Cost-effectiveness analysis of telaprevir triple therapy for treatment-naïve patients with chronic hepatitis C based on the combined efficacy of the ADVANCE and OPTIMIZE studies

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Background

- Treatment of hepatitis C virus (HCV) genotype 1 infected patients is based on the combination of protease inhibitors with pegylated interferon-alfa and ribavirin (PR).[1]
- This treatment is associated to higher efficacies, but also to higher average treatment costs and incidence on existing adverse events (AE) versus PR.

Objective

The aim of this study was to assess the incremental cost-effectiveness ratio (ICER) of triple therapy of telaprevir combined with PR (T/PR) as first-line therapy in treatment-naïve patients versus dual therapy with PR.

Methods

- A cost-utility analysis based on a Markov-model (figure 1) that simulates patient outcomes was used to estimate lifetime costs and quality-adjusted life-years (QALYs) of T/PR and PR from the perspective of the Spanish National Health System.
- One-year transition probabilities between health states[2,3] and utilities[4] were obtained from published sources.

Figure 1. Markov diagram

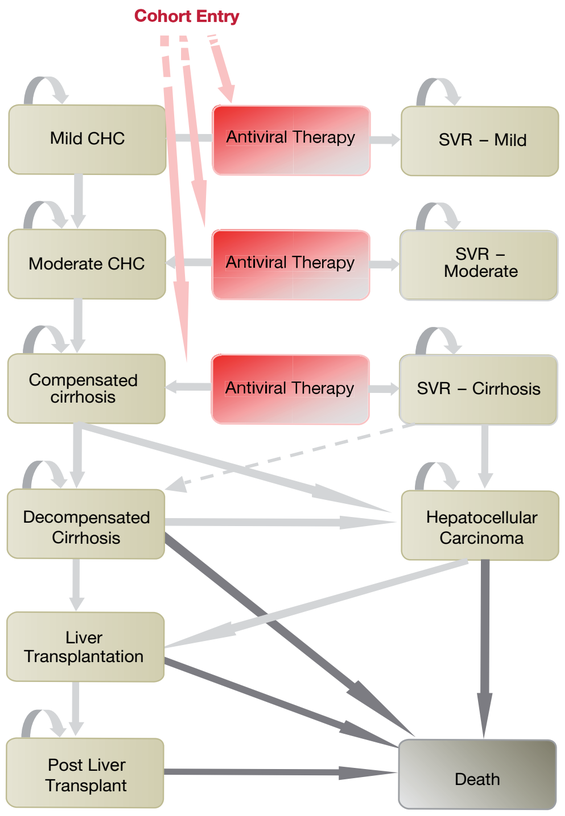


Table 1. Cost (€ 2013) inputs

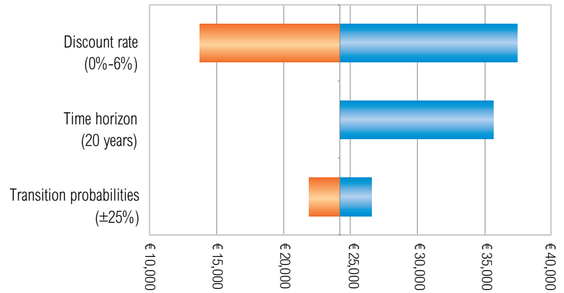
Drug costs (ex-factory price[7] with mandatory rebate[8])	Weekly cost
Telaprevir (Incivo®, 2.250 mg/day)	€2,051.28
Peginterferon-alfa (Pegasys®, 180µg/week)	€177.07
Generic Ribavirin (1,200mg/day)	€73.57
AE cost	**Management cost**
Rash	€848.59
Pruritus	€178.83
Anemia	€877.69
Heatlh state costs	
Mild disease	€256.43
Moderate fibrosis	€257.30
Bridging fibrosis	€257.30
Compensated cirrhosis	€561.48
Decompensated cirrhosis	€2,211
Hepatocellular carcinoma	€7,772
Liver transplantation[9]	€113,238
Post-liver transplantation- 1st year (0-12 months)[9]	€33,094
Post-liver transplantation- 2nd year (13-24 months)[9]	€16,547

