Economic evaluation of targeted treatments of invasive aspergillosis in adult haematopoietic stem cell transplant recipients in the Netherlands: a modelling approach

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 modelled the cost-effectiveness of targeted antifungal treatment strategies for adult haematopoietic stem cell transplant recipients with proven or probable invasive aspergillosis. The authors concluded that first-line therapy with voriconazole and second-line therapy with caspofungin was the preferred option from an economic viewpoint in the Netherlands. The methodology of the study appears to have been appropriate and, on the whole, was clearly and transparently reported. The conclusions appear to be appropriate.

Type of economic evaluation
Cost-effectiveness analysis

Study objective
This study modelled the cost-effectiveness of targeted antifungal treatment strategies for adult haematopoietic stem cell transplant (HSCT) recipients with proven or probable invasive aspergillosis (IA).

Interventions
The antifungal treatments were voriconazole and lipid formulations of amphotericin B (L-AMB) used as first line therapy, and caspofungin and amphotericin B desoxycholate (D-AMB) used as second-line therapy. These treatments were used in combination or sequentially forming a total of seven treatment strategies, which were:

- Voriconazole followed by caspofungin;
- Voriconazole followed by D-AMB;
- Voriconazole followed by L-AMB plus caspofungin;
- L-AMB followed by voriconazole;
- L-AMB followed by caspofungin; and
- L-AMB followed by voriconazole plus caspofungin.

Location/setting
Netherlands/secondary care.

Methods
Analytical approach:
A decision analytic model (decision tree) was constructed in order to compare the cost-effectiveness of the management strategies. The time horizon of the analysis was 12 weeks and the authors stated that the hospital perspective was adopted.

Effectiveness data:
Most of the effectiveness data were obtained from a literature review. Where data were unavailable, estimates were based on authors’ assumptions derived by consensus. The criteria applied for the selection of the estimates, the process used to identify the data, and the sources searched were reported. The main clinical parameter was patient survival 12 weeks after initiating antifungal therapy.

Monetary benefit and utility valuations:
Not relevant.
Measure of benefit:
The measure of benefit was life-years gained (LYGs).

Cost data:
The cost categories included the costs of medication, hospitalisation, and treatment for adverse effects of the treatment strategies. The medication costs reflected national Dutch retail prices. The resource use and hospital costs were derived from national sources or based on expert opinion. All costs were in Euros (EUR) and were reported for the price year of 2005.

Analysis of uncertainty:
One-way sensitivity analyses were performed on all model parameters and the ranges used were fully reported. A probabilistic sensitivity analysis was also conducted and the distributions assigned to model parameters were reported. These results were presented using cost-effectiveness acceptability curves.

Results
The total treatment costs ranged from EUR 6,631 for the voriconazole/caspofungin strategy to EUR 17,742 for the L-AMB/voriconazole plus caspofungin strategy.

The LYGs ranged from 1,109 for the L-AMB/caspofungin strategy to 1,307 for the voriconazole/L-AMB plus caspofungin strategy.

All strategies but the voriconazole/L-AMB plus caspofungin were dominated by the voriconazole/caspofungin strategy as this was less costly and more effective.

Voriconazole/L-AMB plus caspofungin was more effective compared with voriconazole/caspofungin, resulting in an incremental cost-effectiveness ratio (ICER) of EUR 107,036 per incremental LYG.

The one-way sensitivity analyses showed that the results were most sensitive to variations in the number of vials of L-AMB per day, and the number of days of other licensed antifungal therapy (OLAT) treatment. The cost-effectiveness acceptability curves demonstrated that, at various values of willingness-to-pay, the voriconazole/caspofungin strategy mostly produced the highest net monetary benefit.

Authors’ conclusions
The authors concluded that first-line therapy with voriconazole and second-line therapy with caspofungin was the preferred option from an economic point of view for treating IA in adult patients who had received HSCT in the Netherlands.

CRD commentary
Interventions:
The interventions were clearly reported including the dosage. The study appears to have been thorough in its coverage of the available interventions.

Effectiveness/benefits:
The effectiveness data were obtained from published literature or were based on the consensus of authors’ assumptions when data were not available or not sufficiently reliable. The search methods and inclusion criteria were clearly reported, suggesting that a systematic review of the literature was carried out.

Costs:
The costs appeared to reflect the perspective stated. The resource use data and costs were well reported and the cost data appeared to be appropriate for the study population and setting. The unit costs were presented, which will help when replicating the analysis in other settings. The uncertainty in costing data was investigated using sensitivity analyses.

Analysis and results:
The model structure was presented graphically along with all the relevant details and modelling assumptions. The authors conducted an appropriate incremental analysis and the results were adequately presented. Sensitivity analyses were conducted on modelling assumptions and parameters, making the findings more generalisable and robust. The authors provided a thorough discussion on the limitations and weaknesses of their study.

Concluding remarks:
The methodology of the study appears to have been appropriate and, on the whole, was clearly and transparently reported. The conclusions appear to be appropriate.

Funding
Supported by UCB Pharma BV and Gilead Sciences.

Bibliographic details

PubMedID
17561501

DOI
10.1093/jac/dkm196

Original Paper URL
http://jac.oxfordjournals.org/cgi/reprint/60/2/385

Indexing Status
Subject indexing assigned by NLM

MeSH
Amphotericin B /therapeutic use; Antifungal Agents /economics /therapeutic use; Aspergillosis /drug therapy /economics; Cost-Benefit Analysis; Costs and Cost Analysis; Data Interpretation, Statistical; Decision Trees; Drug Combinations; Echinocandins /economics /therapeutic use; Hematopoietic Stem Cell Transplantation; Humans; Models, Economic; Models, Statistical; Netherlands /epidemiology; Pyrimidines /economics /therapeutic use; Reproducibility of Results; Survival Analysis; Triazoles /economics /therapeutic use; Voriconazole

AccessionNumber
22007001886

Date bibliographic record published
03/11/2008

Date abstract record published
31/03/2009