Cost-outcome benefits of fibrate therapy in type 2 diabetes

Feher M D, Langley-Hawthorne C E, Byrne C D

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 use of fibrate (Supralip 160 mg tablets) and statin therapies (pravastatin or simvastatin at 40 mg/day) to treat coronary heart disease (CHD) in patients with Type 2 diabetes.

Type of intervention
Secondary prevention.

Economic study type
Cost-effectiveness analysis.

Study population
The study population consisted of a hypothetical patient population with Type 2 diabetes who were suffering from dyslipidaemia.

Setting
The setting was unclear, but it was likely to have been secondary care. The economic study was carried out in the UK.

Dates to which data relate
The effectiveness data were gathered from studies published between 1994 and 2000. The cost data were derived from 2000 CHD statistics produced by the British Heart Foundation. The price year was 2000.

Source of effectiveness data
The effectiveness data were derived from a non-systematic review of the literature.

Modelling
A decision analysis model was used to determine whether the fibrate treatment was cost-effective in comparison with the statin treatment. The duration of follow-up was 5 years.

Outcomes assessed in the review
The outcomes assessed in the review and used as model inputs were the absolute risk of a CHD event over 5 years in diabetic patients, and the absolute risk reduction with statin and fibrate treatments.

Study designs and other criteria for inclusion in the review
The authors used the results of published analyses (Robins et al., see Other Publications of Related Interest) on the absolute risk reduction observed in three randomised controlled trials of lipid-lowering agents (the VA-HIT trial, the
Sources searched to identify primary studies
Not reported.

Criteria used to ensure the validity of primary studies
Not reported.

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

Number of primary studies included
Three large-scale trials were included in the analysis.

Methods of combining primary studies
The authors referred to a published study that had combined the three primary studies.

Investigation of differences between primary studies
Not reported.

Results of the review
The absolute risk of CHD events over 5 years was 15%.

The absolute risk reduction with fibrate treatment was 7.6% in the VA-HIT trial.

The absolute risk reduction with statin treatment was 2.7% in the CARE trial and 5.5% in the combined 4S, CARE and LIPID trials.

Methods used to derive estimates of effectiveness
The authors made several assumptions about the effectiveness estimates, considering low-, medium- and high-risk reduction scenarios for the absolute risk reduction.

Estimates of effectiveness and key assumptions
The 7.6% absolute risk reduction for fibrate treatment was compared with three alternative scenarios for statin treatment:

a low-risk reduction scenario of a 2.7% absolute risk reduction,

a medium-risk reduction scenario of a 5.5% absolute risk reduction, and

a high-risk reduction scenario of a 7.6% absolute risk reduction.

A further analysis used an 8.1% absolute risk reduction for statin treatment versus an 8.0% reduction for fibrate treatment.

Measure of benefits used in the economic analysis
NHS Economic Evaluation Database (NHS EED)
Produced by the Centre for Reviews and Dissemination
Copyright © 2017 University of York
The benefit measure was the number of CHD events avoided in comparison with no treatment. The CHD events were derived directly from the effectiveness analysis. The benefits were discounted at an annual rate of 1.5%.

**Direct costs**
The perspective of the NHS health care system was adopted. Only the direct costs for treating CHD events and for pharmaceuticals (pravastatin, simvastatin and fibrates) were included. The cost of treating CHD events was derived from 2000 CHD statistics produced by the British Heart Foundation. The pharmaceutical costs were based on costs to the NHS (Haymarket Medical Ltd., London). The resource quantities and the costs were not reported separately. All the costs were likely to be adjusted to year 2000 UK pounds. The costs were discounted at an annual rate of 6%, based on the recommendations made by NICE.

**Statistical analysis of costs**
No statistical analysis of the costs was performed.

**Indirect Costs**
The indirect costs were not included in the analysis.

**Currency**
UK pounds sterling (£).

**Sensitivity analysis**
A series of one-way sensitivity analyses were performed. The parameters varied were:

- the daily dose of statins (2 and 10 mg),
- the fibrate formulation (lipantil, 200 capsules),
- the reduction from the 7.6% absolute risk reduction for fibrate treatment (10 and 20%),
- the lower and upper weighted average cost per CHD event (1,823 and 3,941), and
- the discount rate (6% for both drug costs and clinical benefits, 6% on drug costs and 0% for clinical benefits).

