Health economic assessment of ferric carboxymaltose in patients with iron deficiency and chronic heart failure based on the FAIR-HF trial: an analysis for 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
This study assessed the cost-effectiveness of iron repletion, using intravenous ferric carboxymaltose, for patients with chronic heart failure and iron deficiency, with or without anaemia. The authors concluded that ferric carboxymaltose was cost-effective, compared with placebo, in the UK. There was some uncertainty surrounding some data, but the authors' conclusions appear to be reasonable, for the 24-week period of the analysis.

Type of economic evaluation
Cost-utility analysis

Study objective
This study assessed the cost-effectiveness of iron repletion, using intravenous ferric carboxymaltose, for patients with chronic heart failure and iron deficiency, with or without anaemia.

Interventions
Ferric carboxymaltose was compared with placebo. Patients received a weekly intravenous injection of 4mL of ferric carboxymaltose, equivalent to 200mg of iron, until repletion was achieved. Afterwards, an injection was given every four weeks.

Location/setting
UK/secondary care.

Methods
Analytical approach:
The analysis was based on one clinical trial, which was conducted over 24 weeks. The authors stated that the perspective was that of the UK NHS.

Effectiveness data:
The clinical data were from a multicentre, randomised controlled trial (RCT), with 304 patients in the ferric carboxymaltose group and 155 in the placebo group. An intention-to-treat analysis was conducted. The details of the trial were reported elsewhere (Anker, et al. 2009, see 'Other Publications of Related Interest' below for bibliographic details). The primary endpoint was the change in the New York Heart Association (NYHA) functional class.

Monetary benefit and utility valuations:
The utility values were elicited from patients who participated in the RCT, using the European Quality of life (EQ-5D) questionnaire and a visual analogue scale (VAS). Measures were taken at baseline, and weeks four, 12, and 24.

Measure of benefit:
The health benefit measure was quality-adjusted life-years (QALYs).

Cost data:
The economic analysis considered the costs of ferric carboxymaltose acquisition and administration, and hospitalisation for chronic heart failure. The relative resource use for ferric carboxymaltose compared with placebo was based on the consumption of patients in the RCT. As the clinical trial was conducted in other countries, the length
of hospitalisation for chronic heart failure was from publicly available statistics in England. The unit costs were from UK NHS reference costs. All costs were in UK £ and Euros (EUR), and the exchange rate used was £1 equals EUR 1.11. The price year was 2009.

Analysis of uncertainty:
A probabilistic sensitivity analysis, using Monte Carlo simulation, was conducted to investigate the uncertainty in the cost-effectiveness estimates. One-way sensitivity analyses were conducted to test whether the model outcomes were robust.

Results
In the base case, over 24 weeks, ferric carboxymaltose was associated with 0.037 more QALYs (95% CI 0.017 to 0.060) than placebo. The mean values were 0.298 for placebo and 0.336 for ferric carboxymaltose.

The total costs were £149 more in the ferric carboxymaltose group than in the placebo group. The mean costs were £768 with ferric carboxymaltose and £619 with placebo.

The incremental cost-effectiveness ratio (ICER) of ferric carboxymaltose, compared with placebo, was £3,977 per QALY gained.

In the one-way sensitivity analyses, the results ranged from ferric carboxymaltose dominating placebo, as it was more effective and less costly, to an ICER of £12,482 per QALY gained. The probabilistic sensitivity analysis showed that there was a 98.7% chance that the ICER would be less than £20,000.

Authors’ conclusions
The authors concluded that intravenous ferric carboxymaltose was cost-effective, compared with placebo, for the treatment of iron deficiency in patients with chronic heart failure, in the UK.

CRD commentary
Interventions:
The intervention, which was clearly described, was appropriately compared against no intervention. There was no indication that there was any alternative to intravenous ferric carboxymaltose in usual practice.

Effectiveness/benefits:
The clinical analysis was based on data from a RCT, which appeared to be well conducted. The intention-to-treat approach for missing data was appropriate. The utility data appear to have been derived appropriately. The analysis was based on the 24-week follow-up period, so the conclusions apply to that time period only.

Costs:
The cost categories and the sources for the unit costs reflected the stated perspective. The resource quantities for the drug treatment were estimated from the clinical trial. This approach is likely to ensure that the cost data were appropriate for the effectiveness data. The authors acknowledged that there was a lack of exhaustive medical resource information. They stated that they did not expect the availability of this information to reduce the cost difference between the interventions. The data sources and quantities were stated clearly. The cost estimates were varied in the sensitivity analysis. The price year was reported, making reflation exercises possible.

Analysis and results:
The costs and benefits were combined into an incremental cost-effectiveness ratio. The methods and results were presented clearly. A significant range of parameter values was tested in the sensitivity analyses, but the basis for two or three of the probability distributions appears to have been weak, and the results of the analysis might not be entirely accurate. The main strength of this study was the design of the clinical analysis. The authors discussed the limitations of their analysis.

Concluding remarks:
There was some uncertainty surrounding some data, but the authors’ conclusions appear to be reasonable, for the 24-week period of the analysis.
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