Potential health economic impact of intravenous iron supplementation to erythropoiesis-stimulating agent treatment in patients with cancer- or chemotherapy-induced anemia

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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 aim was to undertake a preliminary analysis of the cost-effectiveness of iron supplementation to improve the response to erythropoiesis-stimulating agents, in patients with anaemia associated with cancer or chemotherapy. The authors concluded that these early results showed favourable economic outcomes, but further research was needed to fully examine cost-effectiveness. The methods and analyses of cost-effectiveness were only briefly reported and not methodologically robust, but the recommendations for further research are valid.

Type of economic evaluation
Cost-effectiveness analysis

Study objective
A preliminary examination of the cost-effectiveness of iron supplementation to improve the response to erythropoiesis-stimulating agents, in patients with anaemia associated with cancer or chemotherapy.

Interventions
Four intravenous iron supplements, in different carbohydrate solutions, were compared with no iron supplementation. The four iron supplements were ferric carboxymaltose, ferric gluconate, iron dextran, and iron sucrose. They were evaluated as a combined class, rather than being compared with each other. The intervention lasted for 10 weeks, and dosage was up to 1g in total.

Location/setting
Switzerland/secondary care.

Methods
Analytical approach:
A key systematic review and meta-analysis provided the clinical data for the analysis (Gafter-Gvili, et al. 2010, see ‘Other Publications of Related Interest’ below for bibliographic details). The analytical time frame was 10 weeks, covering the recommended course of iron treatment for patients with anaemia related to cancer or chemotherapy. The authors stated that the perspective was that of the Swiss health care system.

Effectiveness data:
The main clinical outcome was the haematopoietic response, which was defined as an increase in haemoglobin of more than 2g per dL or to over 12g per dL. The dosages of intravenous iron and erythropoiesis-stimulating agents were from the eight randomised controlled trials identified by the systematic review; these data were pooled and weighted by trial size. The meta-analysis included a total of 1,555 anaemic cancer patients. An average of 1,191mg of intravenous iron was administered over a mean observation period of 14 weeks. The mean intravenous iron doses ranged from 600mg to 2g.

Monetary benefit and utility valuations:
Not relevant.

Measure of benefit:
The measure of benefit was the proportion of responders to erythropoiesis-stimulating agents.
Cost data:
The direct medical costs included the resources for consultations, injections or infusions, administration costs, erythropoiesis-stimulating agents, iron supplements, and hospitalisation. The cost per patient for erythropoiesis-stimulating agents was weighted by their proportional use in Switzerland at the time of the analysis (epoetin alpha 9%, epoetin beta 35%, and darbepoetin alpha 56%). Public reimbursement prices were used for iron dextran, ferric gluconate, iron sucrose, and ferric carboxymaltose and official Swiss tariffs were used for administration resources. All costs were reported in Euros (EUR) for 2011 (EUR 1 was equal to 1.273 Swiss francs).

Analysis of uncertainty:
Not stated.

Results
The cost per patient was EUR 8,196 for erythropoiesis-stimulating agents, EUR 363 for ferric carboxymaltose, EUR 794 for ferric gluconate, EUR 495 for iron dextran, and EUR 479 for iron sucrose. The weighted mean percentage of responders to erythropoiesis-stimulating agents was 84% with intravenous iron, and 60% without supplementation. All but one trial adjusted the erythropoiesis-stimulating agent dose depending on haemoglobin values, but the costs in this analysis were not adjusted to provide more conservative estimates.

The incremental cost per additional responder was EUR 1,704 with ferric carboxymaltose, EUR 2,187 with iron dextran, EUR 2,455 with iron sucrose, and EUR 3,686 with ferric gluconate.

Authors' conclusions
The authors concluded that intravenous iron supplementation to erythropoiesis-stimulating agents appeared to be economically viable, but further research was needed on the potential cost savings from reduced erythropoiesis-stimulating agents.

CRD commentary
Interventions:
The strategies were briefly described and justified. It was acknowledged that an individual assessment of each intervention was required to fully appraise their cost-effectiveness.

Effectiveness/benefits:
The evidence of clinical effectiveness between the two options was based on a meta-analysis of eight randomised controlled trials that compared intravenous iron supplementation with oral or no iron supplementation. This key systematic review was reported as an abstract only (Gafter-Gvili, et al. 2010) with no details of trial selection, analytical methods, and characteristics of the eight trials (patients, randomisation, intention-to-treat analysis, missing data, and adverse events). The quality of this research could not be assessed.

Costs:
The methods used for the cost analyses were clearly stated. The unit costs and quantities were reported separately. The costs of adverse events from iron supplementation, such as constipation, were omitted. No sensitivity analyses were reported, and it is uncertain whether the cost findings were robust.

Analysis and results:
The health outcomes and costs were combined into incremental cost-effectiveness ratios. Sensitivity analyses were not undertaken. It is standard practice in economic evaluations to assess the impact of uncertainty in the data estimates on the final results, but this was lacking. There appear to have been some inconsistencies in the reporting; the total costs in the table were different to those reported in the text.

Concluding remarks:
The methods and results were brief, as this was a preliminary analysis and short communication. Due to the lack of details on the effectiveness of iron supplementation for these patients, it is difficult to judge if the conclusions are reasonable. The absence of sensitivity analyses for the cost and clinical outcomes makes the findings uncertain. These facts were reflected in the authors conclusions, with the call for further research.
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