
Cost-effectiveness analysis of treatment with epoietin-alpha for patients with anaemia due to renal failure: the case of Sweden

Glenngard A H, Persson U, Schon S

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 erythropoietin (epoietin- α) plus red blood cell transfusion (RBCT) compared with RBCT alone for anaemia treatment in renal failure patients undergoing either haemodialysis or peritoneal dialysis. It was found that the cost-effectiveness of erythropoietin fell within the acceptable range in Sweden, with more favourable results for peritoneal dialysis patients. The methodology was valid, but the authors' conclusions may be less robust due to the limited sensitivity analysis.

Type of economic evaluation

Cost-utility analysis

Study objective

The objective was to examine the cost-effectiveness of erythropoietin and complementary red blood cell transfusion (RBCT) for the treatment of anaemia in patients with renal failure, undergoing either haemodialysis or peritoneal dialysis.

Interventions

The combination of erythropoietin (epoietin- α) and RBCT was compared with RBCT alone. Erythropoietin was administered three times per week at a dose of 50 international units per kg.

Location/setting

Sweden/hospital.

Methods

Analytical approach:

This economic evaluation was based on a Markov model which was created for the UK National Institute for Health and Clinical Excellence (NICE). The model had a lifetime horizon. The authors stated that the perspective was that of the provider.

Effectiveness data:

The clinical data for the impact of treatment on patients' health were derived from published studies which were known to the authors. Most of the evidence came from a systematic review and meta-analysis of 16 studies of erythropoietin for the treatment of anaemia associated with cancer. The key clinical endpoint was the change in haemoglobin concentrations with erythropoietin plus RBCT or RBCT alone, and the subsequent changes in quality of life.

Monetary benefit and utility valuations:

The utility estimates were derived from published studies, one of which used the time trade-off methodology to elicit preferences.

Measure of benefit:

Quality-adjusted life-years (QALYs) were the summary benefit measure and were discounted at an annual rate of 3%.

Cost data:

The economic analysis considered the following cost categories: erythropoietin administration, iron supplementation,

RBCT, and hospital stay. The resource consumption patterns reflected the Swedish setting. For instance, the erythropoietin dosage was derived from the Swedish Dialysis Database and the Swedish Registry for Active Treatment of Uremia. Costs came from Swedish sources, such as the Swedish Association of the Pharmaceutical Industry or the Southern Regional Health Board. The reduced consumption of health care services associated with erythropoietin administration was derived from the previous model, created for NICE. The unit costs and quantities of resources used were presented separately for most items. The price year was 2007. Costs were in Euros (EUR) and were also presented in Swedish kroner (SEK). Future costs were discounted at an annual rate of 3%.

Analysis of uncertainty:

A deterministic one-way sensitivity analysis was undertaken on the following model inputs: the discount rate, length of hospital stay, and the costs of blood transfusion and erythropoietin administration. The alternative values were based on authors' opinions or formal recommendations.

Results

The additional lifetime costs of erythropoietin plus RBCT over RBCT alone were EUR 35,968 for haemodialysis patients and EUR 16,191 for peritoneal dialysis patients. The lifetime QALY gain with erythropoietin plus RBCT over RBCT alone was 0.561.

The incremental cost per QALY gained with erythropoietin was EUR 63,665 (SEK 585,678) for haemodialysis patients and EUR 28,875 (SEK 265,635) for peritoneal dialysis patients.

Assuming a population of 78% of patients undergoing haemodialysis and 22% peritoneal dialysis (Swedish data), the incremental cost per QALY gained with erythropoietin in the whole population was EUR 56,011 (SEK 515,268).

The sensitivity analysis did not substantially alter the base-case findings. Reductions in the cost of treatment or hospital stay improved the cost-effectiveness of the erythropoietin strategy. With changes in the discount rate, the cost-utility ratios only improved when the costs were discounted at 3% and benefits were not discounted.

Authors' conclusions

The authors concluded that the cost-effectiveness of erythropoietin fell within the acceptable range in Sweden, although more favourable results were observed for peritoneal dialysis than for haemodialysis patients.

CRD commentary

Interventions:

The authors justified their selection of the comparators, which were the two commonly used treatments in the authors' setting.

Effectiveness/benefits:

The authors selected the sources for the clinical data. Although the key characteristics of the methods used to derive the estimates were given, the sources were not described in detail (patient population, study design, type of interventions, etc). This limits the possibility of assessing the internal validity of these estimates. The quality-of-life weights were associated with changes in haemoglobin concentration on the basis of a UK study which might not be transferable to the Swedish setting. QALYs are a validated benefit measure, which capture the impact of treatment on the quality of life and survival. They are also generalisable and allow comparisons with the benefits of other health care interventions.

Costs:

The economic analysis was presented in detail. The cost categories were consistent with the viewpoint of the economic analysis. The costs were broken down into individual items, with their prices and quantities, for most categories. The sources of data were reported for each set of estimates and the price year, currency conversions, and use of discounting were reported. The authors justified the exclusion of hypertension costs, which were assumed to have been identical in the two treatment arms. Some of the cost categories were varied in the sensitivity analysis. The authors noted that the use of budgetary unit costs might limit the analysis, but these are often used due to a lack of reliable actual cost data.

Analysis and results:

An incremental approach was used to synthesise the costs and benefits. This was appropriate and provided useful data for comparisons with the cost-effectiveness of other treatments. The issue of uncertainty was restricted to specific model inputs, which were considered to be uncertain, and the use of a comprehensive approach would have been more appropriate. The authors reported slightly different results from the UK study submitted to NICE (lower cost-utility ratios) and the potential reasons for these differences were discussed. The findings were presented for two patient populations (haemodialysis and peritoneal dialysis), which makes this economic evaluation interesting for the relevant decision-makers.

Concluding remarks:

The study was based on valid methodology which reflected a previous NICE submission. The authors' conclusions may be less robust due to the limited sensitivity analysis.

Funding

Not stated.

Bibliographic details

Glennard A H, Persson U, Schon S. Cost-effectiveness analysis of treatment with epoetin-alpha for patients with anaemia due to renal failure: the case of Sweden. *Scandinavian Journal of Urology and Nephrology* 2008; 42(1): 66-73

PubMedID

17907051

DOI

10.1080/00365590701561994

Other publications of related interest

Remak E, Hutton J, Jones M, et al. Changes in cost-effectiveness over time. The case of Epoetin Alfa for renal replacement therapy patients in the UK. *Eur J Health Econ* 2003;4:115-21.

Coyle D, Lee KM, Fergusson D, et al. Cost effectiveness of epoetin-alpha to augment preoperative autologous blood donation in elective cardiac surgery. *Pharmacoeconomics* 2000;18:161-71.

Indexing Status

Subject indexing assigned by NLM

MeSH

Anemia /etiology /therapy; Cost-Benefit Analysis; Epoetin Alfa; Erythrocyte Transfusion; Erythropoietin /economics /therapeutic use; Female; Health Care Costs; Hematinics /economics /therapeutic use; Humans; Male; Middle Aged; Recombinant Proteins; Renal Insufficiency /complications; Sweden; Treatment Outcome

AccessionNumber

22008000403

Date bibliographic record published

07/04/2009

Date abstract record published

09/09/2009