Cost-effectiveness analysis of empagliflozin in comparison to liraglutide based on cardiovascular outcome trials

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Background

- Management of type 2 diabetes (T2D) is balanced between achieving and maintaining target glycemic control (haemoglobin A1c (HbA1c)) to avoid or delay the onset of costly macro- and microvascular complications, and avoiding hypoglycaemia. For new treatments addressing both components is critical in T2D management.
- Over the recent years, several cardiovascular outcome trials (CVOTs) have been published with glucose lowering drugs.
  - In the EMPA-REG OUTCOME trial1, empagliflozin (SGLT2i) + standard of care (SoC) was compared to SoC (placebo arm in the trial) in patients with type 2 diabetes (T2D) and established cardiovascular disease (CVD).
  - The LEADER trial2 for liraglutide (GLP-1R) was designed similarly i.e. in patients with T2D and established CVD.

Aim

To assess the short-term (5 years) cost-effectiveness of empagliflozin - standard of care (SoC) and liraglutide – SoC in adult patients with T2D and established CVD compared to liraglutide + SoC from the UK NHS perspective.

Method

CVD overview

- The IQVIA Core Diabetes Model (CDM) CVO v9.0, a well-established microsimulation model with 17 interdependent Markov sub-models was used to capture major complications (CV, renal, ophthalmological, nephropathy etc.) of diabetes along with management cost and results were generated for incremental costs, life expectancy (LE), and quality-adjusted life years (QALYs).
- The model was calibrated to reproduce the 3-year event rates (recalculated from the event rates per 1000 patient years) from the EMPA-REG OUTCOME trial, for empagliflozin + SoC.
- A Network Meta-Analysis (NMA) provided the relative risks for CVD outcomes with empagliflozin versus liraglutide. The CDM was then calibrated to reproduce liraglutide outcomes appropriately.

Table 1. CDM predicted 3-year event rates compared to original EMPA-REG OUTCOME and indirect comparison results (%) (Table 1).

Table 2. Characteristics and risk factors (EMPAR REG OUTCOME trial, n=70200).

Results

Base Case Results

- In the base case analysis, empagliflozin showed additional LE and higher QALY at a lower cost resulting in dominance of empagliflozin compared to liraglutide (Table 4).

- At 5 years, empagliflozin has lower risk of CV and non-CV death as compared to liraglutide (Figure 1).
- Empagliflozin has a lower projected incidence of heart failure, but angina, stroke and PDV incidence were higher (Figure 2).
- Empagliflozin has lower total cost which was attributed to liraglutide higher treatment cost.
- Empagliflozin has higher cost of treating CVD complications, which was driven by the high cost of stroke management (Table 5).

Probabilistic Sensitivity Analysis

- The probabilistic sensitivity analyses performed on the base case demonstrated that Empagliflozin is cost-effective vs. liraglutide in 81% of the simulations for a willingness to pay threshold of £20,000 per QALY, in which dominance is only observed in 6% of the simulations reports (Figure 3).

Conclusion

The cost-effectiveness analyses based on the results of the EMPA-REG OUTCOME and LEADER trials, demonstrate that empagliflozin + SoC is dominant compared to Liraglutide + SoC from the UK NHS perspective.

Disclosure

IQVIA, the employer of MR, VF, and ML, received consulting fees from Boehringer Ingelheim to conduct the current work.

AU, ML and PD are/were full-time employees of Boehringer Ingelheim.


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