Estimating the cost-effectiveness of daclatasvir regimens for patients with advanced chronic hepatitis C in the UK

Phil McEwan1, Samantha Webster1, Thomas Ward1, Anupama Kalsekar2, Yong Yuan1, Michael Brenner1

1Health Economics and Outcomes Research Ltd, Munich, United Kingdom 2School of Human & Health Sciences, Swansea University, Swansea, United Kingdom

World Health Economics and Outcomes Research, Bristol-Myers Squibb Pharmaceuticals Ltd, Princeton, United States 3World Health Economics and Outcomes Research, Bristol-Myers Squibb Pharmaceuticals Ltd, Ulverston, United Kingdom

Introduction

- Chronic infection with the hepatitis C virus (HCV) can lead to end-stage liver disease (ESLD) complications including decompensated cirrhosis (DC) and hepatocellular carcinoma (HCC)
- In patients with advanced fibrosis stages at higher risk

- The availability of effective treatment for these patients is an area of current medical need, with standard of care (SoC) based upon a pegylated interferon-alpha and ribavirin (PR) backbone, which is associated with efficacy and tolerability issues [4, 5]

Methods

- A published Markov model [7—10] was used to estimate the relative cost-effectiveness of HCV treatments over a lifetime horizon in a cohort that were 67 male and had a mean age of 56 years [11-13]

- Patients were distributed across MESTHIV fibrosis stages F1 and F4 (79.6% and 21.4%, respectively [12]), and progressed through fibrosis stages to ESLD complications and death according to published disease state transition rates [14,15] (Figure 1).

- The objective of this study was to assess the cost-effectiveness of daclatasvir plus sofosbuvir (DCV+SOF) versus SoC in treatment-naive patients with HCV genotypes 1, 3 and 4 and advanced disease (MESTHIV score ≥ 3).

- UK-specific costs [16, 17] and health utility estimates [15, 18-20] were sourced (Table 1).

- An annual discount rate of 3.5% was applied

Table 1: Disease state transition rates, costs and health utilities

| Transition | Rate (%/year) | Disease state | Cost (£/year) | Utility
<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>F3 to F4</td>
<td>0.116</td>
<td>F3</td>
<td>£922 (90)</td>
<td>0.86 (0.013)</td>
</tr>
<tr>
<td>F4 to DC</td>
<td>0.030 (0.010)</td>
<td>F4</td>
<td>£1,464 (287)</td>
<td>0.55 (0.054)</td>
</tr>
<tr>
<td>F4 to DC/ HCC</td>
<td>0.054 (0.012)</td>
<td>DC</td>
<td>£17,121 (1,154)</td>
<td>0.45 (0.031)</td>
</tr>
<tr>
<td>DC/ HCC to DC</td>
<td>0.030 (0.012)</td>
<td>DC</td>
<td>£10,452 (2,406)</td>
<td>0.40 (0.033)</td>
</tr>
<tr>
<td>DC to death</td>
<td>0.130 (0.010)</td>
<td>ChY (1Y)</td>
<td>£7,487 (248)</td>
<td>0.45 (0.031)</td>
</tr>
<tr>
<td>HCC to death</td>
<td>0.438 (0.008)</td>
<td>ChY (2Y)</td>
<td>£17,301 (437)</td>
<td>0.67 (0.006)</td>
</tr>
<tr>
<td>ChY (1Y) to death</td>
<td>0.210 (0.064)</td>
<td>Post-SVR (0Y)</td>
<td>£792 (60)</td>
<td>0.72 (0.048)</td>
</tr>
<tr>
<td>ChY (2Y) to death</td>
<td>0.057 (0.012)</td>
<td>Post-SVR (0Y)</td>
<td>£1,464 (280)</td>
<td>0.72 (0.048)</td>
</tr>
</tbody>
</table>

- All-cause mortality was applied in line with published UK life tables [21].

- DCV+SOF was compared to telaprevir (TVR) combined with PR and no treatment in HCV genotype 1 patients, and PR and no treatment in HCV genotype 3 and 4 patients.

- Efficacy data was sourced from relevant clinical trials [22-25] (Table 2). An SVR of 0 was assumed for no treatment.

- Therapy costs were sourced from MIMS [26]

Table 2: Therapy profiles

<table>
<thead>
<tr>
<th>Region</th>
<th>Genotype</th>
<th>Duration (weeks)</th>
<th>SVR %</th>
<th>Weekly cost (£)</th>
</tr>
</thead>
<tbody>
<tr>
<td>UK</td>
<td>DCV/SOF 3</td>
<td>12</td>
<td>100%</td>
<td>£4,956.37</td>
</tr>
<tr>
<td></td>
<td>DCV/SOF 3</td>
<td>24</td>
<td>100%</td>
<td>£9,912.74</td>
</tr>
<tr>
<td></td>
<td>DCV/SOF 4</td>
<td>12</td>
<td>100%</td>
<td>£8,912.74</td>
</tr>
<tr>
<td></td>
<td>DCV/SOF 4</td>
<td>24</td>
<td>100%</td>
<td>£17,825.48</td>
</tr>
<tr>
<td></td>
<td>TVR+PR  1</td>
<td>24</td>
<td>42 (11)</td>
<td>£17,825.48</td>
</tr>
<tr>
<td></td>
<td>TVR+PR  1</td>
<td>40</td>
<td>49 (9)</td>
<td>£199.25</td>
</tr>
<tr>
<td></td>
<td>TVR+PR  2</td>
<td>40</td>
<td>49 (9)</td>
<td>£199.25</td>
</tr>
</tbody>
</table>

- Predicted probabilities rose to 40%.

- The largest amount of variability was observed when comparing DCV+SOF to no treatment, due to a larger degree of uncertainty caused by the lack of SVR in patients that are not treated.

Results

- In HCV genotype 1, treatment with DCV+SOF resulted in incremental costs of £15,344 and £20,864, and QALY gains of 1.95 and 4.88, compared to TVR+PR and no treatment, respectively (ICERs of £7,864 and £14,777, respectively)

- In HCV genotype 3, treatment with DCV+SOF resulted in incremental costs of £95,362 and £78,603, and QALY gains of 3.02 and 5.85, compared to PR and no treatment, respectively (ICERs of £30,972 and £13,442, respectively)

- In HCV genotype 4, treatment with DCV+SOF resulted in incremental costs of £27,029 and £18,701, and QALY gains of 3.07 and 5.16, when comparing to PR and no treatment, respectively (ICERs of £9,042 and £4,911, respectively)

- Therefore, DCV+SOF is predicted to be cost-effective against all comparators, with the exception of PR in HCV genotype 3, assuming a cost-effectiveness threshold of £20,000/QALY.

Conclusions

- At conventional UK cost effectiveness thresholds, treatment with DCV+SOF is estimated to be cost-effective against SoC and no treatment in HCV genotypes 1 and 4.

- In HCV genotype 3, DCV+SOF is predicted to be cost-effective compared to no treatment.

- DCV+SOF has demonstrated high rates of efficacy [22]. This analysis supports the use of DCV+SOF in patients with HCV genotypes 1, 3 and 4 and advanced fibrosis, through demonstration of cost-effectiveness against the majority of comparators.

References


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