Acarbose in addition to existing treatments in patients with type 2 diabetes: health economic analysis in a German setting
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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
The study considered the addition of acarbose to existing treatments in patients with Type 2 diabetes.

Type of intervention
Treatment.

Economic study type
Cost-effectiveness analysis and cost-utility analysis.

Study population
The study population comprised patients with Type 2 diabetes. Their average age was 61 years, and they had a mean body mass index (BMI) of 28.64 kg/m2 and a baseline glycated haemoglobin (HbA1c) level of 8.5%.

Setting
The setting was primary and secondary care. The economic study was carried out in Germany.

Dates to which data relate
The clinical effectiveness and resource use data were taken from a study published in 2004. The price year was 2004.

Source of effectiveness data
The effectiveness data were derived from a review or synthesis of published studies.

Modelling
Markov sub-models were used to simulate the major complications of diabetes. These models had been developed in published studies. The authors then adjusted the probabilities in the model to calculate the effect of acarbose and placebo treatment on disease progression.

Outcomes assessed in the review
The clinical effectiveness estimates for acarbose and placebo were the changes in baseline HbA1c, systolic blood pressure, total cholesterol, low-density lipids, high-density lipids, triglycerides and BMI.

Study designs and other criteria for inclusion in the review
The model parameters were taken from a published meta-analysis of a systematic review (Hanefield et al. 2004, see 'Other Publications of Related Interest' below for bibliographic details).
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
The model parameters were taken from a single meta-analysis.

Methods of combining primary studies
The study that provided the model parameters combined data from several sources using meta-analysis techniques.

Investigation of differences between primary studies
Not reported.

Results of the review
The model parameters identified for the acarbose group were as follows:

the change from baseline in HbA1c was -0.563%;
the change from baseline in systolic blood pressure was -2.689 mmHg;
the change from baseline in total cholesterol was -3.717 mg/dL;
the change from baseline in low-density lipids was -3.596 mg/dL;
the change from baseline in high-density lipids was 0.837 mg/dL;
the change from baseline in triglycerides was -20.396 mg/dL; and
the change from baseline in BMI was -0.395 kg/m2.

The model parameters identified for the placebo group were as follows:

the change from baseline in HbA1c was 0.01%;
the change from baseline in systolic blood pressure was -0.682 mmHg;
the change from baseline in total cholesterol was -2.055 mg/dL;
the change from baseline in low-density lipids was -5.224 mg/dL;
the change from baseline in high-density lipids was 1.724 mg/dL;
the change from baseline in triglycerides was 3.762 mg/dL; and
the change from baseline in BMI was -0.277 kg/m².

**Measure of benefits used in the economic analysis**
The measures of health benefit used were the life-years gained and the quality-adjusted life-years (QALYs). No details of the health state valuations used to calculate the QALYs were given in this paper, but it is possible that they were included in the original model developed in published papers.

**Direct costs**
The direct costs to the health service were included in this study. Resource use was taken from the model that provided the clinical effectiveness data. All unit costs were generally taken from published studies. The exception was the unit cost of acarbose, which was taken from data supplied by Bayer HealthCare. Future costs were discounted at a rate of 5% per annum. The price year was 2004.

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

**Indirect Costs**
No indirect costs were included in the study.

**Currency**
Euros (EUR).

**Sensitivity analysis**
Second-order Monte Carlo simulations were performed. The benefits of acarbose, the discount rates and the time horizon were varied to examine uncertainty at a patient and parameter level.

**Estimated benefits used in the economic analysis**
The mean life expectancy was 7.78 years (standard deviation, SD=0.13) in the acarbose group compared with 7.57 years (SD=0.13) in the placebo group.

The mean quality-adjusted life expectancy was 5.36 QALYs (SD=0.09) in the acarbose group compared with 5.17 QALYs (SD=0.09) in the placebo group.

**Cost results**
The mean total cost was EUR 32,778 (SD=1,194) for the acarbose group compared with EUR 32,643 (SD=1,285) for the placebo group.

**Synthesis of costs and benefits**
The incremental costs of adding acarbose to existing treatment were EUR 633 per life-year gained and EUR 692 per QALY gained.

The sensitivity analyses showed that the results were sensitive to changes in the clinical effect of acarbose and the time horizon. Reducing the clinical effect of acarbose by 50% gave incremental cost-effectiveness ratios of EUR 8,687 per life-year gained and EUR 9,438 per QALY gained. If the time horizon were increased to 20 years, the addition of acarbose to usual treatment was the dominant treatment.
Authors' conclusions
The addition of acarbose to existing treatment in patients with Type 2 diabetes is a cost-effective treatment.

CRD COMMENTARY - Selection of comparators
This study compared the addition of acarbose to existing treatment for patients with Type 2 diabetes with a placebo treatment. This allowed the active value of acarbose to be evaluated. However, few details of the existing treatments received by patients were given in the paper.

Validity of estimate of measure of effectiveness
The clinical effectiveness data were taken from a published meta-analysed systematic review. Since no details of the review methodology were included in this paper, it is not possible to comment on the quality of the data used (for further details of the systematic review see Hanefield et al. 2004).

Validity of estimate of measure of benefit
This study used two measures of health benefit in its economic analysis. These were taken from the model that provided the clinical effectiveness data. The use of QALYs in the economic analysis allows the results of this study to be compared with other interventions for diabetes and other conditions. However, no details of the methods used in the health state valuations were given in this paper. The authors stated that the published model, which may have included utilities, had been validated.

Validity of estimate of costs
The costs of a third party healthcare payer were identified in this study. All the appropriate costs appear to have been included. The resource use data were not provided in the paper but a breakdown of the unit costs was given. Future costs were appropriately discounted and sensitivity analyses were conducted to consider the effect of uncertainty in the data. These factors enhance the generalisability of the study findings. A clear price year was reported, which will aid future reflation exercises.

Other issues
The authors do not appear to have presented their results selectively and their conclusions reflected the scope of their analysis. They compared their findings with those from other studies of treatments for Type 2 diabetes. The study was designed to represent the position in Germany. The authors did not discuss generalisability or how their results could be applied to other countries.

Implications of the study
The authors did not make any direct recommendations for changes in practice or for further research.

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Other publications of related interest
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Indexing Status
Subject indexing assigned by NLM

MeSH
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