Cost-effectiveness analysis of micafungin versus caspofungin for treatment of systemic Candida infections in the UK

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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 was to evaluate the cost-effectiveness of micafungin compared with caspofungin for the treatment of adults with systemic Candida infection in the UK. The authors concluded that micafungin was at least as cost-effective as caspofungin, and the difference was not significant. The study was generally well reported, but there were some limitations to the methods. The authors' conclusions should be considered with caution.

Type of economic evaluation
Cost-effectiveness analysis

Study objective
The objective was to evaluate the cost-effectiveness of micafungin compared with caspofungin for the treatment of adults with systemic Candida infection in the UK.

Interventions
Intravenous micafungin 100mg daily was compared with intravenous caspofungin 70mg followed by 50mg daily. Patients were encouraged to continue treatment for up to 14 days after the clearance of Candida organisms from the bloodstream.

Location/setting
UK/secondary care.

Methods
Analytical approach:
A decision-analytic model was constructed to determine the clinical and economic impact of the treatment strategies, using data from a randomised controlled trial (RCT). A 14-week time horizon was considered, which covered two to eight weeks of treatment, and six weeks of follow-up in survivors after treatment. The authors stated that the perspective was that of the hospital.

Effectiveness data:
The clinical data came from a phase III international published double-blinded randomised trial that compared micafungin and caspofungin (Pappas, et al. 2007, see 'Other Publications of Related Interest' below for bibliographic details). The model used data from 199 patients who were treated with micafungin and 192 treated with caspofungin. The key clinical parameters were the eradication of fungal infection at the end of treatment and survival.

Monetary benefit and utility valuations:
Not relevant.

Measure of benefit:
The measure of benefit was the number of successfully treated patients, defined as the achievement of a clinical and mycological response at the end of the intravenous therapy, who were alive at the end of the study period.

Cost data:
The analysis included the direct medical costs of the treatment of systemic Candida infections, including the antifungal
drugs, fungal culture and radiology, catheters, the cost of treating adverse events, and the hospital stay. These costs were from national sources, such as the British National Formulary (BNF), the Unit Costs of Health and Social Care, and a UK hospital (Newcastle upon Tyne Hospitals NHS Foundation Trust). The price year was 2007 and all costs were reported in UK pounds sterling (£).

Analysis of uncertainty:
Univariate sensitivity analysis was performed by varying the number of study dropouts and the hospitalisations, and by using trial data from only the European patients. A probabilistic sensitivity analysis was performed and the results were presented in a cost-effectiveness scatter plot and a cost-effectiveness acceptability curve.

Results
The percentage of patients who were successfully treated and alive at the end of the study was 59.7% in the micafungin group and 57.5% in the caspofungin group. The total treatment costs for micafungin were £29,095 compared with £29,953 for caspofungin. The major cost driver for both treatments was the cost of hospitalisation (£23,554 for micafungin and £24,547 for caspofungin).

Micafungin was dominant as it was more effective and less costly. The cost-effectiveness of micafungin was £48,771 per successfully treated patient compared with £52,066 per successfully treated patient for caspofungin.

The sensitivity analyses showed that the results were fairly robust, and micafungin remained the most cost-effective option in all but one analysis, which was for patients with Candida tropicalis infection. The probabilistic sensitivity analysis showed that the likelihood that micafungin was more cost-effective than caspofungin ranged from 55% to 69% depending on the willingness to pay for an additional successfully treated patient.

Authors' conclusions
The authors concluded that micafungin was at least as cost-effective as caspofungin for the treatment of systemic Candida infections in the UK; the difference was not significant.

CRD commentary
Interventions:
The interventions did not include the usual practice, which was likely to be fluconazole or liposomal amphotericin-B. Other dosages of micafungin were included in the source trial, but were not analysed. The authors justified these choices, but these omissions might not be reasonable and the interventions might not be relevant in other settings.

Effectiveness/benefits:
The effectiveness data were from one trial, with potentially high-quality methods, but the inclusion and exclusion criteria for this trial were not described, making it unclear how representative the population was of typical patients with systemic Candida infections. The authors stated that the measure of benefit was the cost per successfully treated patient, rather than quality-adjusted life-years, because no directly collected or published utility estimates were available. There was no indication that a systematic review of the literature was performed, so it is difficult to ascertain if the best available evidence was used.

Costs:
The perspective was clearly defined and it appears that all the relevant costs were considered. The sources of cost data appear to have been appropriate. The authors stated that trial data was used to estimate the resource use, but it appears that author assumptions were needed for the hospital length of stay in intensive care and on the general ward, which was the biggest cost driver for both treatment groups. This could introduce uncertainty into the results. The details for the main resources and costs were presented clearly in the text and in tables, which aids the ability to replicate the study for other settings. Adjustments to the costs and the cost year were reported.

Analysis and results:
The incremental cost and effectiveness of the strategies was not compared, nor were they compared with the usual practice. The uncertainty in the source data was appropriately assessed in univariate and probabilistic sensitivity analyses. The authors reported the average cost-effectiveness ratios, but for a few scenarios, such as varying...
hospitalisation, micafungin was more effective and more costly than caspofungin, and an incremental cost-effectiveness ratio would have been relevant. In general, the results were well reported and the authors discussed the limitations of their analysis, including the need for future studies to compare micafungin with a broader spectrum of treatments. They compared their findings with those from other studies.

Concluding remarks:
- The study was generally well reported, but there were some limitations to the methods. The authors' conclusions should be considered with caution.

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