Economic evaluation for hepatitis C

Grieve R, Roberts J

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.

Health technology
The use of combination treatment (CMB) comprising interferon and ribavirin for hepatitis C (HCV).

Type of intervention
Treatment.

Economic study type
Cost-effectiveness analysis; cost-utility analysis.

Study population
The study population comprised a hypothetical cohort of patients with mild HCV.

Setting
The setting was secondary care. The economic study was carried out in the UK.

Dates to which data relate
The effectiveness and resource use data were derived from studies published between 1997 and 2002. The price year was not reported.

Source of effectiveness data
The effectiveness evidence was derived from a review of published studies and some authors' assumptions.

Modelling
A Markov model was used to assess the economic and clinical outcomes of CMB in a hypothetical cohort of patients with mild HCV. The structure of the model was taken from a published study (Dusheiko and Roberts, see Other Publications of Related Interest). The model was modified to deal with a cohort of patients with mild rather than chronic HCV.

Outcomes assessed in the review
The outcomes assessed were the annual transition probabilities of:

- mild to moderate HCV,
- moderate HCV to cirrhosis,
- cirrhosis to decompensated cirrhosis,
decompensated cirrhosis to hepatocellular carcinoma (HCC), and
decompensated cirrhosis to liver transplant.

Also assessed were mortality rates, the percentage of patients who had a sustained virological response (SVR) to therapy, and the utility values associated with health states. The mortality rates were derived from UK official statistics.

**Study designs and other criteria for inclusion in the review**
A review of the literature was undertaken but the design of the primary studies was not reported. The mortality rates were estimated from UK Government life tables.

**Sources searched to identify primary studies**
Not stated.

**Criteria used to ensure the validity of primary studies**
Not stated.

**Methods used to judge relevance and validity, and for extracting data**
Not stated.

**Number of primary studies included**
Three studies provided the model inputs, while a further two studies assessed the utility values.

**Methods of combining primary studies**
Not stated.

**Investigation of differences between primary studies**
Not stated.

**Results of the review**
The transition probabilities were:

0.06 for mild to moderate HCV,

0.06 for moderate HCV to cirrhosis,

0.04 for cirrhosis to decompensated cirrhosis,

0.01 for decompensated cirrhosis to HCC, and

0.03 for decompensated cirrhosis to liver transplant.

The percentage of patients who had a SVR to therapy was 43%.

The mortality rates were not reported.

The utility values were:
1 after SVR to antiviral therapy,
0.98 for mild HCV,
0.92 for moderate HCV, 0.82 for cirrhosis,
0.50 for decompensated cirrhosis, and
0.25 for HCC.

Methods used to derive estimates of effectiveness
The authors made some assumptions that were used to build up the model structure.

Estimates of effectiveness and key assumptions
It was assumed that CMB was as effective for patients with mild disease as for those with moderate disease. Also, all cases were treated if they progressed from mild to moderate disease or cirrhosis.

Measure of benefits used in the economic analysis
The summary benefit measure used in the economic analysis was the quality-adjusted life-years (QALYs). The utility weights were derived from the literature and values were extrapolated from health care professionals. An annual discount rate of 1.5% was applied to benefits incurred in the future, as recommended in the UK. The life-years gained were also reported.

Direct costs
Discounting was relevant due to the long time horizon of the model. An annual rate of 6% was applied to those costs that were incurred after the first year. The unit costs were not reported separately from the quantities of resources used and only the annual costs were reported. The health services in the economic evaluation were interferon, ribavirin, treatment (chronic HCV, cirrhosis, decompensated cirrhosis, HCC) and transplantation. The cost/resource boundary of the health care system was adopted. Resource consumption and costs were estimated using data coming from published studies, whilst most of the resource use data were derived from experts’ opinions. The price year was not reported.

Statistical analysis of costs
The costs were treated deterministically.

Indirect Costs
The indirect costs were not considered.

Currency
The costs were estimated in UK pounds sterling () and then presented in Euros (Euro). The exchange rate was 1 = Euro 1.58.

