The pharmaco-economics of peri-operative statin therapy

Biccard B M, Sear J W, Foex P

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 perioperative use of statin therapy (atorvastatin) in patients undergoing major vascular surgery was examined.

Type of intervention
Secondary prevention.

Economic study type
Cost-effectiveness analysis.

Study population
The study population comprised patients undergoing major vascular surgery. Non-cardiac surgical patients were considered.

Setting
The setting was a hospital. The economic study was carried out in the UK.

Dates to which data relate
The effectiveness and resource use data were derived from studies published between 1994 and 2005. The price year was 2004.

Source of effectiveness data
The effectiveness evidence was derived from a synthesis of published studies.

Outcomes assessed in the review
The outcomes estimated from the literature were the rates of death, nonfatal myocardial infarction (MI), unstable angina and ischaemic cerebrovascular accident (CVA). The incidence of adverse perioperative cardiac events (rhabdomyolysis and elevated hepatic transaminases) was also estimated.

Study designs and other criteria for inclusion in the review
It was not stated whether a systematic review of the literature was undertaken to identify the primary studies. The clinical data were derived from clinical trials. Two studies, in particular, were used as the main sources of data.

Sources searched to identify primary studies
Not reported.
Criteria used to ensure the validity of primary studies
Since only randomised, clinical trials were included, the validity of the primary estimates should be high.

Methods used to judge relevance and validity, and for extracting data
Not reported.

Number of primary studies included
Twelve primary studies provided the clinical data.

Methods of combining primary studies
A narrative approach appears to have been used to combine the primary estimates.

Investigation of differences between primary studies
Not reported.

Results of the review
The rate of death was 2.2% in the statin group and 4.0% in the no statin group.
The rate of nonfatal MI was 6.7% in the statin group and 11.1% in the no statin group.
The rate of unstable angina was 0% in the statin group and 0.1% in the no statin group.
The rate of ischaemic CVA was 0% in the statin group and 0.2% in the no statin group.
The incidence of rhabdomyolysis was 1.3% and the incidence of elevated hepatic transaminases was 2.0%.

Measure of benefits used in the economic analysis
The summary benefit measure used was the number-needed-to-treat (NNT) to prevent an adverse perioperative event or death with perioperative statin therapy in comparison with no statin therapy.

Direct costs
The analysis of the costs was undertaken from the perspective of the NHS. It included the costs of statin, treatment of adverse events and monitoring for complications. The unit costs were not presented separately from the quantities of resources used. Some costs were presented as macro-categories. Resource use was estimated from published data, while costs were estimated using NHS reference prices and the British National Formulary (for 45 days of admission). Discounting was not relevant as the costs were incurred during a short time. The price year was 2004.

Statistical analysis of costs
The costs were treated deterministically.

Indirect Costs
The indirect costs were not considered.

Currency
UK pounds sterling (£).
Sensitivity analysis
Sensitivity analyses were not carried out.

Estimated benefits used in the economic analysis
Post publication, an erratum has been brought to our attention that affects some of the results presented here. The reader should refer to 'Other Publications of Related Interest' for the link to the erratum.

The NNT to prevent an adverse perioperative event or death with perioperative statin therapy in comparison with no statin therapy was 15.2 (56 for death alone and 21 for major cardiovascular complications excluding death).

Cost results
The total costs per patient were 295.90 with statin therapy and 252.17 with no statin therapy. The cost-difference was 43.73.

Synthesis of costs and benefits
The costs and benefits were not combined because perioperative statin therapy was the dominant strategy, being more effective and less expensive than conventional no statin therapy.

Authors' conclusions
Perioperative use of statins in patients undergoing major vascular surgery was a cost-effective strategy, compared with no statin therapy, in the UK.

This abstract should be read in conjunction with the published erratum.

CRD COMMENTARY - Selection of comparators
The choice of the comparator (i.e. no statin therapy) was appropriate since it reflected the conventional approach for patients undergoing major vascular surgery. You should decide whether this is a valid approach in your own setting.

Validity of estimate of measure of effectiveness
The effectiveness data were derived from a synthesis of published studies. The authors did not state whether a systematic review of the literature was undertaken to identify the primary studies, which might have been selected individually. The authors included only randomised clinical trials, thus the primary measures used in the analysis were valid. Some information on the two key trials was reported, but details of other sources of data were not provided. The authors did not address the issue of heterogeneity among the primary studies with respect to patient populations and other aspects of the studies, such as follow-up and clinical end points. Further, the use of alternative clinical estimates was not investigated.

Validity of estimate of measure of benefit
The NNT represents a benefit measure that can be calculated easily using clinical data on the absolute risk reduction, which in this case were derived directly from the clinical trials. The NNT might be comparable with the benefits of other health care interventions.

Validity of estimate of costs
The authors stated explicitly which perspective was adopted in the analysis, and the costs included were consistent with this viewpoint. The information on unit costs and quantities of resources used was limited, and a detailed breakdown of the cost items was not reported. Some costs were presented as macro-categories, which limits the
possibility of replicating the analysis in other settings. The sources of the costs were reported and were consistent with the choice of an NHS perspective. Resource use came from published sources. The price year was reported, which will help in reflating the results of the study in other time periods. No statistical analyses of the costs were carried out, and the cost estimates were specific to the study setting. No sensitivity analysis were performed.

**Other issues**
The authors did not compare their findings with those from other published studies. They also did not explicitly address the issue of the generalisability of the study results to other settings. Sensitivity analyses were not carried out, which limits the external validity of the study. The authors stated that the costs of statins might have been overestimated given the sources of data used, thus cost-savings associated with statin therapy could be even larger than those conservatively calculated in this study. Similarly, complications were always costed as "uncomplicated" according to NHS reference costs, which means that no intensive care costs were considered. In addition, the analysis did not consider the cost implications of late cardiac events. Both these considerations appear to have increased the costs in the control group.

This abstract is intended to reflect the original paper as published, therefore the published erratum has not been considered. The reader should refer to ‘Other Publications of Related Interest’ for details of the erratum.

**Implications of the study**
The study results strongly support the use of perioperative statin therapy in patients undergoing major vascular surgery. Future studies should evaluate the impact of late cardiovascular outcomes on the cost-effectiveness of perioperative statins.

**Source of funding**
None stated.

**Bibliographic details**

PubMedID
16229688

DOI
10.1111/j.1365-2044.2005.04371.x

**Other publications of related interest**


Erratum in: Anaesthesia 2006;61:106. Link as follows:

Indexing Status
Subject indexing assigned by NLM

MeSH
Atorvastatin Calcium; Cardiovascular Diseases /economics /prevention & control; Cost-Benefit Analysis; Drug Costs /statistics & numerical data; Drug Monitoring /economics; Great Britain; Heptanoic Acids /adverse effects /economics /therapeutic use; Humans; Hydroxymethylglutaryl-CoA Reductase Inhibitors /adverse effects /economics /therapeutic use; Perioperative Care /economics /methods; Prospective Studies; Pyrroles /adverse effects /economics /therapeutic use; State Medicine /economics; Vascular Surgical Procedures /economics

AccessionNumber
22005001750

Date bibliographic record published
28/02/2007

Date abstract record published
28/02/2007