and 53.3% among admitted patients.

A prior cost-utility study estimated that treatment with tPA resulted in an additional 0.564 QALYs and a cost-saving of $4,500 compared with no tPA.

The previous cost-utility analysis was conducted from a societal perspective, applied a discount rate of 5% per annum, and reported the results in 1997 dollars.

**Measure of benefits used in the economic analysis**
The measure of benefits used was the QALYS. The authors did not specify the method by which quality adjustments were derived in the primary studies, although it would appear that the published results cited in the ‘Results of the Review’ section were used to assess these benefits. The authors multiplied the proportion treated with tPA by the
expected number of QALYs gained per tPA treatment (0.564).

**Direct costs**
The study included the direct costs to the hospital for hospitalisation following TIA and tPA. The cost-saving associated with treating stroke with tPA compared with no tPA was estimated from a societal perspective. The incremental costs of a 24-hour hospitalisation were derived from a single academic centre, but the nature of the prices used was not described. The costs were inflated to 2003 dollars using the medical care component of the Consumer Price Index. The long-term costs incorporated in the model had been calculated using a discount rate of 5% per annum.

**Statistical analysis of costs**
Since sampled data were not available for the costs, no statistical analysis was possible.

**Indirect Costs**
The study did not explicitly include the indirect costs. However, they might have been included in the estimated cost-saving associated with treating stroke with tPA, as this was stated to have been estimated from a societal perspective.

**Currency**
US dollars ($).

**Sensitivity analysis**
The authors conducted one-way sensitivity analyses for each model input in order to investigate variability in the data. Threshold values for the cost of 24-hour hospitalisation, 24-hour stroke risk, cost gained per treatment and QALYs gained per treatment were reported.

**Estimated benefits used in the economic analysis**
Hospitalisation for 24 hours following TIA was estimated to result in a gain of 0.0126 QALYs, compared with 0.0019 QALYs with no hospitalisation. The benefits were estimated over a lifetime horizon.

**Cost results**
Hospitalisation following TIA was estimated to cost $568, compared with a saving of $20 for no admission.

**Synthesis of costs and benefits**
The costs and benefits were synthesised to calculate the cost per QALY gained. This was estimated to be $55,044 for 24-hour hospitalisation following TIA.

The authors reported that the results were very sensitive to the model inputs. For example, a cost of less than $600 for 24-hour hospitalisation resulted in a favourable cost-effectiveness ratio (<$50,000/QALY). Similarly, a 24-hour stroke risk greater than 5%, cost gained per treatment greater than $9,000, or QALYs gained per treatment greater than 0.60, would make admission cost-effective.

**Authors' conclusions**
The 24-hour hospitalisation for patients with an emergency department diagnosis of transient ischaemic attack (TIA) was borderline cost-effective.

**CRD COMMENTARY - Selection of comparators**
The authors investigated a strategy to increase the use of IV tPA in the treatment of stroke following TIA. The authors stated that IV tPA was the only licensed treatment for acute ischaemic stroke in the study setting. You must consider what treatments are relevant in your own setting.

Validity of estimate of measure of effectiveness
The estimate of effectiveness was derived from a review of published studies. The authors did not state that a systematic review of the literature had been undertaken. The authors used data from the available studies selectively and did not consider the impact of differences between the primary studies when estimating effectiveness. This may be pertinent to the study perspective as the cost-saving associated with treatment of stroke with tPA was estimated from a societal perspective, while the cost of 24-hour hospitalisation following TIA was not.

Validity of estimate of measure of benefit
The estimation of benefits was modelled using a sequential decision model. The QALY gain associated with treating stroke with IV tPA was derived using a published decision model.

Validity of estimate of costs
The authors did not specify a perspective for the analysis. The study appears to have incorporated cost components estimated from different perspectives. With the exception of the incremental hospital costs of an additional day of hospitalisation, the unit costs were not reported separately, which will limit the generalisability of the authors' results. The cost data were derived from a single academic centre and a published decision model. The price year was reported to be 2003 and the costs were inflated appropriately using the medical care component of the Consumer Price Index. A one-way sensitivity analysis was performed around all model input values, which will improve the generalisability of the authors' results. The price year was reported, which will assist any future inflation exercises.

Other issues
The authors did not compare their results with the findings from other studies. The issue of generalisability to other settings was addressed in terms of 24-hour stroke risk, level of patient education regarding stroke treatment, and costs. The authors did not present their results selectively and their conclusions reflected the scope of the analysis. The authors discussed the limitations of excluding other potential benefits and harms associated with an additional 24-hour hospitalisation.

Implications of the study
The authors suggest that decisions on whether to admit a patient with TIA should still be individualised and should incorporate both clinical and cost considerations.

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