Long-term clopidogrel therapy in patients receiving percutaneous coronary intervention

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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.

CRD summary
This study compared the use of short-term versus long-term therapy with clopidogrel, in patients undergoing percutaneous coronary intervention, either electively or as patients with acute coronary syndrome. The authors concluded that long-term clopidogrel resulted in cost savings and increased the number of life-years and QALYs gained compared with short-term clopidogrel treatment. A few important features of the analysis were not reported, but the authors’ conclusions were appropriate to the study question and the clinical evidence used.

Type of economic evaluation
Cost-effectiveness analysis, cost-utility analysis

Study objective
This study evaluated the cost-effectiveness of long-term clopidogrel for two populations: patients with acute coronary syndrome (ACS) undergoing percutaneous coronary intervention (PCI), and patients undergoing elective PCI.

Interventions
All patients were assumed to receive treatment with clopidogrel before PCI and this was followed by nine- or 12-months compared with four weeks of clopidogrel treatment.

Location/setting
Netherlands/primary and secondary care.

Methods
Analytical approach:
A Markov model was constructed to extrapolate the clinical outcomes, costs and effects over a patient’s lifetime. The model was based on one used in a previous study and the time horizon was 50 years. The authors reported that the perspective was that of the Dutch health care system.

Effectiveness data:
The effectiveness data for the two populations were obtained from two separate studies, namely the Percutaneous Coronary Intervention - Clopidogrel in Unstable Angina to Prevent Recurrent Events (PCI-CURE) and the Clopidogrel for the Reduction of Events During Observation (CREDO) studies, which were augmented with data from the relevant literature. The individual event probabilities for the first year were estimated using event-specific Weibull models. The subsequent event probabilities were based on the data from the second half of the year and adjusted for higher risk, using relative rates. The main clinical parameters included the risk of events such as fatal and non-fatal Myocardial infarction (MI) and stroke, coronary artery bypass graft (CABG), PCI, and cardiovascular death.

Monetary benefit and utility valuations:
The utility values for the different health states, were obtained from the literature and were fully presented.

Measure of benefit:
Life-years gained and quality-adjusted life-years (QALYs) were the measures of benefit and they were discounted at an annual rate of 4%.

Cost data:
The cost categories included those of acute care, drugs, PCI, CABG, and the treatment of events such as major bleeding.
or MI in the first six months or one year. The summary costs were reported for each event and these were derived from published studies and a national price publication. All costs were in Euros (EUR), for the price year 2004, and adjusted for inflation using price indices. They were discounted at an annual rate of 4%.

Analysis of uncertainty:
The parameter uncertainty was investigated using one-way sensitivity analyses on all the cost estimates, various clinical effectiveness parameters, and the utility values. The ranges over which the parameters were tested were reported. In addition, probabilistic sensitivity analysis was conducted, using Monte Carlo simulations, and the parameter distributions were clearly described.

Results
For the population of the PCI-CURE study, long-term treatment with clopidogrel appeared to be the dominant strategy over the patient's lifetime, as it was more effective and less costly compared with short-term (four weeks) clopidogrel treatment.

These results were sensitive to variations in the transition probabilities for undergoing a major event during the first year. The probabilistic analysis demonstrated that long-term clopidogrel had a 0.98 probability of being cost-saving and a 0.65 probability of being more effective, with additional life-years saved and QALYs gained.

For the population of the CREDO study, long-term treatment with clopidogrel was more effective and less costly in 99% of the simulations and the results were robust. At a willingness-to-pay of EUR 20,000 per life-year gained, long-term treatment had a 0.99 probability of being cost-effective.

Authors' conclusions
The authors concluded that, in the Dutch setting, pre-treatment followed by long-term treatment of nine to 12 months, with clopidogrel, was a less costly and more effective option, for the prevention of ischaemic events, in patients undergoing elective PCI or those with ACS undergoing PCI, compared with short-term treatment.

CRD commentary
Interventions:
The interventions were clearly reported and the selection of comparators was justified by reference to two randomised trials. The existence of alternative therapies was not discussed, except that the authors noted that there was a possibility that the loading dose was the most effective part of the treatment. The current practice in the Dutch setting was not reported and if this was not included, it would make this a partial analysis.

Effectiveness/benefits:
The effectiveness results were mainly derived from two published studies and no systematic search of the literature was reported. It is hard to judge the internal validity of the data, with the limited information provided, but extensive sensitivity analysis was undertaken to assess the effects of uncertain estimates on the reliability of the results. The utilities were taken from published literature and, although those assigned to different health states were presented, no details of their valuation methods were reported.

Costs:
The costs appeared to reflect the perspective. The costs and quantities were not reported separately, but otherwise, the costing analysis was adequately reported and included appropriate adjustments for inflation, discounting and the price year.

Analysis and results:
The model structure, relevant details, and modelling assumptions were clearly presented. Extensive one-way and probabilistic sensitivity analyses were conducted on the modelling parameters and the results were presented in full, with a cost-effectiveness plane. The authors gave a balanced discussion on the limitations of their study.

Concluding remarks:
A few important features of the analysis were not reported, but the authors' conclusions were appropriate to the study
question and clinical evidence used.

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