Cost-effectiveness analysis of voglibose for prevention of type 2 diabetes mellitus in Japanese patients with impaired glucose tolerance

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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
The objective was to estimate the cost-effectiveness of voglibose for Japanese patients with impaired glucose tolerance and a high risk of developing type 2 diabetes. The authors concluded that voglibose saved costs and increased life-expectancy, compared with standard care. There were a few limitations to this study, but overall it was satisfactory. The results were adequately reported and the authors’ conclusions seem appropriate.

Type of economic evaluation
Cost-effectiveness analysis

Study objective
The objective was to estimate the cost-effectiveness of voglibose for Japanese patients with impaired glucose tolerance (IGT) and a high risk of developing type 2 diabetes.

Interventions
The intervention was 0.6mg voglibose per day in addition to standard care, which consisted of diet and exercise. This was compared with standard care alone.

Location/setting
Japan/primary care.

Methods
Analytical approach:
A Markov state-transition model, with yearly cycles, was constructed to synthesise the data from a randomised controlled trial and published sources, to estimate the long-term costs, life expectancy, and cost-effectiveness of voglibose. The mean starting age for patients in the model was 56 years and the time horizon was lifetime, to a maximum age of 105 years. The authors stated that the perspective was that of the health care payer.

Effectiveness data:
The clinical effectiveness estimates were primarily from one multicentre randomised double-blind placebo-controlled trial of Japanese patients with IGT (Kawamori, et al. 2009, see ‘Other Publications of Related Interest’ below for bibliographic detail). These were supplemented with other published data. The main clinical outcomes were the transitions to type 2 diabetes mellitus, dialysis, and death.

Monetary benefit and utility valuations:
Not relevant.

Measure of benefit:
The measure of benefit was life-years gained and these were discounted at an annual rate of 3%.

Cost data:
The direct costs included those of managing IGT, managing type 2 diabetes, and dialysis. The cost of voglibose was from the randomised controlled trial (Kawamori, et al. 2009) and the costs of managing diabetes and dialysis were from published literature. Future costs were discounted at an annual rate of 3%. All costs were reported in both Japanese yen.
(JPY) and US dollars ($) and the price year was 2009.

Analysis of uncertainty:
One-way sensitivity analyses were performed on all the model parameters and the results were presented in tornado diagrams.

Results
The life-years were 18.672 for voglibose in addition to standard care, compared with 18.073 for standard care alone; a gain of 0.599 life-years with voglibose.

The expected costs were JPY 718,724 ($7,598) with voglibose and JPY 1,365,405 ($14,433) with standard care; a saving of JPY 646,681 ($6,836) with voglibose. The cost of the voglibose was offset by reduced costs for treating diabetes and for dialysis.

Voglibose treatment was dominant over standard care, as it was less costly and more effective. The results were most sensitive to changes in the discount rate and rate of progression to type 2 diabetes, but voglibose remained cost-saving.

Authors' conclusions
The authors concluded that voglibose saved costs and increased life-expectancy, compared with standard care, in Japanese patients with impaired glucose tolerance.

CRD commentary
Interventions:
The interventions were described and appear to have been relevant. The addition of voglibose was compared with the usual care in the study setting.

Effectiveness/benefits:
No systematic review was reported to identify the key trial and published sources, so it is unclear whether the best available evidence was used. The most appropriate estimates were selected and were mostly from Japanese sources. The main source trial had a strong design, but its methods and results were not described in detail; the patient selection criteria and dosage were given. The measure of benefit of life-years gained was appropriate, but quality of life might have been a significant factor. The benefits were appropriately discounted.

Costs:
The authors reported the perspective and they appear to have included those costs relevant to this perspective. The costs were country-specific and were reported well in the main text and a table. Total cost categories were given and, except for voglibose, the resource use was not presented separately, which may hinder the replication of costs for other settings. The price year and exchange rate were reported.

Analysis and results:
The incremental approach was appropriate for comparing the relative costs and effectiveness of the treatments over a lifetime. The model structure was reported well, with a diagram. The results were reported clearly and in full. The impact of uncertainty was partly assessed in one-way sensitivity analyses, but multi-way and probabilistic sensitivity analyses could more comprehensively evaluate its overall impact on the model results. The authors discussed the limitations of their study.

Concluding remarks:
There were a few limitations to this study, but overall it was satisfactory. The results were adequately reported and the authors' conclusions seem appropriate.

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