- The reference cohort was a 49-year aged population with clinical profile: mild (41.1%), moderate fibrosis (35.5%), bridging fibrosis (14.2%) and cirrhosis (9.2%)[5,6].
- A response guided approach for 24 and 48 weeks was used for T/PR therapy.
- Results on efficacy, based on sustained virological response (SVR): 74.6% for T/PR and 44.0% for PR and AE rates were obtained from ADVANCE[5] and OPTIMIZE studies[6].
- Total cost (€, 2013) included medication, AE and disease management costs by health state.
- Pharmaceutical costs were based on local ex-factory prices[7] with mandatory rebate[8].
- Resource use provided by an expert panel was used to estimate AE management and health state costs apart from liver and post-liver transplantation, both obtained from literature[9]. (Table 1)
- Unitary resources cost were obtained from a local cost database[10].
- Cost and health benefits were both discounted at 3% annually[11].
- Both one way and probabilistic sensitivity analyses were performed to test model robustness.

Results

- T/PR showed better outcomes (14.44 QALYs) and higher costs (€38,420) compared to PR therapy (13.71 QALYs and €20,673).
- The lifetime ICER resulted €24,186/QALY gained for T/PR vs PR.
- Figure 2 shows results for one-way sensitivity analyses performed. The discount rate was the parameter associated to the greatest variations.

Figure 2. Tornado diagram for one-way sensitivity analyses



- The analysis showed also that T/PR could avoid 14 cirrhosis and 5 liver transplants per 1,000 patients compared to PR alone.
- On the probabilistic analysis following 1,000 Montecarlo simulations (figure 3), the probability of an ICER below a €30,000/QALY gained threshold[12] was 88%, and 98% for a €40,000/QALY gained threshold. (figure 4)

Figure 3. Cost-effectiveness plane

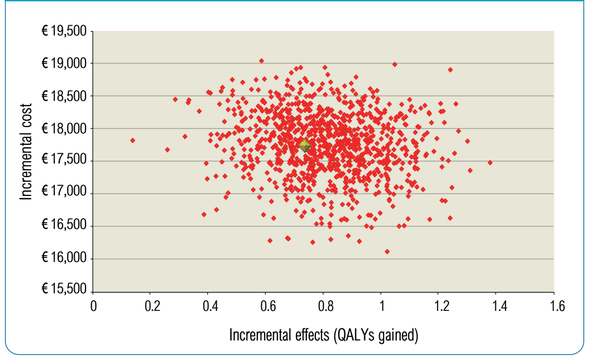
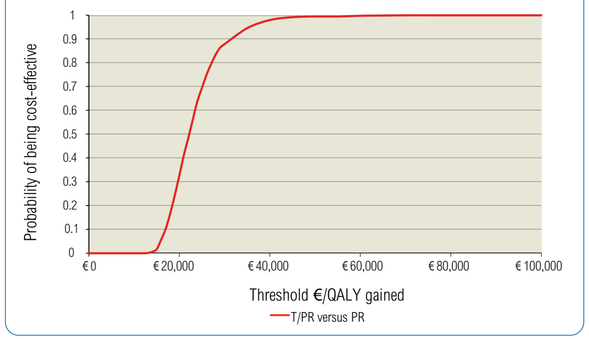


Figure 4. Acceptability curve



Conclusion

- **Telaprevir triple therapy is a cost-effective option compared with PR alone for treatment-naïve patients with genotype 1 HCV, based on the combined results of ADVANCE and OPTIMIZE studies.**
- **Telaprevir triple therapy is clinically significantly more efficacious than PR alone and is also cost-effective at a €30,000/QALY willingness-to-pay (88% probability)**
- **These economic results were robust in various one-way sensitivity analyses.**

Disclosure

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