Chronic hepatitis B treatment: the cost-effectiveness of interferon compared to lamivudine

Almeida AM, da Silva AL, Cherchiglia ML, Andrade EI, de Oliveira GL, de Assis Acurcio 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
The study assessed the cost-effectiveness of strategies for treatment of patients with chronic hepatitis B who presented elevated aminotransferase levels and no evidence of cirrhosis at the beginning of treatment. The authors concluded that conventional interferon was the chosen alternative for treatment of chronic hepatitis B. The quality of the study methodology was good. Methods and results were reported adequately, although some of the effectiveness data could have been better reported. The authors' conclusions appear appropriate.

Type of economic evaluation
Cost-effectiveness analysis

Study objective
The objective of the study was to assess the cost-effectiveness of strategies for treatment of patients with chronic hepatitis B who present elevated aminotransferase levels and no evidence of cirrhosis at the beginning of treatment.

Interventions
The study compared the interventions conventional interferon, pegylated interferon and lamivudine.

Location/setting
Brazil/In-patient secondary care.

Methods
Analytical approach:
A decision analytic Markov model was developed to assess the cost-effectiveness of the different treatment strategies. Due to differences in the age profile of patients who were hepatitis B antigen e positive and those who were negative, the model was run separately for each of these subgroups. The time horizon was 40 years. The perspective was that of the Brazilian national health system.

Effectiveness data:
Effectiveness data were derived from a previously published systematic review (Almeida et al. 2009, see Other Publications of Related Interest) and a review of selected studies. The main clinical effectiveness estimates were HBeAg (hepatitis B e antigen) seroconversion rates, treatment response rates and relapse rates associated with the three interventions. These estimates were derived from published studies.

Monetary benefit and utility valuations:
None.

Measure of benefit:
The benefit measure was life-years gained discounted at an annual rate of 5%.

Cost data:
The direct costs included in the analysis were those related with: medication therapies, and treatment of chronic hepatitis B complications (including medical fees, examinations, diagnostic and therapeutic procedures, hospitalisations and medications). Hepatitis B treatment costs were derived from published study (Castelo et al. 2007, see Other Publications of Related Interest) that evaluated the chronic hepatitis B costs in Brazil with a Delphi panel of specialists. Medication therapy costs were based on medication prices from the Brazilian Medication Market Regulating Chamber.
All costs were updated to 2009 prices. All costs were converted from Brazilian real (BRL) to USA dollars adjusted for purchasing power parity ($) and discounted at an annual rate of 5%.

Analysis of uncertainty:
A series of one-way sensitivity analyses were carried out by varying therapy response, price of medication, discount rates and treatment effectiveness. Results were presented in a Tornado diagram. A probabilistic sensitivity analysis was conducted with results presented in a cost-effectiveness acceptability curve.

Results
Costs and benefits were combined using an incremental cost-effectiveness ratio (additional cost per life year gained). For HBeAg positive patients, when pegylated interferon was compared with interferon the average cost per life year gained was $100,752.24. For these patients lamivudine was found to be dominated by interferon (lamivudine was more costly and less effective).

For HBeAg negative patients, when interferon was compared with lamivudine the incremental cost-effectiveness ratio was $15,766.90 per life year gained. For these patients pegylated interferon was found to be dominated by interferon (pegylated interferon was more costly and less effective).

One-way sensitivity analysis indicated that the results were sensitive to variations in the probability of transition from chronic hepatitis B to compensated cirrhosis, discount rate and medicine prices. Results of the probabilistic sensitivity analysis showed that at willingness to pay thresholds set by the World Health Organisation, interferon was the most cost-effective intervention for both HBeAg positive and negative patients.

Authors’ conclusions
The authors concluded that conventional interferon was the chosen alternative for treatment of chronic hepatitis B.

CRD commentary
Interventions:
The interventions were adequately described and appeared to be appropriate comparators.

Effectiveness/benefits:
Effectiveness data were derived from a systematic review conducted by the authors and published elsewhere supplemented by results from other studies. The reference for the systematic review was reported, but no details were provided for the methodology used and the nature of the studies included in the review so it was difficult to assess its quality. Given the systematic nature of the review and that it had been published, it was likely that all relevant major evidence was identified and included in the model.

Costs:
The study perspective was clearly stated. It appeared that all relevant costs for the healthcare system perspective were included in the study. Sources of cost data were presented clearly and appeared appropriate. Little information was provided on how resource use was estimated and this made it difficult to assess whether it was quantified appropriately. Costs were discounted appropriately and adjusted for inflation. Details of currency conversions were reported adequately.

Analysis and results:
The analytical approach appeared appropriate. Adequate details of the model structure were reported. A graphical depiction of the model was provided in the supplementary material. It appeared appropriate that the model was run for the two different populations given that the average age at onset of treatment was different for the two subgroups. Model uncertainty was adequately assessed using a series of one-way and probabilistic sensitivity analyses. The results were reported adequately. Costs and benefits for each intervention were reported in the supplementary material. The authors reported as the main limitation to their study that they did not include adverse events and consequences due to treatment compliance.

Concluding remarks:
The quality of the study methodology was good. Methods and results were reported adequately, but some of the
effectiveness data could have been better reported. The authors’ conclusions appear appropriate.

**Bibliographic details**

**PubMedID**
21839893

**DOI**
10.1016/j.jval.2011.05.011

**Original Paper URL**
http://www.valueinhealthjournal.com/article/S1098-3015(11)01427-6/abstract

**Other publications of related interest**


**Indexing Status**
Subject indexing assigned by NLM

**MeSH**
Adult; Alanine Transaminase /blood; Antiviral Agents /economics /therapeutic use; Biomarkers /blood; Brazil; Cost-Benefit Analysis; Disease Progression; Drug Costs; Gross Domestic Product; Hepatitis B Antibodies /blood; Hepatitis B e Antigens /immunology; Hepatitis B, Chronic /complications /diagnosis /drug therapy /economics; Humans; Interferons /economics /therapeutic use; Lamivudine /economics /therapeutic use; Markov Chains; Models, Economic; National Health Programs /economics; Outcome and Process Assessment (Health Care) /economics; Time Factors; Treatment Outcome

**AccessionNumber**
22011001672

**Date bibliographic record published**
22/02/2012

**Date abstract record published**
01/06/2012