A cost analysis of autologous and allogeneic transfusions in hip-replacement surgery

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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
Using allogeneic transfusions in addition to, or instead of, autologous transfusions in patients undergoing hip-replacement surgery.

Type of intervention
Treatment.

Economic study type
Cost-effectiveness analysis.

Study population
Patients undergoing hip-replacement surgery.

Setting
Hospital. The economic study was carried out in Rochester, New York, USA.

Dates to which data relate
The data for the resource use and the effectiveness analyses were collected between 1986-1988 and in 1992. The prices used were those prevailing in 1992.

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

Link between effectiveness and cost data
The costing was undertaken retrospectively on the same patient sample as that used in the effectiveness analysis.

Study sample
No power calculations were reported. The number of patients included in the study was 82. Thirty-three of these were patients receiving 2 to 3 units of autologous blood only. Another 49 patients received 2 or 3 units of allogeneic blood only.

Study design
Case-control study, carried out in a single centre.
Analysis of effectiveness

The principal (intention to treat or treatment completers only) used in the analysis of the effectiveness was not explicitly specified. The primary health outcome measure used was 'rate of infection', as representative of short-term patient morbidity after surgery. The groups of patients were shown to be comparable in terms of age, sex, units transfused, duration of surgery, and days of wound drainage. Before surgery, the autologous group had a mean hematocrit of 38%, whereas the allogeneic group had a mean hematocrit of 41% (p=0.0008). The mean hematocrit at hospital discharge was 32% for the autologous group and 33% for the allogeneic. In another patient sample, the potential confounding factor associated with patients who donated blood preoperatively and those who did not, or could not, was controlled for. However, the clinical results were not reported.

Effectiveness results

The rate of infection ("or suspected infection") for the autologous group was 3%, whereas it was 32% for the allogeneic group (p=0.0029).

Clinical conclusions

"Autologous transfusion reduces the risks of short-term immunologic and long-term infectious complications of transfusion".

Measure of benefits used in the economic analysis

The measure of benefit used in the economic analysis was the rate of infection or suspected infection, representing short-term patient morbidity after surgery.

Direct costs

The quantities measured were not reported separately from the prices. The costs measured were operating costs, costs of complications and overhead costs. The cost boundary adopted was the hospital. The duration of costs was until hospital discharge (mean hospital stay of 12.1 days for the autologous group, and 13.5 days for the allogeneic group). The estimation of length of hospital stay was based on actual data as well as costs, whose source was the hospital and laboratory files. 'Charges' were originally recorded and then adjusted by a factor of 0.5 yielding the relation of costs over charges for the institution. Cost analysis was based on both a 1992 study cohort (n=140) and a 1986-88 cohort (n=82). The costs were reflated from 1989 to 1992, based on an index constructed from the increase in the institution's charges (which, after comparison with the index for the health sector in the consumer price index, yielded equivalent results). The cost estimate did not include costs associated with outdating/wastage of blood and not did it take into account any savings arising from not testing blood intended only for autologous use for infectious-diseases.

Statistical analysis of costs

Student's t test was used to compare the groups in terms of average costs. Confidence intervals (95% CI) were reported.

Indirect Costs

Not considered.

Currency

US dollars ($).

Sensitivity analysis

No sensitivity analysis was performed.
Estimated benefits used in the economic analysis
The rate of infection was used as an indication of the patient morbidity after intervention. The rate of infection ("or suspected infection") for the autologous group was 3\%, whereas it was 32\% for the allogeneic group (p=0.0029).

Cost results
The patients who received both autologous and allogeneic transfusions had mean total hospital charges of $26,490 versus $19,295 for the recipient of autologous only or no transfusion (P= 0.0001). In the 1992 cohort, the average incremental cost of the allogeneic transfusion was about $1,480. The additional cost of allogeneic transfusion in the 1986-88 cohort was about $1,043.

Synthesis of costs and benefits
The costs and benefits were not combined since autologous transfusion was the dominant strategy.

Authors' conclusions
Allogeneic transfusions are associated with incremental costs of about $1,000 to $1,500 per unit transfused when compared with costs for similar patients receiving no transfusions or 1 to 5 units of autologous blood.

CRD COMMENTARY - Selection of comparators
A justification was given for the choice of the comparator. Autologous transfusion was used as the comparator since it represented the routine procedure in the study site in question. You should consider whether this a widely used health technology in your own setting.

Validity of estimate of measure of benefit
The retrospective nature of the study can introduce potential biases. However, appropriate entry criteria were applied and demographic and clinical characteristics, and confounding factors were adequately controlled for.

Validity of estimate of costs
The resource quantities were not reported separately from the prices (only length of hospital stay was reported). However, apart from this, most other important details were given.

Other issues
Given the lack of randomisation and sensitivity analysis, the results may need to be treated with some caution. With respect to the generalisability of the results, the authors stated that "whether our results can be generalized will need to be determined by additional studies in other settings". Comparisons were made with other studies in terms of clinical findings (yielding overall support for the effectiveness analysis results). The results were not presented selectively.

Source of funding
None stated.

Bibliographic details

PubMedID
8615466
DOI
10.1016/S0002-9610(97)89635-3

Indexing Status
Subject indexing assigned by NLM

MeSH
Analysis of Variance; Blood Transfusion /economics; Blood Transfusion, Autologous /economics; Cohort Studies; Cost-Benefit Analysis; Hip Prosthesis /economics; Hospital Charges; Humans; Linear Models

AccessionNumber
21996000393

Date bibliographic record published
30/04/1999

Date abstract record published
30/04/1999