Economic evaluation of chronic hepatitis B treatments in Taiwan
Lacey L, Chien R N, Chuang W L, Pwu R F

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
This study assessed the cost-effectiveness of antiviral treatments of short duration and longer duration (i.e. 5 years) for hepatitis B e antigen-positive and -negative chronic hepatitis B patients. The authors concluded that antiviral therapies of longer duration (such as lamivudine plus adefovir, or vice versa), given for up to 5 years, were highly cost-effective from the perspective of the Taiwanese health care system. Overall, the analysis was characterised by limited reporting of the clinical and economic sources, which makes it difficult to objectively assess the authors' conclusions, despite a good presentation of the study results.

Type of economic evaluation
Cost-effectiveness analysis, cost-utility analysis

Study objective
The objective of the study was to examine the cost-effectiveness of antiviral treatments of short duration and longer duration (i.e. 5 years) for patients with chronic hepatitis B (CHB). Both hepatitis B e antigen (HBeAg)-positive and HBeAg-negative CHB patients were considered. The patient population included those CHB patients with elevated serum aminotransferase levels at least twice the upper limit of normal.

Interventions
The strategies considered were:
- no treatment;
- short-duration therapy with conventional interferon-α 2a, lamivudine (LAM) or adefovir (ADE);
- 2-year antiviral treatment with ADE or LAM monotherapy, with switch to the alternative antiviral agent (if resistance emerged, the alternative antiviral agent was added); and
- the same as before but for 5 years.

Location/setting
Taiwan/secondary care.

Methods
Analytical approach:
A published Markov model was used to simulate the natural history of disease and its management under the different treatment scenarios. Two alternative analyses were conducted for HBeAg-positive and HBeAg-negative CHB patients. The time horizon of the analysis was 40 years. The authors stated that the perspective of the Taiwan health care system was adopted.

Effectiveness data:
The clinical estimates appear to have been derived from a selection of known relevant studies, details of which were not given. Most of the clinical data (transition probabilities) and epidemiological estimates were derived from the published modelling study (based on Asian patients) and were used in the base-case analysis. No information on the design of the studies used for these clinical estimates was explicitly given. Taiwanese data were used in a sensitivity analysis.
Monetary benefit and utility valuations:
Details of the valuation of utility estimates were not provided. These values were taken directly from the published model.

Measure of benefit:
The summary benefit measures were the life-years (LYs) and quality-adjusted life-years (QALYs). QALYs were estimated using the decision model. An annual discount rate of 3% was applied to benefits accrued after the first year.

Cost data:
An explicit breakdown of the cost categories included in the analysis was not reported. The authors stated that the health care costs considered were those for treating CHB, compensated and decompensated cirrhosis, and drugs. The unit costs and the resource quantities were derived from published studies (details not given). The costs were discounted at an annual rate of 3%. A unique price year was not reported. Some costs reflected 2005 prices, while others referred to the year 2004 or to the year 2003. The costs were in New Taiwan dollars (NTD).

Analysis of uncertainty:
One- and multivariate sensitivity analyses were carried out in order to investigate the impact of variations in duration of CHB antiviral therapies and in other model inputs on the results of the analysis. The effect of using LAM plus ADE combination therapy in patients in whom drug-resistant mutants emerged was also investigated. The analysis was also repeated using Taiwanese estimates for epidemiological inputs.

Results
The results of the analysis were presented with respect to a baseline strategy of a 1-year course of LAM, which was used as the reference strategy.

Although more costly, the long-term treatments led to substantial incremental QALYs with respect to a 1-year course of LAM, both in HBeAg-positive and HBeAg-negative CHB patients. In general, short-term treatments led to a limited impact in terms of clinical benefits.

Long-term treatments were highly cost-effective when using a threshold of NTD 580,000 per QALY gained (standard threshold for Taiwan). For example, the incremental cost per QALY gained with LAM plus ADE for 5 years was NTD 154,733 in HBeAg-positive CHB patients and NTD 103,856 in HBeAg-negative CHB patients. In comparison, the incremental cost per QALY gained with ADE plus LAM for 5 years was NTD 276,235 in HBeAg-positive patients and NTD 168,428 in HBeAg-negative patients.

The most interesting finding from the sensitivity analysis resulted from the use of Taiwanese data for HBeAg-positive patients. In this scenario, the incremental cost per QALY for LAM plus ADE increased by approximately 100% over the base-case estimate. However, this remained below the threshold of NTD 580,000 per QALY.

Authors' conclusions
The authors concluded that longer duration antiviral therapies (LAM plus ADE as rescue medication, or ADE plus LAM as rescue medication), given for up to 5 years, were highly cost-effective from the perspective of the Taiwanese health care system.

CRD commentary
Interventions:
The authors did not provide an explicit justification for their selection of the interventions. Nevertheless, all the strategies under examination appear to have been relevant and represented several short- or long-term options for patients with CHB. The authors stated that newer antiviral therapies such as entecavir, sequential interferon/antiviral based-strategies, and combination LAM plus ADE as initial therapy, were not investigated.

Effectiveness/benefits:
There was little information on the approach used to identify the clinical estimates. The authors did not describe the primary sources of data. Thus, it is not possible to judge the validity of the clinical inputs. However, it seems that some
clinical estimates were taken from clinical trials, while epidemiological data were obtained from Taiwanese or Asian patients; these represent appropriate approaches and sources. Other aspects of the analysis, such as the issue of heterogeneity due to the use of multiple sources, were not discussed but may have been covered in the original model. The approach used to derive the QALYs was not explicitly described.

Costs:
Few details of the cost analysis were reported. A breakdown of the cost items was not given and the costs were presented as macro-categories related to specific health states. A unique price year was not reported. There were no details of the studies from which economic inputs were derived. This limits the possibility of replicating the analysis in other settings and time periods.

Analysis and results:
The synthesis of the costs and benefits was appropriately carried out and the results of the analysis were presented clearly in tables and graphs. The issue of uncertainty was restricted to the most influential model inputs, which were investigated in a deterministic sensitivity analysis. The use of Taiwanese data enhances the applicability of the study to the local setting. The authors noted some potential limitations of the analysis, such as the specific patient population under examination and the paucity of published evidence about clinical estimates such as patient adherence, or the annual loss of response following treatment with pegylated interferon-α 2a.

Concluding remarks:
Overall, the analysis was characterised by limited reporting of the clinical and economic sources of the study, despite a good presentation of the study results. It is therefore difficult to make an objective assessment of the authors’ conclusions.

Funding
None stated.

Bibliographic details

Other publications of related interest

Indexing Status
Subject indexing assigned by NLM

MeSH
Adenine /analogs & derivatives /economics /therapeutic use; Adult; Antiviral Agents /economics /therapeutic use; Cost-Benefit Analysis; Female; Hepatitis B, Chronic /drug therapy /economics; Humans; Lamivudine /economics /therapeutic use; Male; Phosphonic Acids /economics /therapeutic use; Taiwan; Time Factors

AccessionNumber