Cost-minimisation analysis of dapagliflozin compared to lixisenatide as an add-on to insulin in the treatment of type 2 diabetes mellitus from a UK healthcare perspective

Viox H.1, Eddowes L.A.2, Griffiths M.3, Gabriel Z.1
1AstraZeneca UK Ltd., Luton, United Kingdom; 2Costello Medical Consulting Ltd., Cambridge, United Kingdom

Introduction

- Type 2 diabetes mellitus (T2DM) is a chronic progressive disease that is characterised by high glucose levels due to insulin resistance and deficiency.
- T2DM represents a large clinical burden, with approximately 2.9 million people were diagnosed with T2DM in 2013 in the UK, and treating T2DM and its complications is estimated to cost £12 billion annually.1
- Many T2DM patients’ glycaemic control gradually deteriorates over time, while others do not reach their glycaemic targets with current treatment. Older patients, glycaemic targets are not met despite treatment with insulin, and sometimes despite insulin therapy is required.2
- Dapagliflozin belongs to the sodium-glucose transport-2 (SGLT-2) inhibitor class, and acts by reducing glucose reabsorption from the proximal tubule in the kidney. Dapaglizlozin is a novel class of insulin-independent, glucose-lowering medications.

Methods

- The economic evaluation was performed using the star-shaped network meta-analysis of continuous and dichotomous data.10
- The NMA included 7 studies of relevant treatments.11
- The results of the TCO-MAN were used to inform the choice of economic evaluation performed.

Economic evaluation

- Based on the TCA/MMA results (see Table 1), a cost-minimisation analysis over a 1-year horizon was considered an appropriate form of economic evaluation.
- The most important treatment option in this option based on the net difference in cost and cost-effectiveness.12

Table 1. Summary of drug and administration costs considered in the economic evaluation

<table>
<thead>
<tr>
<th>Drug</th>
<th>Cost</th>
<th>Daily cost</th>
<th>Yearly cost</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dapaglizlozin (0.75 mg)</td>
<td>£36.98</td>
<td>£1.23</td>
<td>£460.85</td>
<td>PDB95</td>
</tr>
<tr>
<td>Lixisenatide (20 µg)</td>
<td>£12.69</td>
<td>£0.44</td>
<td>£53.00</td>
<td>PDB95</td>
</tr>
<tr>
<td>BD Microfine + 5 mm/31 G</td>
<td>£6.00</td>
<td>£0.20</td>
<td>£275.10</td>
<td>PDB95</td>
</tr>
</tbody>
</table>

Results

Clinical effectiveness

- Both the adjusted ITCs and the NMA found that there were no significant differences between dapaglizlozin add-on therapy and placebo. Both the adjusted ITCs and the NMA found that there were no significant differences between dapaglizlozin and lixisenatide (Table 2).
- The absolute point estimates of the costs of the differences are shown to be small and are considered to be clinically irrelevant.

Table 2. Results of the fixed-effect NMA comparing dapaglizlozin to lixisenatide at 24 weeks of treatment

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Placebo</th>
<th>Dapaglizlozin 2.5 mg (BNF)</th>
<th>Dapaglizlozin 10 mg (BNF)</th>
<th>Fixed-effect NMA (95% CrI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HbA1c (%)</td>
<td>0.753 (0.42, 1.09)</td>
<td>0.753 (0.42, 1.09)</td>
<td>0.753 (0.42, 1.09)</td>
<td>(-0.72, -0.42)*</td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>-0.27 (0.81, -1.34)</td>
<td>-0.27 (0.81, -1.34)</td>
<td>-0.27 (0.81, -1.34)</td>
<td>(-0.58, -0.02)</td>
</tr>
<tr>
<td>Hypoglycaemia (events/100 patient years)</td>
<td>0.67 (0.20, 1.15)</td>
<td>0.67 (0.20, 1.15)</td>
<td>0.67 (0.20, 1.15)</td>
<td>0.797</td>
</tr>
</tbody>
</table>

Cost-minimisation

- Dapaglizlozin was associated with a yearly cost of £476.98 per patient. The cost per patient for lixisenatide was £765.76 in the first year and £752.07 in subsequent years (Table 3).

Table 3. Cost-minimisation results over a 1-year horizon comparing dapaglizlozin to lixisenatide

<table>
<thead>
<tr>
<th>Year</th>
<th>Daily drug cost</th>
<th>Daily needle cost</th>
<th>Total daily cost</th>
<th>Yearly cost</th>
<th>Yearly drug cost</th>
<th>Yearly needle cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>£12.69</td>
<td>£53.00</td>
<td>£65.69</td>
<td>£752.07</td>
<td>£36.98</td>
<td>£53.00</td>
</tr>
<tr>
<td>Cost incremental</td>
<td>£0.13</td>
<td>£-0.62</td>
<td>£-2.04</td>
<td>£-0.13</td>
<td>£-0.62</td>
<td>£-2.04</td>
</tr>
<tr>
<td>Cost per patient saved</td>
<td>£1,200</td>
<td>£4,772.06</td>
<td>£5,972.06</td>
<td>£1,200</td>
<td>£4,772.06</td>
<td>£5,972.06</td>
</tr>
</tbody>
</table>

Conclusion

- This analysis was performed to inform a submission to the SMC in 2014. Dapaglizlozin was accepted for routine use in adults aged 18 years and older with T2DM to improve glycaemic control in combination with insulin when insulin with diet and exercise, does not provide adequate glycaemic control.
- Dapaglizlozin as an add-on to insulin was shown to be a cost-saving treatment option compared to lixisenatide from a Scottish healthcare perspective. These results are considered applicable to the UK setting.
- Dapaglizlozin and lixisenatide have comparable clinical outcomes, permitting a cost-minimisation analysis. Dapaglizlozin is a cost-saving therapy in the add-on on insulin indication, with the potential to achieve significant savings for the NHS healthcare budget.

References


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Figure 1A. Cost-minimisation results of the 3.5% discounting scenario comparing dapaglizlozin to lixisenatide.