Cost-effectiveness of blood transfusion and white cell reduction in elective colorectal 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
White cell (WBC)-reduced blood transfusion performed by filtering whole blood through a beside filter (RC100, Pall Biomedical, Glen Cove, NY).

Type of intervention
Primary prevention; treatment.

Economic study type
Cost-effectiveness analysis.

Study population
Patients admitted for elective colorectal surgery.

Setting
Hospital. The economic study was carried out in Aarhus, Denmark.

Dates to which data relate
The main effectiveness data were taken from sources dated 1990 (although the study was published in 1992). 1990 prices were used.

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

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

Study sample
197 patients were admitted for elective colorectal surgery. 48 patients (18 males and 30 females, median age 61) received WBC-reduced whole blood; 56 patients (19 males and 37 females, median age 68) received unfiltered whole blood and 93 patients (50 males and 43 females, median age 67) received no transfusion. No power calculations to determine the sample size were reported.

Study design
The study was a randomised controlled trial. The duration and the loss to follow up were not stated.
Analysis of effectiveness
The primary health outcomes used in the analysis were postoperative infections and noninfectious complications. It was not stated whether the analysis was based on intention to treat or on treatment completers only.

Effectiveness results
Postoperative infections and non-infectious complications were significantly higher in the group that received unfiltered whole blood, (p<0.01). This group also had a significantly greater incidence of abdominal wound infection.

Clinical conclusions
The study demonstrates clinical benefits derived from the use of WBC-reduced whole blood in elective colorectal surgery as its use is associated with significant reductions in the frequency of postoperative infections.

Measure of benefits used in the economic analysis
The measures of benefits used in the economic analysis were postoperative infections and noninfectious complications, and length of hospital stay.

Direct costs
Quantities and costs were analysed separately. Only health service costs were considered: number of bed days, number of blood transfusions, and number of filters. The authors stated that the costs provided were Danish at the time of the study (data collected in 1990). Discounting was not deemed necessary as the study duration was less than one year.

Statistical analysis of costs
Chi-square test and t-test.

Indirect Costs
Not included.

Currency
US dollars ($).

Sensitivity analysis
A sensitivity analysis was not performed.

Estimated benefits used in the economic analysis
Postoperative infections and non-infectious complications were significantly higher in the group that received unfiltered whole blood, (p<0.01). This group also had a significantly greater incidence of abdominal wound infection and significantly longer hospital days; 17 days compared to 10 and 11 days for the no transfusion and filtered whole blood transfusions groups respectively, (p<0.01).

Cost results
A unit of whole blood cost $92, the RC 100 filter $33, and a 1-day hospital stay $676. The total hospital cost per patient was $12,347 for those receiving unfiltered whole blood, $7,867 for those who receiving WBC-reduced whole blood and $7,030 for those receiving no transfusion.
Synthesis of costs and benefits
Costs and benefits were not combined.

Authors' conclusions
The authors concluded that the use of WBC-reduced whole blood transfusions in elective colorectal surgery significantly reduces the frequency of postoperative infection, the length of hospital stay and the total hospital charges for patients needing blood transfusion.

CRD COMMENTARY - Selection of comparators
A justification was given for the comparators used (no transfusion, unfiltered whole blood). Unfiltered whole blood was selected so that the blood containing all components, including plasma, could be compared to a similar component rendered WBC-reduced by filtration. You, as a user of this database, should consider whether these represent appropriate comparators in your own setting.

Validity of estimate of measure of benefit
The study was based on a randomized controlled trial and hence the assessment of benefits was relatively reliable.

Validity of estimate of costs
Adequate details were provided of the source and nature of costs included.

Other issues
Although the generalisability of the clinical data was addressed (e.g. results are applicable to transfusion of red cells), the cost data are unlikely to be generalisable to other countries or settings.

Source of funding
None stated.

Bibliographic details

PubMedID
7570929

Other publications of related interest
Comment in: Transfusion 1996;36(6):582.

Indexing Status
Subject indexing assigned by NLM

MeSH
Adult; Aged; Aged, 80 and over; Blood Transfusion /economics /methods; Colonic Diseases /economics /surgery; Costs and Cost Analysis; Erythrocyte Transfusion /economics; Female; Humans; Infection Control; Leukapheresis /economics; Male; Middle Aged; Postoperative Complications /prevention & control; Prospective Studies; Rectal Diseases /economics /surgery

AccessionNumber