Is the use of recombinant human erythropoietin in anaemia of prematurity cost-effective

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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.

Health technology
The use of recombinant human erythropoietin (rHuEpo) in anaemia of prematurity. Patients received subcutaneous Eprex 600 U/kg/wk for up to six weeks. Infants were given blood transfusions (BTFs) according to a strict 5-point protocol which is fully described in the paper.

Type of intervention
Treatment.

Economic study type
Cost-effectiveness analysis.

Study population
Preterm infants with anaemia of prematurity.

Setting
Hospital. The study was carried out at Groote Schuur Hospital and at the University of Cape Town, South Africa.

Dates to which data relate
Effectiveness data were derived from a single study published in 1994. The dates to which resource use and cost data relate were not reported. The price year was not stated.

Source of effectiveness data
Effectiveness data were derived from a single study.

Link between effectiveness and cost data
The costing was undertaken on the same patient sample as that used in the effectiveness study. The costing was carried out prospectively alongside the effectiveness study.

Study sample
The study sample consisted of 80 stable growing preterm infants (birth weight less than 1,390g, gestation less than 33 weeks, central haematocrit less than 35%). 40 infants received subcutaneous rHuEpo and 40 infants received an equivalent volume of placebo.

Study design
A double-blind, placebo-controlled cohort study carried out in a single centre. Randomisation was carried out at study
entry but no details of the method were given. One placebo infant died soon after entry and the results for 2 other placebo infants were missing.

**Analysis of effectiveness**
The basis of the analysis (intention to treat or treatment completers only) was not clearly stated. The primary health outcomes used were risk factors for BTFs and the need for BTFs. The authors did not report whether groups, at analysis, were comparable in terms of demographic characteristics.

**Effectiveness results**
A weight gain of less than 7.5g/day from birth to study entry and a haematocrit of less than 50% within 48 hours of birth were significantly associated with BTFs, (p<0.001). Giving rHuEpo to patients with either of these risk factors prevented 24 of 28 BTFs.

**Clinical conclusions**
rHuEpo decreases BTF requirements in preterm infants with anaemia of prematurity.

**Modelling**
Bivariate logistic regression was carried out on the placebo group using 8 variables which addressed the risk factors affecting the need for BTF in preterm infants. The results enabled the authors to identify the principal risk factors involved and to determine sample inclusion criteria.

**Measure of benefits used in the economic analysis**
The principal measure of benefit was the need for BTFs. This was determined by subtracting the actual number of BTFs in the rHuEpo group from the number of BTFs predicted on the basis of the control group results.

**Direct costs**
Costs were not discounted given the short time frame of the study (less than 1 year). Quantities and costs were reported separately. Direct costs included the costs of rHuEpo therapy, costs of paediatric BTF, and costs of laboratory tests. The quantity/cost boundary adopted was that of the hospital. The estimation of quantities and costs was based on actual data. Cost data were collected from Groote Schuur Hospital. The cost results were based on 19 placebo recipients with at least one risk factor whilst 25 patients in the rHuEpo group had the same risk factors. From these data the predicted resource utilisation levels for the intervention were determined. The price year was not reported.

**Statistical analysis of costs**
Not reported.

**Indirect Costs**
Not included.

**Currency**
South African Rand (R).

**Sensitivity analysis**
Not reported.
Estimated benefits used in the economic analysis
Giving rHuEpo to patients with identifiable risk factors prevented 24 of 28 BTFs. Four BTFs were therefore given (95% CI: 2.6 - 6.0)

Cost results
The cost of transfusion was R187.

Synthesis of costs and benefits
Giving rHuEpo to patients with identifiable risk factors generated a cost of R184 to prevent one BTF.

Authors' conclusions
The costs of the two treatment options were similar, but as the risk of transmitting infection is lower with rHuEpo, its use in selected preterm infants was recommended. Infants likely to need intervention for anaemia of prematurity can be identified using the approach reported here.

CRD COMMENTARY - Selection of comparators
The rationale for the choice of comparator was clear. You, as a user of this database, should verify whether this health technology is relevant to your setting.

Validity of estimate of measure of benefit
The authors considered a relevant measure of benefit. The effectiveness of rHuEpo in the resolution of symptoms was not considered. The authors did not examine a final measure of outcome (such as years of life gained). The likely benefits of rHuEpo in preventing the transmission of infection (HIV, hepatitis, CMV) were identified but not examined. The authors stated that the intervention did not appear to be associated with any significant side-effects.

Validity of estimate of costs
Only direct costs were included and no sensitivity analysis was conducted to test the robustness of the cost results. Cost estimates are likely to be specific since they were derived from a local source.

Other issues
Incremental effectiveness should preferably be calculated by comparing the required number of BTFs per patient in each group. The study suffered from a small sample size. Comparisons with other relevant studies were made. The generalisability of the results to other settings or countries was not discussed.

Implications of the study
The use of erythropoietin is recommended by the authors in selected preterm infants. Further research is needed which incorporates the risk of transmitting infections into the analysis.

Source of funding
None stated

Bibliographic details
Other publications of related interest


Indexing Status
Subject indexing assigned by NLM

MeSH
Anemia, Neonatal /drug therapy /therapy; Blood Transfusion /economics; Combined Modality Therapy; Cost-Benefit Analysis; Double-Blind Method; Erythropoietin /economics /therapeutic use; Humans; Infant, Newborn; Infant, Premature, Diseases /drug therapy; Recombinant Proteins /economics /therapeutic use; Treatment Outcome

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