Cost-minimization analysis of intravenous adenosine and dipyridamole in thallous chloride TI 201 SPECT myocardial perfusion imaging
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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
Pharmacological coronary vasodilation as an adjunct to myocardial perfusion imaging.

Type of intervention
Diagnosis.

Economic study type
Cost-effectiveness analysis.

Study population
Patients requiring myocardial perfusion imaging, unable to undergo diagnosis by standard exercise stress tests.

Setting
The setting was an outpatient nuclear medicine department of a teaching hospital. The economic analysis was conducted in Omaha, Nebraska, USA.

Dates to which data relate
Data on clinical effectiveness and resources used were collected between January 1994 and March 1995. The base price year used in the analysis was not reported.

Source of effectiveness data
Effectiveness data were derived from a single study.

Link between effectiveness and cost data
Cost data were collected retrospectively using the same patient sample as in the effectiveness analysis.

Study sample
There were 83 patients in the dipyridamole group and 166 in the adenosine group. The mean age of patients was 67.0 years and 55% (dipyridamole) and 58% (adenosine) of patients were female. The patient sample consisted of consecutive patients referred for myocardial perfusion imaging. Power calculations were not used to determine the sample size and patients were not randomised between the two groups.

Study design
Single centre retrospective cohort study. The duration of the study was until the end of imaging and treatment of any
related adverse effects. There was no loss to follow up.

Analysis of effectiveness
The analysis of effectiveness was based on intention to treat. The primary health outcomes used in the analysis were the incidence and severity of adverse events. At baseline analysis there were no significant differences in demographic or clinical characteristics between patients in the two groups.

Effectiveness results
63 patients (76%) in the dipyridamole group experienced at least one adverse event compared with 134 patients (81%) in the adenosine group. This difference was not significant, and there were also no significant differences in the number of severe adverse events: 3 patients (3.6%) in the dipyridamole group and 7 patients (4.2%) in the adenosine group.

Clinical conclusions
There were no differences in the number or severity of adverse events experienced in the groups, although there were more late onset and prolonged adverse events in the dipyridamole group because of its longer half life.

Measure of benefits used in the economic analysis
Since the effectiveness analysis showed no difference in effectiveness or clinical benefit between the intervention and the comparator, the economic analysis was based on the difference in costs only.

Direct costs
Costs related to acquisition, administration, monitoring, management of adverse events and follow up care and testing were included in the analysis. Item costs were reported separately. Actual quantities of resources used by patients in the study were determined and acquisition and administration costs at the institution were used. The base price year used was not reported. Costs were estimated from the perspective of the institution and were not discounted (this was appropriate given the short duration of the analysis).

Statistical analysis of costs
Costs were treated stochastically; t-test and Mann-Whitney U test were applied.

Indirect Costs
Not included.

Currency
US dollars ($).

Sensitivity analysis
One way analysis examined the impact on overall costs of variation in cost components.

Estimated benefits used in the economic analysis
Not applicable.

Cost results
The mean total costs per patient were significantly lower in the adenosine group than in the dipyridamole group, $378.5
(SD, +/- 128.2) compared with $485.6 (+/- 230.4), (p<0.0001 Mann Whitney test). This cost difference was due to the much higher costs of monitoring and treating adverse events in the dipyridamole group which offset lower acquisition costs because of its longer half life and greater incidence of late onset and prolonged adverse events.

**Synthesis of costs and benefits**
Not applicable.

**Authors’ conclusions**
Adenosine appears to have lower costs per patient, despite higher acquisition costs, because of lower costs in administration, monitoring and treating patients for adverse events. Well designed randomised clinical trials, which would also examine the diagnostic sensitivity and specificity of the two interventions, are required to validate the study results.

**CRD COMMENTARY - Selection of comparators**
A justification was provided by the authors for the comparators used, as these were the only pharmacological stress tests available in the United States.

**Validity of estimate of measure of benefit**
Clinical benefit data were taken from a retrospective observational study which, as noted by the authors, could be prone to bias. Furthermore the authors noted that their assumption of identical diagnostic results needs to be tested in clinical trials. As both tests were of similar effectiveness the authors conducted a cost-minimization analysis.

**Validity of estimate of costs**
Details were provided of cost data sources and these estimates were based on actual resource use by patients. However, the study does not appear to state what base year was used for the reporting of costs in the analysis.

**Other issues**
The results of the analysis cannot be generalised beyond the study institution.

**Implications of the study**
Well-designed randomised controlled trials and economic evaluations are required to examine further pharmacological stress tests and to test the hypothesis that adenosine is a cost minimising intervention compared with dipyridamole.

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