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[Intervention Review]

Cell salvage for minimising perioperative allogeneic blood transfusion

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ABSTRACT

Background

Concerns regarding the safety of transfused blood, have prompted reconsideration of the use of allogeneic (blood from an unrelated donor) red blood cell (RBC) transfusion, and a range of techniques to minimise transfusion requirements.

Objectives

To examine the evidence for the efficacy of cell salvage in reducing allogeneic blood transfusion and the evidence for any effect on clinical outcomes.

Search methods

We searched the Cochrane Central Register of Controlled Trials, MEDLINE, EMBASE, Current Contents and the websites of international health technology assessment agencies. The reference lists in identified trials and review articles were also searched, and study authors were contacted to identify additional studies. The searches were updated in January 2004.

Selection criteria

Controlled parallel group trials in which adult patients, scheduled for non-urgent surgery, were randomised to cell salvage, or to a control group, who did not receive the intervention.

Data collection and analysis

Two authors independently screened search results, extracted data and assessed methodological quality. The main outcomes measures were the number of patients exposed to allogeneic red cell transfusion, and the amount of blood transfused. Other outcomes measured were re-operation for bleeding, blood loss, post-operative complications (thrombosis, infection, non-fatal myocardial infarction, renal failure), mortality, and length of hospital stay (LOS).

Main results

Overall, the use of cell salvage reduced the rate of exposure to allogeneic RBC transfusion by a relative 39% (relative risk [RR] = 0.61: 95% confidence interval [CI] 0.52 to 0.71). The absolute reduction in risk (ARR) of receiving an allogeneic RBC transfusion was 23% (95% CI 16% to 30%). In orthopaedic procedures the RR of exposure to RBC transfusion was 0.42 (95% CI 0.32 to 0.54) compared to 0.77 (95% CI 0.68

to 0.87) for cardiac procedures. The use of cell salvage resulted in an average saving of 0.67 units of allogeneic RBC per patient (weighted mean difference was -0.64; 95% CI -0.89 to -0.45). Cell salvage did not appear to impact adversely on clinical outcomes.

Authors' conclusions

The results suggest cell salvage is efficacious in reducing the need for allogeneic red cell transfusion in adult elective surgery. However, the methodological quality of trials was poor. As the trials were unblinded and lacked adequate concealment of treatment allocation, transfusion practices may have been influenced by knowledge of the patients' treatment status biasing the results in favour of cell salvage.

PLAIN LANGUAGE SUMMARY

Cell salvage, the process of collecting a patient's own blood during surgery for transfusion back into the patient, is an alternative to reliance on donor blood when a transfusion is required. However, what is the evidence for the effectiveness of this procedure in reducing transfusions with donor blood?

Some patients who undergo surgery require blood transfusions to compensate for the blood loss that occurs during the procedure; often the blood used for the transfusion has been donated by a volunteer. The risks associated with receiving a volunteer donor blood that has been screened by a competently managed modern laboratory are considered minimal, with the risk of contracting diseases such as HIV and Hepatitis-C being extremely low. However, there is concern in many developing countries where there is a high prevalence of such infections and transfusion services are inadequately equipped to screen donor blood as thoroughly. Although in developed countries, the risks of acquiring a disease from transfused blood is low, the financial costs associated with providing a safe and reliable blood product are escalating. Therefore there is much attention being placed on alternative strategies to minimise the need for transfusions of donor blood.

'Cell salvage' is one technique designed to reduce the use of such transfusions. It involves the collection of a patients own blood from surgical sites, which can be transfused back into the same person during or after surgery, as required.

The authors undertook this systematic review to examine the evidence for the effectiveness of cell salvage in reducing the need for blood transfusions of donor blood, in adults (over 18 years) undergoing surgery.

The authors found 51 studies investigating the effectiveness of cell salvage in cardiac (23 studies), orthopaedic (23 studies) and vascular (five studies) surgery. Overall, the findings show that cell salvage reduces the need for transfusions of donated blood. The authors conclude that there appears to be sufficient evidence to support the use of cell salvage in cardiac and orthopaedic surgery. Cell salvage does not appear to cause any adverse clinical outcomes.

As the methodological quality of the trials was poor, the findings may be biased in favour of cell salvage. Large trials of high methodological quality that assess the relative effectiveness, safety, and cost-effectiveness of cell salvage in different surgical procedures, should be the focus of future research in this area.