AIM

- Type 2 diabetes mellitus imposes a considerable and increasing burden on healthcare resources, largely as a result of long-term complications associated with hyperglycaemia.
- Therapy for type 2 diabetes mellitus is aimed to achieve and maintain recommended targets for glycaemic control.
- Long-term, add-on treatment with the glucagon-like peptide-1 (GLP-1) receptor agonist exenatide was associated with improvements in glycaemic control and cardiovascular risk factors, and progressive weight loss during at least 3 years of follow-up.
- The aim of this analysis was to estimate the cost-effectiveness of treatment with exenatide once weekly (EQW) compared with that of exenatide twice daily (BID) in patients with type 2 diabetes in the UK.

METHODS

- The published and validated IMS CORE Diabetes Model (CDM)17 was used to make 50-year projections of clinical and cost outcomes based on pooled DURATION-1 and DURATION-5 baseline patient characteristics and study results.
- These studies had similar methodology and were randomised comparisons of EQW and exenatide BID.
- The model simulates disease progression by combining 15 inter-dependent Markov sub-models to determine the occurrence time to onset of diabetes-related complications, life years gained and quality-adjusted life years (QALYs); and also projects costs.

Case base assumptions

Simulation cohort

- Pooled data from patients with type 2 diabetes mellitus managed with dietary modification and exercise and oral antidiabetic medications enrolled in the 30-week DURATION-1 (N=250) and 24-week DURATION-6 (N=250) phase I, phase II, randomised, open-label clinical trials.
- Baseline diabetes-related medical histories were based on data from the UKPDS cohort, 18
- For diabetes complications not reported in the CG87 cohort, complications incidence and costs were projected.
- Baseline characteristics in line with NICE recommendations.
- The analysis has been conducted from the UK national health service payer perspective.

Key treatment-associated changes:

- Long-term, add-on treatment with the glucagon-like peptide-1 (GLP-1) receptor agonist exenatide was associated with improvements in glycaemic control and cardiovascular risk factors, and progressive weight loss during at least 3 years of follow-up.
- Various deterministic sensitivity analyses were performed: the analysis was estimated to be 0.05, 0.01; two sample t-test.

Primary outcome:

- EQW treatment was projected to improve QALYs (Tables 3 and 4) and life expectancy (PSA; by 0.154 (95% CI: 0.055-0.256)) years; deterministic analysis: Table 2 compared with exenatide BID.

RESULTS

- EQW treatment was projected to be delayed onset of any diabetes-related complication versus exenatide BID.
- Key treatment-associated changes:
- Due to the lower projected incidence of most diabetes-related complications during treatment with EQW (Figure 1), and hence reduction in their treatment costs, EQW was projected to be dominant over exenatide BID (Tables 3 and 4).
- EQW treatment was therefore projected to be dominant versus exenatide BID.
- Results were robust to all determinist sensitivity analyses (Table 4).

Figure 1. Projected cumulative incidence of complications

RESULTS CONT.

- The lower incidence of most diabetes-related complications during treatment with EQW (Figure 1), and hence reduction in their treatment costs, EQW was projected to be dominant over exenatide BID (Tables 3 and 4).
- EQW treatment was therefore projected to be dominant versus exenatide BID.
- Results were robust to all determinist sensitivity analyses (Table 4).

Table 2. Key projected treatment-associated changes

Table 3. Summary of IMS CORE model results – deterministic base case analyses

Table 4. Sensitivity analyses (treatment differences)

Table 5. Projected time alive and free of complications (years)

CONCLUSIONS

- In the UK setting, EQW was projected to be associated with greater improvements in long-term clinical outcomes than exenatide BID when pooled results of DURATION-1 and DURATION-5 were considered.
- The lower incidence of most diabetes-related complications in EQW-treated patients was projected to result in lower costs over a patient’s lifetime with EQW compared with exenatide BID.
- Limitations: Patients were switched to insulin glargine after five years; intermediate end points (e.g. Hba1c, systolic blood pressure, lipids) were used to project long-term outcomes; intervention effects were applied in the first year only.

Acknowledgements

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References

2. DURATION 1 trial data alone
3. DURATION 5 trial data alone
4. EQW dominant
5. BID dominant
6. Baseline diabetes-related medical histories were based on data from the UKPDS cohort
7. EQW, exenatide once weekly; BID, exenatide twice daily; QALY, quality-adjusted life years; ICER, incremental cost-effectiveness ratio; HbA1c, glycated haemoglobin; BMI, body mass index; SBP, systolic blood pressure; DBP, diastolic blood pressure; LDL-C, low-density lipoprotein cholesterol; HDL-C, high-density cholesterol; TC, total cholesterol; TG, triglycerides; HbA1c, glycated haemoglobin; ** p<0.01, * p<0.05; two sample t-test.

Table 1. Patient characteristics

Table 2. Main population characteristics

Table 3. Summary of IMS CORE model results – deterministic base case analyses

Figure 1. Projected cumulative incidence of complications

Table 4. Sensitivity analyses (treatment differences)

Table 5. Projected time alive and free of complications (years)

4.  Cochrane Database Syst Rev. 2011 Art. No.: CD005812. HbA1c, glycated haemoglobin; BMI, body mass index; SBP, systolic blood pressure; DBP, diastolic blood pressure; LDL-C, low-density lipoprotein cholesterol; HDL-C, high-density cholesterol; TC, total cholesterol; TG, triglycerides; HbA1c, glycated haemoglobin; ** p<0.01, * p<0.05; two sample t-test.

Figure 1. Projected cumulative incidence of complications

Table 1. Main population characteristics

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