**Estimated benefits used in the economic analysis**
The number of untreated patients suffering a CHD event was 150.

Compared with no treatment, the number of CHD events avoided over 5 years with fibrate treatment (discounted benefits) was 72.7.

Compared with no treatment, the number of CHD events avoided over 5 years with statin treatment was 25.8 in the low-risk reduction scenario, 52.6 in the medium-risk reduction scenario and 72.7 in the high-risk reduction scenario.

The incremental benefit of fenofibrate versus pravastatin was 46.9 for the low-risk reduction scenario with statin, 20.09 for the medium-risk reduction scenario and 0 for the high-risk reduction scenario.

**Cost results**
The discounted costs over 5 years were 305,315 with no treatment and 960,569 with fibrate treatment. With statin treatment, these costs were 1,880,685 for the low-risk scenario, 1,823,693 for the medium-risk scenario and 1,780,979 for the high-risk scenario.
The incremental savings of fibrate treatment compared with statin treatment were 920,116 for the low-risk scenario, 863,124 for the medium-risk scenario and 820,410 for the high-risk scenario (a 54% reduction in annual cost).

Synthesis of costs and benefits
The synthesis of the costs and benefits was not applicable in the base-case analysis because fibrate treatment was more effective and less costly than statin treatment.

The sensitivity analyses showed that a 13.2% absolute risk reduction was needed for pravastatin to be as cost-effective as fenofibrate.

In addition, pravastatin and simvastatin would need to be associated with an absolute risk reduction rate of 9.8% to be equally cost-effective as fenofibrate.

Authors’ conclusions
Fibrate treatment was more cost-effective than statin therapy in patients with Type 2 diabetes.

CRD COMMENTARY - Selection of comparators
A justification was given for the comparators used (no treatment and statin treatment). Statin treatment was chosen as a comparator on the basis of the NICE guidelines for the management of lipids in Type 2 diabetes. You should consider whether this is a widely used technology in your own setting.

Validity of estimate of measure of effectiveness
The principal input parameters for the model were derived from a published study combining three primary studies. Hence, the review was not conducted systematically to identify relevant research and minimise biases. However, the study design of the three primary studies (randomised controlled trials) was appropriate for the study question. The estimates were investigated through sensitivity analyses, using what appear to have been appropriate ranges. Given that a systematic review of the literature was not undertaken, it is difficult to assess the validity of the effectiveness estimates used in the model.

Validity of estimate of measure of benefit
The benefit measure was derived directly from the effectiveness analysis. The authors highlighted that the benefit measure of CHD events avoided was linked to clinical end points rather than lipid end points.

Validity of estimate of costs
The authors limited the estimation of costs to the NHS perspective. However, a societal perspective would have been more appropriate. The costs and the quantities were not reported separately. In addition, only limited details of the cost of treating CHD events were given. Consequently, there is uncertainty as to whether all the relevant costs were included in the analysis. Sensitivity analyses were conducted on these costs. Since the time horizon of the model was 5 years, discounting was appropriately undertaken and a sensitivity analysis on the discount rate was performed. The reader should decide whether the time horizon for evaluating the effects was sufficient. The price year was reported, which will aid any future reflation exercises. The authors reported the incremental cost-effectiveness ratio (ICER). However, because fenofibrate was both more effective and less costly than pravastatin, the ICER was not relevant and may be confusing.

Other issues
The generalisability of the results was not discussed. The authors made appropriate comparisons of their findings with those from other studies. The authors do not appear to have reported their results selectively and did not report further limitations of their study. The results presented appear to be within the scope of the analysis undertaken.
Implications of the study
Current and future CHD treatment guidelines should incorporate pharmacoeconomic data for fibrate as well as statin therapy.

Source of funding
Supported by Fournier Pharmaceuticals Ltd.

Bibliographic details

Other publications of related interest


Indexing Status
Subject indexing assigned by CRD

MeSH
Antilipemic Agents /therapeutic use; Cholesterol, HDL; Cholesterol, LDL; Coronary Disease; Cost-Benefit Analysis; Diabetes Mellitus /blood /complications; Hydroxymethylglutaryl-CoA Reductase Inhibitors /therapeutic use /economics; Hyperlipidemias; Lipids

AccessionNumber
22003009824

Date bibliographic record published
30/06/2004

Date abstract record published
30/06/2004