Incremental benefit and cost-effectiveness of high-dose statin therapy in high-risk patients with coronary artery disease
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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 evaluated the cost-effectiveness of high-dose statin therapy for patients aged over 60 years with acute coronary syndrome (ACS) and stable coronary artery disease (CAD). The authors concluded that high-dose statin therapy was cost-effective for ACS patients, but its cost-effectiveness was less clear for stable CAD patients. Despite some limitations to the costing report, the authors presented an appropriate and transparent analysis. The authors’ conclusion appears appropriate.

Type of economic evaluation
Cost-utility analysis

Study objective
This study evaluated the cost-effectiveness of high-dose statin therapy for patients aged over 60 years with acute coronary syndrome (ACS) and stable coronary artery disease (CAD).

Interventions
Daily high-dose statin therapy (atorvastatin 80 mg/day) was compared with conventional-dose statin therapy (simvastatin 20 mg/day).

Location/setting
USA/secondary care.

Methods
Analytical approach:
A Markov model was used to compare both interventions for patients with ACS and stable CAD. The six health states considered in the model were remains well, myocardial infarction (MI), stroke, rehospitalisation, revascularisation and death. The cycle length was 1 year and the time horizon was lifetime. The ACS patient was assumed to be transferred into a stable CAD state after two cycles. The authors stated that a societal perspective was adopted. For the baseline case, a constant risk reduction beyond 5 years was assumed.

Effectiveness data:
The main clinical evidence came from a pooled analysis, using data from 4 published clinical trials. The investigators of the clinical trials were contacted for additional information that had not been reported in the published articles. A random-effects model was used to derive summary risk ratios. These clinical outcomes included transition probabilities and mortalities. Besides this clinical evidence, a number of published studies were used to obtain other clinical outcomes (e.g. complication rates of stroke). However, neither the search method nor the inclusion criteria for the literature used to derive the clinical evidence were reported.

Monetary benefit and utility valuations:
Utility estimates were used to derive quality-adjusted life-years (QALYs) for each health state. The utility scores were obtained from the literature, but no details of the method used to derive the utilities were reported.

Measure of benefit:
The measures of benefit were the life-years and QALYs. These were discounted at an annual rate of 3%.
Cost data:
It would appear that productivity costs were not included, even though the authors stated that a societal perspective was adopted. The cost categories included the costs of statin and non-statin drugs, the costs of treating MI, stroke, rehospitalisation and revascularisation, and the costs of managing disability associated with stroke. The cost data came from the published literature and other publicly available sources. The resource quantities were not reported. All costs were adjusted to 2005 US dollars ($) using the health care component of the Consumer Price Index. Discounting was conducted at an annual rate of 3%.

Analysis of uncertainty:
Extensive sensitivity analyses were conducted on model input parameters. Such parameters included prices of the drugs under investigation, their clinical efficacy, utility scores for patients with MI and stroke, and the discount rate. A two-way sensitivity analysis was conducted, varying simultaneously the efficacy and the value of differences in costs between high- and conventional-dose statin treatments. A threshold sensitivity analysis was also conducted on the value of the cost-difference. Uncertainty in parameters was assessed using probabilistic sensitivity analysis with Monte Carlo simulations.

Results
For ACS patients, the discounted life-years were 14.326 versus 14.017 for high- versus conventional-dose statin treatment, while stable CAD patients gained 14.469 versus 14.441 life-years. The QALYs were 13.589 versus 13.237 for ACS patients treated with high- versus conventional- dose treatments, and 13.770 versus 13.674 for stable CAD patients.

The study reported incremental cost-effective ratios (ICERs) for given differences in costs between the drug interventions, but the total costs were not reported. For ACS patients, the ICER for the high-dose treatment was under $44,000 per QALY gained, even when the difference in price was $3.5. For stable CAD patients, the ICER for the high-dose treatment was under $50,000, $100,000 and $150,000 per QALY gained for differences in price of $1.20, $1.80 and $2.40, respectively.

Sensitivity analyses demonstrated that the ICERs were sensitive to the efficacy of high-dose treatment beyond the clinical trial duration, and the difference in costs between high- and conventional-dose statin treatments. The probabilistic sensitivity analysis generated the likelihood with which high-dose therapy would be cost-effective over a range of threshold values.

Authors' conclusions
The authors concluded that high-dose statin therapy was cost-effective for ACS patients, but its cost-effectiveness was less clear for stable CAD patients.

CRD commentary
Interventions:
Both interventions were well described, including the dosage. The rationale for the choice of the comparator was clear as conventional-dose statin therapy represented current practice in the authors’ setting.

Effectiveness/benefits:
The effectiveness data were obtained from published studies, including clinical trials. A pooled analysis was conducted to quantify the clinical benefit of the interventions. However, the methods of the review of the literature were not reported, which makes it difficult to ascertain whether the best available evidence was used to inform the model. The outcomes used were the rates and probabilities of transition for ACS and stable CAD patients among the health states.

The methods used to derive the utilities found in the literature were not reported. It is not possible to tell if the utility estimates are relevant to the population and setting.

Costs:
The perspective of the study was stated, and it appears that all the cost items associated with this perspective have been included. The authors did not explain why, but they might have omitted productivity costs due to the 60-year age of the NHS EED
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cohort. The cost categories included intervention drugs and the costs of treating diseases at each health state. However, no breakdown of the costs or resources used was reported, which makes it impossible to ascertain in detail what was included in the cost estimates. The price difference between the drugs being investigated was used as a proxy to compare both therapy options, which was appropriate for addressing the study question. Discounting and the price year were well reported.

Analysis and results:
An incremental analysis was appropriately conducted and, in general, the results were reported in full. In addition, issues of uncertainty were addressed through extensive deterministic and probabilistic sensitivity analyses, and threshold analysis. Overall, the level of reporting was good for clinical data, but was somewhat less detailed for the costing. The authors also acknowledged a number of limitations to their analysis.

Concluding remarks:
Despite some limitations to the costing report, the authors presented an appropriate and transparent analysis. The authors' conclusion appears appropriate.

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Bibliographic details

Other publications of related interest


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Subject indexing assigned by NLM

MeSH
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