Cost-effectiveness of combination therapy with etravirine in treatment-experienced adults with HIV-1 infection

Mauskopf J, Brogan AJ, Talbird SE, Martin S

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 objective of the study was to assess the cost-effectiveness of etravirine used in combination with a background regimen including darunavir/ritonavir in patients with HIV-1 infection. Addition of etravirine represented a cost-effective option when compared to optimised standard of care. Overall quality of the study methodology was good. Methods and results were reported adequately. Given the scope of the study, the authors’ conclusions appear appropriate.

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

Study objective
The objective of the study was to assess the cost-effectiveness of etravirine used in combination with a background regimen that included darunavir/ritonavir in treatment of patients with HIV-1 infection.

Interventions
The authors compared two initial treatment regimens: etravirine plus a background regimen consisting of darunavir/ritonavir, at least two nucleoside reverse transcriptase inhibitors (NRTIs) and optionally enfuvirtide; and the same darunavir/ritonavir-based background regimen without etravirine.

Location/setting
Canada/Outpatient secondary care.

Methods
Analytical approach:
A published decision analytic Markov model (three monthly cycles) was adapted to follow disease progression in a hypothetical cohort of treatment experienced adults with HIV-1 infection (Mauskopf et al. 2010, see Other Publications of Related Interest). Two study time horizons were considered: one year and the lifetime of the patient. The authors stated that the perspective was Canadian Provincial Ministry of Health.

Effectiveness data:
Clinical and effectiveness data were derived from previously published studies. The main effectiveness parameter used in the model was time spent by individuals in the two phases of CD4 cell count response. This estimate was derived from two published randomised controlled clinical trials, DUET 1 and DUET 2 (Katlama et al. 2009, see Other Publications of Related Interest).

Monetary benefit and utility valuations:
Utility weights were derived from a study that estimated values using responses to the EuroQol questionnaire from 21,000 participants in HIV clinical trials, including participants in Canada (Simpson et al. 2004, see Other Publications of Related Interest).

Measure of benefit:
Three measures of benefit were considered: percentage of patients with viral load less than 50 copies/mL at 48 weeks, life-years gained and quality-adjusted life-years (QALYs) gained. Future benefits were discounted at an annual rate of
Cost data:
Direct costs included in the study were of antiretroviral therapy, non-antiretroviral therapy, in-patient hospital days, physician visits, emergency department visits and laboratory tests. One year resource use was obtained from the DUET 1 and DUET 2 clinical trials. Unit costs were derived from published studies and reports. All costs were inflated to 2009 prices using the health and personal care component of the consumer price index. All costs were reported in Canadian dollars ($). Future costs were discounted using an annual rate of 5%.

Analysis of uncertainty:
A series of one-way sensitivity analyses were undertaken to assess the impact of parameter uncertainty. A probabilistic sensitivity analysis was performed in which parameter values were varied simultaneously from appropriate probability distributions using a Monte Carlo simulation.

Results
Lifetime average cost per patient was $530,000 with etravirine and $497,803 for the control intervention.

The average lifetime QALYs gained were 10.00 with etravirine and 9.35 for the control intervention.

Lifetime costs and benefits were combined using an incremental cost-utility ratio (additional cost per QALY gained). When compared to the control intervention, the incremental cost-utility ratio for etravirine was $49,120 per QALY gained.

The etravirine regimen was cost-effective in 50.3% of simulations at a willingness to pay threshold of $50,000 and in 82.3% of simulations at a willingness to pay threshold of $100,000.

Authors’ conclusions
The authors concluded that when compared to optimised standard of care, addition of etravirine represented a cost-effective option for treatment-experienced adults in Canada.

CRD commentary
Interventions:
The intervention was reported clearly. The comparator appeared appropriate.

Effectiveness/benefits:
Clinical and effectiveness data were derived from previously published studies. The authors reported neither how published studies were identified nor whether a systematic review of the literature was undertaken. As a result it was not possible to determine whether all relevant information was included in the model. The main measure of effectiveness was derived from two published randomised clinical trials so it was likely that the main measure of effectiveness used in the model was internally valid. QALY was an appropriate benefit measure for patients with HIV as it not only assessed morbidity and mortality but also enabled comparisons with the benefits of other healthcare interventions.

Costs:
The perspective adopted in the economic analysis was reported explicitly. It appeared that all relevant cost categories and costs for the Canadian Provincial Ministry of Health perspective were included in the analysis. The sources from which resource use and costs were derived were provided. The time horizon, discount rate used, price year and currency details were all reported adequately.

Analysis and results:
Cost and outcome information were appropriately synthesised using a Markov model. Adequate details of the model used were provided and there was a graphical depiction. The results were presented clearly and combined appropriately in an incremental analysis. Uncertainty in the model’s results was exhaustively tested using a series of one-way and probabilistic sensitivity analyses. The main limitation of the study reported by the authors was that no long-term follow-up data were available for the regimens included in the study. Data were derived from studies with 96-week follow-up.
Concluding remarks:
Overall quality of the study methodology was good. Methods and results were reported adequately. Given the scope of the study, the authors’ conclusions appear appropriate.

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