Sensitivity analysis
Sensitivity analyses were performed to assess the impact of variations in the progression rates and effectiveness of treatment on the estimated cost-effectiveness of the intervention. The sub-groups of cases with genotype 1 or non-1 were also considered. Other model inputs were also varied, but were not reported. The type of analysis and the ranges used were not reported.
Estimated benefits used in the economic analysis

The average QALYs obtained in a hypothetical 40-year-old patient entering the model with mild HCV were 28.2 with CMB and 26.4 with no treatment. Therefore, the use of CMB led to a gain of 1.8 QALYs. The average life-years were 28.9 with CMB and 27.6 with no treatment (difference: 1.2 life-years). Fifty-five deaths were also avoided with CMB, 97 (CMB) versus 162 (no treatment). It is worthwhile noting that the authors stated that the difference in avoided deaths was 55, whereas subtracting the figures presented in the table produced a value of 65.

Cost results

The estimated lifetime costs were Euro 33,228 with CMB and Euro 18,346 with no treatment. Therefore, the use of CMB led to an extra cost of Euro 14,882.

Synthesis of costs and benefits

An incremental cost-effectiveness ratio was calculated to combine the costs and benefits of the two alternative strategies under evaluation.

The incremental cost with CMB versus no treatment was Euro 8,490 per QALY gained and Euro 12,089 per life-year saved.

The sensitivity analysis showed that the intervention was more cost-effective for cases with genotype non-1, and for those who progress fast from mild to moderate disease and then to cirrhosis.

The results of the base-case cost-effectiveness analysis were insensitive to variations in other parameters.

Authors' conclusions

Combination treatment (CMB) for mild hepatitis C (HCV) was cost-effective relative to no treatment. In addition, it compared favourably with other health care interventions that are routinely provided within the National Health Service (NHS).

CRD COMMENTARY - Selection of comparators

The rationale for the choice of the comparator was clear. No treatment was selected in order to assess the active value of CMB in patients with moderate disease. However, it appears not to have reflected usual care. You should decide whether it represents a valid comparator in your own setting.

Validity of estimate of measure of effectiveness

The analysis of effectiveness used data coming from a review of the literature. However, few details on the method and conduct of the review were reported. It was unclear whether the review was systematic and the design of the primary studies was not reported. Further, the review concerned only a part of the effectiveness evidence (the transition probabilities). Other data, namely utility values and mortality rates, were also derived from the literature but did not form part of the review. The method of combining the primary estimates was not reported and the issue of the validity of the data was not discussed. Some assumptions were also made. It was unclear whether these were varied in the sensitivity analysis.

Validity of estimate of measure of benefit

QALYs and unadjusted survival were the benefit measures used in the analysis. The use of both measures appears to have been appropriate, as they represent comparable measures with the benefits of other health care interventions. Further, although the utility weights were estimated from a published study, the authors stated the subjects to which such values belonged. The benefits were discounted, as recommended by the UK Department of Health guidelines.
Validity of estimate of costs
The authors stated explicitly which perspective was adopted and it appears that all the relevant categories of costs have been included in the analysis. The authors acknowledged that the indirect costs were not included, although their inclusion would have been interesting. All economic data were derived from published studies and a detailed breakdown of the cost items was not provided. The unit costs and the quantities of resources used were not presented separately and the price year was not reported. This limits the transferability of the study to other settings and makes reflation exercises difficult. The quality of the primary sources was unclear and most of the resource use data were derived from experts’ assumptions. The uncertainty in the cost estimates was not investigated in the sensitivity analysis.

Other issues
The authors did not compare their findings with those from other studies. They also did not address the issue of the generalisability of the study results to other settings. Sensitivity analyses were carried out, but only on probability values. This reduces the external validity of the analysis. The study referred to patients with mild HCV and this was reflected in the conclusions of the study. However, the structure of the model might also be used for more severe stages of disease. The authors noted that some data for mild HCV patients were extrapolated from data on patients with moderate disease.

Implications of the study
The authors noted that, as further data based on reliable sources become available, the analysis will be replicated in order to achieve more robust cost-effectiveness estimates.

Source of funding
None stated.

Bibliographic details

PubMedID
12148430

Other publications of related interest

Indexing Status
Subject indexing assigned by NLM

MeSH
Cost-Benefit Analysis; Female; Great Britain; Health Care Costs; Hepatitis C /economics /therapy; Hepatitis C, Chronic /economics /therapy; Humans; Male; Middle Aged; Models, Economic

AccessionNumber
22002001401

Date bibliographic record published
31/08/2004

Date abstract record published
31/08/2004