Biphasic insulin aspart 70/30 vs. insulin glargine in insulin naive type 2 diabetes patients: modelling the long-term health economic implications in a Swedish setting


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 assessed the long-term cost-effectiveness of two modern insulins, namely biphasic insulin aspart 70/30 (BIAsp) and insulin glargine, for insulin naive, type 2 diabetes patients, for whom oral antidiabetic drugs had failed. Over the patients’ lifetimes, BIAsp treatment was associated with lower costs and improved clinical outcomes in comparison with insulin glargine. The study was based on valid methodology, although some aspects of the analysis were not reported in detail. Overall, the authors’ conclusions are robust.

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

Study objective
This study assessed the long-term cost-effectiveness of two modern insulins, namely biphasic insulin aspart 70/30 (BIAsp) and insulin glargine, for type 2 diabetes patients, who were starting insulin for the first time and for whom oral antidiabetic drugs had failed.

Interventions
The two treatments were insulin glargine, given once a day, and BIAsp, which contained 70% slow release, protamine-crystallised insulin aspart with 30% soluble, fast-acting insulin aspart and was given twice a day. The insulin doses were titrated to achieve a target blood glucose level of 80 to 110mg per dL and metformin was given, before the insulin, up to a maximum dose of 2,550mg per day.

Location/setting
Sweden/primary care.

Methods
Analytical approach:
This economic evaluation was based on the published CORE Diabetes Model with a lifetime horizon of 35 years. The authors stated that the perspective of the third-party payer was used.

Effectiveness data:
The clinical data came from selected studies. The baseline characteristics of the patient population and short term treatment effect data came from a published 28-week, randomised, open-label, multi-centre, clinical trial (INITIATE trial), which included 233 patients receiving either BIAsp or insulin glargine. The epidemiological data came from published sources. All disease-related inputs were already incorporated in the decision model. The key clinical endpoints were improvements in haemoglobin A1c and the reduction in diabetes-related complications.

Monetary benefit and utility valuations:
The utility values were derived from a published study, the details of which were not reported.

Measure of benefit:
The summary benefit measures were life-years (LYs) and quality-adjusted life-years (QALYs), which were both discounted at an annual rate of 3%.
Cost data:
The economic analysis included the costs of treatment (drug acquisition and administration) and those associated with diabetes-specific complications. All economic data came from published Swedish studies. The dosages for medication came from the INITIATE trial and drug costs reflected official prices in the Swedish setting. Costs were in Swedish kronor (SEK), for the price year 2006, and were discounted at an annual rate of 3%.

Analysis of uncertainty:
A deterministic sensitivity analysis investigated the impact of changing the discount rates, the time horizon of the analysis, and the duration of the difference between the treatment efficacies. The mean values for all the model outputs were generated by running 1,000 patients through the model 1,000 times.

Results
The model predicted that BIAsp would gain 0.21 LYs and 0.21 QALYs and would save SEK 10,367 in comparison with insulin glargine.

The higher cost of medication for BIAsp was more than offset by a reduction in diabetes-related complication costs and so, under base-case conditions, BIAsp was the dominant strategy, which means it was both less expensive and more effective.

The sensitivity analysis confirmed that the base-case findings were robust. In a few cases BIAsp was no longer dominant, but it was still cost-effective. For example, when the time horizon of the analysis was set at five years, BIAsp was no longer dominant, and the incremental cost per QALY gained over glargine was SEK 9,902.

Authors' conclusions
The authors concluded that BIAsp was associated with lower costs and improved clinical outcomes in comparison with insulin glargine over a patient's lifetime.

CRD commentary
Interventions:
The authors did not provide an explicit justification for their selection of the two comparators, which were the treatments examined in the INITIATE trial.

Effectiveness/benefits:
The selection of sources for the data precluded the use of a systematic approach to identify the relevant studies, but the choice of the INITIATE trial appears to have been appropriate given that it was a recent study with a high internal validity. Few details of the characteristics of the other sources of data or the source of the utility valuations were provided. However, these data were already incorporated in the model, which had been validated for diabetes and used in several other studies. The benefit measures were appropriate for capturing the global impact of the treatments on patients’ health.

Costs:
The analysis of costs reflected the perspective in terms of the categories of costs included, but the unit costs and resource quantities were not presented separately. The costs of diabetes-related complications were presented as macro-categories and were not broken down into individual items. This is common in studies assessing disease-related complications, but it may reduce the transparency of the analysis. The price year, the use of discounting, and the sources of costs were reported. The impact of including productivity losses was investigated in a separate analysis, which showed increased savings associated with BIAsp.

Analysis and results:
A synthesis of the costs and benefits was not required given the dominance of one treatment over the comparator. The findings were clearly presented. The issue of uncertainty was satisfactorily addressed and the findings were discussed, but only first-order simulations were used instead of a second-order stochastic analysis. The study was based on Swedish data and Swedish patterns of care and the transferability of the findings to other settings was not investigated.
Concluding remarks:
The study was based on valid methodology and appears to have been well conducted, although some aspects of the analysis were not reported in detail. Overall, the authors’ conclusions are robust.

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