The cost effectiveness of primary angioplasty compared to thrombolysis in the real world: one year results from West London
Morgan KP, Leahy MG, Butts JN, Beatt KJ

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.

CRD summary
This study examined the clinical and economic impact of primary percutaneous coronary angioplasty versus thrombolysis for the treatment of ST-segment elevation myocardial infarction, using data from a cohort of real patients. Primary angioplasty was more effective in reducing major cardiac adverse events and was cost neutral compared with thrombolysis. The methods were valid and the authors’ conclusions appear to be robust, but the analysis was of one cohort of patients, which might not have been representative of other patient groups.

Type of economic evaluation
Cost-effectiveness analysis

Study objective
This study examined the clinical and economic impact of primary angioplasty, such as percutaneous coronary intervention (PCI), versus thrombolysis for the treatment of ST-segment elevation myocardial infarction, using data from a cohort of real patients.

Interventions
A contemporary primary PCI service was compared against thrombolysis, using the European Hub and Spoke model.

Location/setting
UK/hospital.

Methods
Analytical approach:
The analysis was based on a single study, with a one-year time horizon. The authors stated that the analysis was carried out from the perspective of the health care provider.

Effectiveness data:
The clinical evidence came from a prospective cohort study of 200 consecutive thrombolysis patients (median age 62.4 years; 80% men) enrolled from 2002 until October 2003, and 200 consecutive primary PCI patients (median age 63.2 years; 76.5% men) enrolled from October 2003 until February 2005. The participating centres were one hub site and two spoke sites. The sample size was calculated from a pilot study of the first 10 patients in each group. The key endpoint was the rate of major adverse cardiac events (MACE), which were myocardial infarction, cerebrovascular accident, ischaemia driven revascularisation, and death. The baseline differences between groups were taken into account using statistical tests. The length of follow-up was one year and endpoints were also assessed after 30 days.

Monetary benefit and utility valuations:
Not considered.

Measure of benefit:
The incidence of MACE was the summary benefit measure and was derived directly from the clinical analysis.

Cost data:
The economic analysis included the costs of initial and subsequent hospital admissions including ward stay, nursing,
equipment, personnel, overheads, and surgical procedures. All economic data (unit costs and quantities of resources) were from hospital records, computer databases, and telephone follow-up with the patients. The costs were in UK pounds sterling (£) and the price year was 2005. Comparisons of unadjusted costs were made, using non-parametric tests, and the total costs were log transformed, after removing any outliers, for an analysis of covariance.

Analysis of uncertainty:
Univariate analyses were carried out to identify the variables that significantly influenced the outcomes.

Results
At one year, the incidence of MACE was 13.2% in the primary PCI group and 57.4% in the thrombolysis group (p<0.001). The median unadjusted costs (initial admission) were £6,344 (IQR 4,662 to 9,322) in the primary PCI group and £7,190 (IQR 5,082 to 11,232) in the thrombolysis group (p=0.038).

The median adjusted costs at one year were £7,731 (IQR 6,967 to 8,578) in the primary PCI group and £8,442 (IQR 7,646 to 9,405) in the thrombolysis group (p=0.213); this difference was not statistically significant. The significantly higher costs of the PCI intervention were more than offset by a reduction in the length of hospital stay by a median of 4.5 days.

No further analysis was undertaken as primary PCI was associated with significant improvements in outcome with no additional costs.

Authors’ conclusions
The authors concluded that primary PCI was more effective in reducing cardiac adverse events and, from the perspective of the health care provider, was cost neutral compared with thrombolysis.

CRD commentary
Interventions:
The selection of the comparators was valid as the two available treatments for this patient population were considered.

Effectiveness/benefits:
An appropriate prospective study was carried out to examine the impact of the alternative treatments. The patients were selected based on the admission period and a before-and-after study was carried out around the introduction of the PCI protocol at the authors’ institution in October 2003. The authors considered the baseline differences in study groups as potential confounding factors, but they do not appear to have considered the impact of time factors due to the different enrolment periods. The size of the sample was adequate for capturing the differences in the clinical input. In general, the clinical analysis appears to have been satisfactorily carried out and reported. The authors stated that previous randomised controlled trials had proven the efficacy of primary PCI and the scope of this analysis was to confirm these findings using real-world data. The benefit measure was disease specific, but this is common in this type of study.

Costs:
The cost categories and their sources were consistent with the perspective adopted. The unit costs were reported for all items. The resource quantities were from real-world data from patients participating in the clinical study. Appropriate statistical analyses were carried out to account for the skewed distribution of costs and the presence of outliers. Both the adjusted and unadjusted results were presented. The price year was clearly stated, allowing reflation exercises for other time periods.

Analysis and results:
The results were extensively presented. An incremental analysis to combine the costs and benefits was not required because primary PCI was more effective than, and as expensive as, thrombolysis. The authors did not explicitly investigate the uncertainty, but various statistical analyses were carried out to consider baseline differences between groups as well as the impact of outliers. The authors compared their results with those of other published studies, which generally confirmed the superiority of primary PCI. These results might be transferable to settings with a similar cost structure and similar patient population.
Concluding remarks:
The methods were valid and the authors' conclusions appear to be robust, but the analysis reflected the experience of one cohort of patients, which might not have been representative of other patient groups.

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