Erythrocytapheresis can reduce iron overload and prevent the need for chelation therapy in chronically transfused paediatric patients
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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
Erythrocytapheresis.

Type of intervention
Treatment.

Economic study type
Cost-effectiveness analysis.

Study population
Young African-American paediatric patients with a mean and median age of 12 years, undergoing chronic transfusion therapy for either homozygous sickle cell anaemia complicated by a cerebral vascular accident (n=9), or congenital dyserythropoietic anaemia (n=1).

Setting
Hospital. The study was carried out in North Carolina, USA.

Dates to which data relate
The dates between which the effectiveness data and resource use data were collected were not reported, but appear to be 1992 to 1995. 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 analysis. Both analyses were undertaken retrospectively.

Study sample
Ten patients were included in the study. Details of sample selection were not provided, and no power calculations were performed. Three of the patients underwent chelation therapy in addition to erythrocytapheresis for 20 months, four patients, who were either allergic to or non-compliant with chelation therapy, underwent erythrocytapheresis for 12-20 months, and three patients underwent erythrocytapheresis alone for 6-8 months.
Study design
A case series of patients at a single centre was used to compare simple transfusion with or without chelation therapy to erythrocytapheresis. The duration of follow-up was not reported.

Analysis of effectiveness
The primary health outcome used was serum ferritin levels which provide an estimate of total body iron levels. These were measured approximately every 3 months, using the Imx microparticle enzyme immunoassay.

Effectiveness results
Three patients who received erythrocytapheresis in addition to chelation therapy (deferoxamine) showed a significant decrease in serum ferritin levels. One discontinued chelation therapy due to a decline in serum ferritin to 600 ng/ml. Four patients, who did not receive chelation therapy due to allergy or non-compliance, underwent erythrocytapheresis for up to 20 months. Three of these stabilised their serum ferritin levels, and one decreased his serum ferritin levels significantly. The remaining three received no chelation therapy and started erythrocytapheresis therapy soon after a cerebral vascular accident. Their serum ferritin levels remained at a level below that necessitating chelation therapy.

Clinical conclusions
Erythrocytapheresis is a safe method of exchange transfusion which has been proven to be efficacious in small paediatric patients.

Measure of benefits used in the economic analysis
No specific measure of benefit was used in the analysis.

Direct costs
Costs were not discounted. Quantities were not reported separately from the prices. The costs measured were mean annual charges. The charges for simple transfusion therapy included a clinic fee, an equipment fee (filter, tubing, catheters), and a blood bank fee (type and cross, processing). The charges for chelation therapy varied among the home health agencies used. The mean annual charge for erythrocytapheresis included a clinic fee, a blood bank fee, and an apheresis fee. No specific price date was reported.

Currency
US dollars ($).

Sensitivity analysis
No sensitivity analysis was carried out.

Estimated benefits used in the economic analysis
No specific measure of benefit was used in the analysis.

Cost results
The mean annual charges for simple transfusion and for erythrocytapheresis were as follows:
for the three-patient group compliant with chelation therapy, $10,492 and $21,995, respectively;
for the four-patient group allergic to or non-compliant with chelation therapy, $9,175 and $20,226, respectively; and
for the three CVA cases followed by erythrocytapheresis, not applicable and $17,553 (projected), respectively.

**Synthesis of costs and benefits**
Not combined.

**Authors' conclusions**
Erythrocytapheresis is a safe and efficacious method of exchange transfusion for small paediatric patients. A reduced need for chelation therapy resulting from the use of erythrocytapheresis can produce significant net savings and improve the quality of life for the children requiring chronic red cell transfusion therapy.

**CRD COMMENTARY - Selection of comparators**
The reason for the choice of comparator is clear. The use of erythrocytapheresis may reduce the need for chelation therapy, which has significant side effects.

**Validity of estimate of measure of benefit**
The estimate of measure of benefits is not likely to be internally valid, mainly due to very small patient numbers and the case series design of the study.

**Validity of estimate of costs**
There were significant problems with the cost estimates: resource quantities were not reported separately from the prices; the method and years of resource use collection were not reported; no price year was given; and the discounting of costs was not considered. Furthermore, the cost of the chelation therapy did not appear to be included in the analysis.

**Other issues**
The authors' conclusions that the use of erythrocytapheresis can produce significant net savings lack a solid basis. The generalisability of the study results is very doubtful and was not addressed. Similar results were found in a study of older patients.

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**Bibliographic details**

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Subject indexing assigned by NLM

**MeSH**
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**AccessionNumber**
NHS Economic Evaluation Database (NHS EED)