

Cost-effectiveness of peginterferon alfa-2b plus ribavirin compared to interferon alfa-2b plus ribavirin as initial treatment of chronic hepatitis C in Belgium

(extended abstract)

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Introduction

Initial therapy with peginterferon alfa-2b and ribavirin results in a higher sustained virological response but is more expensive than interferon alfa-2b and ribavirin.

The objective of the analysis was to examine the cost-effectiveness of peginterferon alfa-2b combination therapy versus interferon alfa-2b combination therapy for treatment naïve chronic hepatitis C patients in Belgium.

Methods

Data from a recent randomised clinical trial (1) comparing these therapies were applied to a previously published computer cohort simulation (2) to project lifelong clinical and economic outcomes. Natural history estimates were based on published literature, expert panel estimates, and actual variable cost and reimbursement data. Our analysis used the following data to describe short-term events : age, gender, pre-treatment histology, viral response after 24 and 48 weeks of treatment, and 24 week follow-up after treatment discontinuation, adverse events, and actual dosages of drugs received. We then projected the long-term outcomes for each treatment using a previously published computer simulation model to estimate the long-term prognosis of chronic hepatitis C (2-4). The model has been previously validated by showing that predicted estimates match closely results found in published natural history studies (2).

To estimate health resource consumption, we used drug dosage from the trial, but as would likely occur in clinical practice, we discontinued treatment in patients who were viral positive after 24 weeks of combination therapy in the base-case analysis. Any missing viral tests were considered to be viral positive. As is recommended for pharmaco-economic analysis, drug costs were based on average wholesale costs of € 4.61 for ribavirin, € 6.17 per million units for interferon alfa-2b, and € 1.83 per microgram for peginterferon alfa-2b after

adjustment for the weight distribution in the randomised trial and for the different size vials and numbers of capsules. Antiviral treatment costs were based solely on Belgium drug costs. Annual costs of care for hepatitis C complications were based on 1996 Gasthuisberg estimates : € 125 for chronic hepatitis without cirrhosis, € 250 for compensated cirrhosis, € 8,060 for decompensated cirrhosis, € 10,000 for hepatocellular carcinoma, € 50,000 for the first year and € 8,700 beyond the first year after liver transplantation. The likelihood of liver transplantation for individuals developing decompensated cirrhosis was increased to reflect the higher Belgium versus US per capita transplantation rates.

The analysis applied a societal perspective, excluding productivity costs (e.g., time lost from work or non-medical costs). Survival and costs were discounted at an annual 3% rate. Most well-accepted medical interventions have marginal cost-effectiveness ratios falling below US \$ 50,000 or approximately € 50,000 per year of life saved, so we consider any ratios below this threshold to be cost-effective.

Results

Table 1 displays the projected results from the trial. Compared to interferon alfa-2b plus ribavirin, weight-based dosing for peginterferon alfa-2b plus ribavirin should prolong life expectancy by 1.0 life years or 1.3 quality-adjusted life years. When compared to no antiviral therapy, the discounted marginal cost-effectiveness of peginterferon alfa-2b plus ribavirin was € 2,376 per discounted quality-adjusted life year gained. The discounted marginal cost-effectiveness of peginterferon alfa-2b plus ribavirin compared to interferon alfa-2b plus ribavirin was € 6,378 per discounted quality-adjusted life year gained. For genotype 2 or 3, the discounted marginal cost-effectiveness of peginterferon alfa-2b plus ribavirin versus interferon alfa-2b plus ribavirin was € 12,639 per discounted quality-adjusted life year gained. For genotype 1, 4 or 5, the discounted marginal cost-effectiveness of peginterferon alfa-2b plus

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Table 1. — Results

Strategy	Lifetime Costs (€)	Life Expectancy (Y)	Quality-adjusted Life Expectancy (QALY)	Discounted (at 3%/yr) Costs (€)	Discounted Quality-adjusted Life Expectancy (DQALY) Ratio	Marginal Cost-effectiveness (€ per DQALY gained)
No antiviral	25,879	24.93	20.58	14,370	13.82	
Interferon alfa-2b + ribavirin	22,402	27.75	24.30	15,650	15.36	834
Peginterferon alfa-2b + ribavirin	24,783	28.70	25.57	19,419	15.95	6,378

ribavirin compared to interferon alfa-2b plus ribavirin was € 4 195 per discounted quality-adjusted life year gained. These results suggest that peginterferon alfa-2b plus ribavirin is “cost-effective” when compared to other well-accepted medical interventions.

Results were similar for price to patient drug costs of € 5.11 for ribavirin, € 7.28 per million units for interferon alfa-2b, and € 2.02 per microgram for peginterferon alfa-2b. Using these costs, the marginal cost-effectiveness ratio for peginterferon alfa-2b plus ribavirin was € 3,021 per discounted quality-adjusted life year gained versus no antiviral therapy ; compared to interferon alfa-2b plus ribavirin, the marginal cost-effectiveness ratios for peginterferon alfa-2b plus ribavirin were € 7,111 for the overall population, € 4,748 for genotype 1, 4 or 5, and € 13,841 for genotype 2 or 3 per discounted quality-adjusted life year gained.

Conclusions

The results show that the higher sustained viral response associated with peginterferon alfa-2b and ribavirin therapy should result in lower future hepatitis C

related morbidity and future cost savings by preventing hepatitis C complications, in particular the need for liver transplantation. Compared to other well-accepted medical interventions, peginterferon alfa-2b and ribavirin therapy should be considered “cost-effective”.

References

1. MANN S.M.P., MC HUTCHISON J.G., GORDON S.C., RUSTGI V.K., SHIFFMAN M., REINDOLLAR R., GOODMAN Z.D., KOURY K., LING M.-H., ALBRECHT J.K., INTERNATIONAL HEPATITIS INTERVENTIONAL THERAPY GROUP. Peginterferon alfa-2b plus ribavirin compared with interferon alfa-2b plus ribavirin for initial treatment of chronic hepatitis C : a randomised trial. *Lancet*, 2001, **358** : 958-965.
2. BENNETT W.G., INOUE Y., BECK J.R., WONG J.B., PAUKER S.G., DAVIS G.L. Estimates of the cost-effectiveness of a single course of interferon-alpha 2b in patients with histologically mild chronic hepatitis C. *Ann. Int. Med.*, 1997, **127** : 855-865.
3. WONG J.B., BENNETT W.G., KOFF R.S., PAUKER S.G. Pre-treatment evaluation of chronic hepatitis C : Risks, benefits and costs. *JAMA*, 1998, **280** : 2088-2093.
4. WONG J.B., POYNARD T., LING M.H., ALBRECHT J.K., PAUKER S.G. Cost-effectiveness of 24 or 48 weeks of interferon alpha-2b alone or with ribavirin as initial treatment of chronic hepatitis C. International Hepatitis Interventional Therapy Group. *Am. J. Gastroenterol.*, 2000, **95** : 1524-1530.