Cost-effectiveness analysis of anidulafungin versus fluconazole for the treatment of invasive candidiasis

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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 determine the cost-effectiveness of anidulafungin versus fluconazole in the treatment of invasive candidiasis. The authors concluded that anidulafungin was cost-effective. The methods were adequate, and they and the results were sufficiently reported. Given the scope of the study, the authors’ conclusions appear to be appropriate.

Type of economic evaluation
Cost-effectiveness analysis

Study objective
The objective was to determine the cost-effectiveness of anidulafungin versus fluconazole in the treatment of invasive candidiasis.

Interventions
The interventions were anidulafungin, 200mg on day one, then 100mg daily, compared with fluconazole, 800mg on day one, then 400mg daily.

Location/setting
Australia/secondary in-patient care.

Methods
Analytical approach:
A decision-tree model was used to assess the cost-effectiveness of the two interventions. The authors stated that the perspective was that of the hospital.

Effectiveness data:
The clinical and effectiveness data were primarily from one double-blind randomised controlled trial (RCT) of 261 patients who received anidulafungin or fluconazole (Reboli, et al. 2007, see ‘Other Publications of Related Interest’ below for bibliographic details). The primary outcome was success after intravenous antifungal therapy. Success had to be both clinical and microbiological, as defined in the Reboli trial. Four experts provided local data that were not available in the published literature, such as for the tests to monitor the response to treatment or side-effects. They determined if data from the trial were generalisable to Australia. Long-term survival was estimated using mortality at six weeks from the two arms of the trial and Australian life tables.

Monetary benefit and utility valuations:
None.

Measure of benefit:
The measures of benefit were the treatment success and life-years gained. Life-years were discounted at a rate of 5% per year.

Cost data:
The direct costs were those of initial and alternative antifungal therapy, screening tests to diagnose invasive candidiasis (including chest X-ray, abdominal computed tomography, echocardiography, fundoscopy, and non-blood and blood
cultures), tests to monitor adverse effects of the antifungal therapy (full blood count, renal function test, and electrolyte test), hospitalisations, and critical care. Resource use was from the Reboli trial and the expert panel. The unit costs were from Australian Refined Diagnosis Related Group information, the Medicare Benefits Schedule Book, wholesale drug prices paid by Australian hospitals, and the manufacturer of anidulafungin. The price year was 2010 to 2011 and all costs were reported in Australian dollars (AUD).

Analysis of uncertainty:
One-way sensitivity analyses were undertaken to assess if the model results were robust. A probabilistic sensitivity analysis was performed, varying the inputs simultaneously, using 10,000 Monte Carlo simulations, within predefined probability distributions. The results were presented in a cost-effectiveness acceptability curve.

Results
The percentage of patients who were successfully treated was 75.59 with anidulafungin and 60.17 with fluconazole. An additional 15.4% were successfully treated with anidulafungin (p<0.02). The additional life-years gained with anidulafungin, compared with fluconazole, were 0.62 per patient.

The total cost per patient was AUD 74,587 with anidulafungin and AUD 60,945 with fluconazole. The incremental cost was AUD 13,642. Hospitalisation was the major cost driver for both comparators.

Compared with fluconazole, anidulafungin was associated with an incremental cost-effectiveness ratio of AUD 88,584 per additional patient successfully treated or AUD 22,003 per life-year gained.

The sensitivity analyses showed that the results were robust to wide variations in a range of inputs. The probabilistic sensitivity analysis showed that anidulafungin was cost-effective (below the accepted threshold for Australia of AUD 76,000 per life-year gained) in the treatment of invasive candidiasis in almost 100% of simulations.

Authors' conclusions
The authors concluded that anidulafungin was cost-effective.

CRD commentary
Interventions:
The interventions were reported clearly and in detail.

Effectiveness/benefits:
The effectiveness data were mainly from a published RCT, which was referenced, but few other details were given. This publication should be consulted to assess the trial's quality; well-conducted RCTs are considered to be the gold standard when comparing health interventions and the results are likely to have been internally valid. An expert panel was used to supplement the data from the RCT, and to assess whether its findings could be generalised to Australia, which makes the results likely to be externally valid. Discounting was applied to the expected life-years, but the time horizon was not explicitly stated.

Costs:
The direct costs were transparently reported. It appears that no major cost, relevant to the stated hospital perspective, was omitted. The sources for the resource use and costs were given. The authors stated that patients were followed-up until treatment was successful (secondary treatment was assumed to be successful) or the patient died, but it was unclear how long this was, and so over what period the costs were accrued, making it unclear if discounting was relevant. The price year, currency, and adjustments for inflation were reported.

Analysis and results:
The cost and outcome information was synthesised in a decision model, which was described and a diagram was given. One-way and probabilistic sensitivity analyses were undertaken to assess the overall model uncertainty. The authors reported that the main limitation to their analysis was that their results might not be generalisable to patients with neutropenic invasive candidiasis, as most of these patients were excluded from the RCT. They reported that another limitation was that they extrapolated the six-week mortality to a longer period.
Concluding remarks:
The methods were adequate, and they and the results were sufficiently reported. Given the scope of the study, the authors' conclusions appear to be appropriate.

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