Cost effectiveness of intraoperative autotransfusion in total hip arthroplasty 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 intraoperative autotransfusion, or cell saver, in total hip arthroplasty surgery.

Type of intervention
Treatment.

Economic study type
Cost-effectiveness analysis.

Study population
Patients undergoing primary total hip arthroplasties.

Setting
Hospital. The economic study was conducted in Birmingham, Alabama, USA.

Dates to which data relate
Effectiveness and resource use data were collected between August 1987 and September 1991. The fiscal year was not reported.

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

Link between effectiveness and cost data
The costing was retrospectively based on a flat rate for intraoperative autotransfusion regardless of the amount of blood salvaged and the charge for a unit of homologous blood transfusion in the study institution.

Study sample
Power calculations were not used to determine the sample size. The cell saver group consisted of 45 patients with an average age of 62 years. The control group consisted of 45 patients with an average age of 63 years.

Study design
This was a retrospective cohort study, carried out in a single centre. The duration of the follow-up was until discharge. No loss to follow-up was reported.
Analysis of effectiveness
The principle (intention to treat or treatment completers only) used in the analysis of effectiveness was not explicitly specified. The primary health outcomes used in the analysis were transfusion requirements (units of blood per patient, exposure to banked blood), number of units of blood saved by the cell saver and postoperative haemoglobin and hematocrit levels. The two groups were comparable with respect to diagnoses, age, gender and race.

Effectiveness results
Intraoperative blood salvage for the 45 cell saver group patients was a mean of 483ml autotransfused operatively or 58% of the mean estimated blood loss for this group. There were no complications reported from using the cell saver. The total number of perioperative transfusions of predonated autologous blood and homologous banked blood for the control group was 99 units or 2.2 units per patient. The addition of the cell saver decreased the total transfusion requirements in the cell saver group to 77 units or 1.7 per patient. However this result was not statistically significant (p=0.062). Looking only at the perioperative homologous blood transfusions, the cell saver group had a 65.5% reduction (p=0.008). There were no significant differences between the groups in post-operative haemoglobin or hematocrit levels.

Clinical conclusions
In patients undergoing elective primary hip arthroplasty, the availability of predonated autologous blood obviates the need for a cell saver. If an adequate volume of autologous blood cannot be procured preoperatively, or if the clinician suspects excessive intraoperative bleeding, then using the cell saver may be justified.

Measure of benefits used in the economic analysis
No summary benefit measure was identified in the economic study, and only separate clinical outcomes were reported.

Direct costs
Costs were not discounted due to the short time frame of the study. Resource use utilisation was not reported separately from the costs except for units of blood transfusion. Direct health service costs, in terms of charges, were considered such as cost of intraoperative autotransfusion, including technical personnel. The charge to the patient for transfusion of a single unit of homologous blood (including technical and professional fees, administration charges, and laboratory crossmatch) was also presented. The perspective adopted in the cost analysis was that of a patient. The price year not clearly stated.

Indirect Costs
Not considered.

Currency
US dollars ($).

Sensitivity analysis
Not performed.

Estimated benefits used in the economic analysis
Not applicable.

Cost results
The cost per patient for intraoperative autotransfusion was $1,469, regardless of the amount of blood salvaged. The
charge to the patient for transfusion of a single unit of homologous blood was $595.

**Synthesis of costs and benefits**
A synthesis of costs and benefits was not required since the use of the cell saver in the context in question was a dominated strategy.

**Authors' conclusions**
If an adequate amount of autologous blood is produced, usually 2 units, the routine use of cell saver is probably unnecessary. If the patient is unable to predonate the recommended amount or if the clinician suspects excessive blood loss, it seems prudent to recommend the use of the cell saver.

**CRD COMMENTARY - Selection of comparators**
The reason for the choice of the comparator is clear.

**Validity of estimate of measure of benefit**
The internal validity of the estimates of effectiveness may be weakened by the lack of a prospective study design. In addition, the authors acknowledged that the analysis was confounded by the risk of exposure to blood-borne potentially life-threatening pathogens. Given that the study lacked a summary benefit measure in the economic analysis it may be regarded as a cost-consequences analysis.

**Validity of estimate of costs**
Quantities were not systematically reported separately from the costs and insufficient details of the methods of cost estimation were provided. Charges were used rather than true costs and the dates to which the cost and price data referred were not given. Overall, the study lacked a comprehensive and prospective cost analysis.

**Other issues**
In view of the lack of a prospective study design, sensitivity analysis, and statistical analysis of the costs, the results need to be treated with some caution. The issue of generalisability to other countries or settings was not addressed.

**Source of funding**
None stated.

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