Economic evaluation of caspofungin versus liposomal amphotericin B for empirical antifungal therapy in patients with persistent fever and neutropenia in Sweden

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 examined the cost-effectiveness of caspofungin versus liposomal amphotericin B as antifungal therapy for patients with persistent fever and neutropenia. The authors concluded that caspofungin was likely to be cost-effective for these patients in Sweden. The cost-effectiveness framework was valid and key areas of uncertainty were considered, showing that the authors’ conclusions are robust.

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

Study objective
This study examined the cost-effectiveness of caspofungin versus liposomal amphotericin B (LAMB) as antifungal therapy for patients with persistent fever and neutropenia.

Interventions
Caspofungin 70mg on day one then 50mg daily was compared with LAMB 3mg per kg per day. Therapy could be discontinued due to toxicity and patients could switch to the alternative treatment if they did not respond to their first treatment.

Location/setting
Sweden/hospital.

Methods
Analytical approach:
The analysis was based on a published decision-analytic model, with a lifetime horizon. The authors did not explicitly state the perspective.

Effectiveness data:
Most of the clinical data were from a published multinational, double-blind, randomised controlled trial (RCT) that directly compared caspofungin with LAMB. Discontinuation of therapy due to drug-related toxicity was a key input for the model. It was assumed that there were no differences in discontinuation due to a lack of treatment efficacy. Additional data to calculate survival were from the literature. Long-term survival Weibull curves were used to project the short-term values to a lifetime.

Monetary benefit and utility valuations:
The utility values were from a published study.

Measure of benefit:
Life-years and quality-adjusted life-years (QALYs) were the summary benefit measures.

Cost data:
The economic analysis included the costs of drugs, in-patient stay (on a normal ward and in intensive care), and treatment of adverse events. These costs were from official price lists in Sweden. The patterns of resource consumption were from the main RCT and authors’ opinions. All costs were in Swedish kronor and in Euros (EUR).
Analysis of uncertainty:
One-way and probabilistic sensitivity analyses were carried out to investigate the uncertainty. The probabilistic analysis produced 95% uncertainty intervals for the model outcomes.

Results
The total costs were EUR 22,948 (95% UI 22,088 to 23,768) with caspofungin and EUR 26,684 (95% UI 25,802 to 27,610) with LAMB. The expected life-years lost were 0.87 (95% UI 0.52 to 1.31) with caspofungin and 1.22 (95% UI 0.73 to 1.80) with LAMB. The expected QALYs lost were 0.63 (95% UI 0.35 to 0.97) with caspofungin and 0.88 (95% UI 0.49 to 1.36) with LAMB.

In this base case, caspofungin was dominant as it was more effective and cheaper than LAMB.

The cost savings with caspofungin were sensitive to variations in the efficacy of the drugs for patients without a baseline infection. The QALYs were affected by variations in the risk of dying during initial antifungal therapy, for patients without a baseline infection. Caspofungin was dominant in more than 95% of 1,000 model iterations.

Authors' conclusions
The authors concluded that caspofungin was likely to be cost-effective compared with LAMB as antifungal therapy in Sweden.

CRD commentary
Interventions:
A justification for the selection of the comparators was given; LAMB and caspofungin were two newer antifungal treatments for these patients. Other treatments, such as voriconazole, fluconazole, and amphotericin B, were not considered as they were less effective than LAMB.

Effectiveness/benefits:
The clinical data were mostly from a head-to-head RCT, which should have ensured high internal validity for them, but this trial was not described and the authors did not report a search for other relevant trials. Survival was extrapolated to the long-term using standard survival curves. Some assumptions were made and it was unclear if these were tested in the sensitivity analysis. Both life-years lost and QALYs lost appear to have been valid and appropriate benefit measures, given the impact of the disease on survival and quality of life. The methods used to elicit the preferences for the utilities were not reported.

Costs:
The economic viewpoint was not explicitly stated, but the cost categories and data sources suggest the selection of a health care payer perspective. The unit costs and quantities of resources were clearly reported, enhancing the possibility of transferring the analysis to other settings. Typical Swedish sources appear to have been used for the unit costs. The resource use was partly from a RCT, which might not have been representative of clinical practice, but ensured the detailed collection of data. Expert opinion was used to support these values. The price year was not explicitly reported, but all the data sources were 2009 publications. The cost estimates were subjected to extensive analysis of uncertainty.

Analysis and results:
The total and incremental outcomes of the two treatments were reported. Incremental ratios were not calculated because caspofungin was dominant. The uncertainty was investigated in both deterministic and probabilistic analyses and the findings were clearly illustrated. The decision model was well described, with a diagram. The authors compared their results with those of other countries and tried to explain some of the differences in the results, partly addressing their transferability. Some limitations were acknowledged by the authors and these mainly related to the need for assumptions. It was unclear whether the costs and benefits were discounted and this would have been necessary, given the lifetime analysis.
Concluding remarks:
The cost-effectiveness framework was valid and key areas of uncertainty were considered, showing that the authors' conclusions are robust.

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