Cost-effectiveness of pegylated interferon and ribavirin for patients with chronic hepatitis C treated in routine clinical practice

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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 aim was to evaluate the cost-effectiveness of treatment with interferon plus ribavirin for patients with chronic hepatitis C virus, in routine clinical practice. The authors concluded that pegylated interferon plus ribavirin was generally cost-effective, except for cirrhosis patients aged over 50 with genotype one. The study was appropriately designed and the methodology was well reported. The authors’ conclusions appear to be robust and appropriate.

Type of economic evaluation
Cost-utility analysis

Study objective
The aim was to evaluate the cost-effectiveness of treatment with interferon plus ribavirin for patients with chronic hepatitis C virus (HCV), in routine clinical practice.

Interventions
No treatment was compared with interferon plus ribavirin. The interferon was with either pegylated interferon-α2a 180mg weekly or pegylated interferon-α2b 1.5mg per kg.

Location/setting
UK/primary care.

Methods
Analytical approach:
A published Markov model was used to estimate the cost-effectiveness of the two options. Logistic regression was used to predict the transition probabilities with data at patient level. The analysis was conducted for patient subgroups classified according to HCV genotype, baseline fibrosis stage, age, and gender. The time horizon was lifetime and the authors stated that the perspective of the health services was adopted.

Effectiveness data:
The clinical estimates were derived from the Trent HCV cohort study, a large observational study. Patients who also had human immunodeficiency virus, haemophilia, or end-stage renal disease were excluded from the analysis. The sample comprised 315 patients and the key clinical endpoint was the sustained virological response with the treatment.

Monetary benefit and utility valuations:
The utility estimates were from published studies that assessed patient preferences using the European Quality of life (EQ-5D) questionnaire.

Measure of benefit:
The summary benefit measure was the expected quality-adjusted life-years (QALYs), which were derived using the model. An annual discount rate of 3.5% was applied.

Cost data:
The costs included those of antiviral treatment, out-patient visits, day cases, and hospitalisation associated with chronic HCV. The resource use data were mainly based on actual data from the observational study, hospital databases, and
patients' care notes and nurses' diaries. The unit costs were from the British National Formulary and a published study. All costs were in UK pounds sterling (£) and the price year was 2007. They were discounted at an annual rate of 3.5%.

Analysis of uncertainty:
A deterministic sensitivity analysis was carried out on the key model inputs, such as the utilities, follow-up period, unit costs, death rates for patients with cirrhosis, and probability of hepatocellular carcinoma with no sustained virological response. A probabilistic sensitivity analysis based on a Monte Carlo simulation was performed by assigning stochastic distributions to the model parameters.

Results
The costs and benefits were combined using an incremental cost-utility ratio (ICUR) for each subgroup. Treatment with pegylated interferon and ribavirin was cost-effective for most patient subgroups.

For those aged 40 years, the mean costs were £16,104 with treatment versus £12,228 with no treatment, for patients with mild HCV and genotype one; £10,750 with treatment versus £15,362 without, for mild HCV and genotype other than one; £29,122 with treatment versus £30,044 without, for moderate HCV and genotype one; £17,250 with treatment versus £32,442 without, for moderate HCV and genotype other than one; £47,709 with treatment versus £44,476 without, for cirrhosis and genotype one; and £34,977 with treatment versus £44,539 without, for cirrhosis and genotype other than one.

For those aged 40 years, the mean QALYs were 15.78 with treatment versus 14.67 without for patients with mild HCV and genotype one; 16.25 with treatment versus 14.20 without for mild HCV and genotype other than one; 12.59 with treatment versus 11.64 without for moderate HCV and genotype one; 13.43 with treatment versus 11.15 without for moderate HCV and genotype other than one; 8.12 with treatment versus 7.71 without for cirrhosis and genotype one; and 9.45 with treatment versus 7.71 without for cirrhosis and genotype other than one.

For those aged 40 years, the ICURs of treatment over no treatment were £3,507 per QALY gained for patients with mild HCV and genotype one, and £8,017 per QALY gained for patients with cirrhosis and genotype one. For patients aged 40 years in other subgroups, the treatment was dominant as it was more effective and cost less than no treatment.

For those aged 50 years and older, the ICUR was over £60,000 for patients with cirrhosis and genotype one.

One-way sensitivity analysis showed that these results were robust to changes in the key model inputs. The probabilistic sensitivity analysis showed that, at a threshold value of £20,000, the treatment was cost-effective for the majority of patient groups except for cirrhotic patients aged over 50 years with genotype one, where the probability that treatment was cost-effective was 0.31.

Authors' conclusions
The authors concluded that the pegylated interferon plus ribavirin was a cost-effective treatment except for cirrhosis patients aged over 50 with genotype one.

CRD commentary
Interventions:
The selection of the comparators was appropriate as they were the relevant strategies for patients with chronic HCV in the authors' setting.

Effectiveness/benefits:
The effectiveness data were from an observational study with a sample of 315 patients. The measurement of the clinical effects and their statistical analyses was transparent and rigorous. The issue of uncertainty surrounding some of the clinical estimates was addressed in extensive sensitivity analyses. The approach used to derive utility values was described. Using QALYs as the measure of benefit facilitates cross-disease comparisons.

Costs:
The analysis of costs appears to have been consistent with the perspective. The sources of costs were clearly reported,
but the details of the cost valuation and analytic approach were not reported. The price year was explicitly stated, which will facilitate refletion exercises in other time periods.

Analysis and results:
The costs and benefits were appropriately combined. The results of both the base-case analysis and the sensitivity analyses were extensively presented. The logistic regression analysis using patient-level data was appropriately conducted to estimate the clinical effects.

Concluding remarks:
The study was appropriately designed and the methodology was well reported. The authors’ conclusions appear to be robust and appropriate.

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