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Anti-fibrinolytic use for minimising perioperative allogeneic blood transfusion

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Summary

Background and objectives: Concerns regarding the safety of transfused blood have prompted re-consideration of the use of allogeneic (blood from an unrelated donor) blood transfusion. To assess the effects of the anti-fibrinolytic drugs **aprotinin**, **tranexamic acid**, and epsilon aminocaproic **acid**, on peri-operative red blood cell (RBC) transfusion.

Implications for practice: The use of anti-fibrinolytic drugs is justified in cardiac surgery, particularly in situations where there is doubt about the safety of the blood supply. **Tranexamic acid** is cheaper and may be as effective as **aprotinin**, although the data are sparse.

Search strategy: We searched MEDLINE (to May 1998), EMBASE (to December 1997), web sites of international health technology assessment agencies (to May 1998). References in identified trials and review articles were checked and authors contacted to identify any additional studies.

Selection criteria: Randomised controlled trials of anti-fibrinolytic drugs in adults scheduled for non-urgent surgery.

Data collection and analysis: Two reviewers independently assessed trial quality and extracted data.

Main results: We found 61 trials of **aprotinin** (7027 participants). **Aprotinin** reduced the rate of RBC transfusion by a relative 30% (RR=0.70: 95%CI: 0.64 to 0.76). The average absolute risk reduction (ARR) was 20.4% (95%CI: 15.6% to 25.3%). On average, **aprotinin** use saved 1.1 units of RBC (95%CI: 0.69 to 1.47) in those requiring transfusion. **Aprotinin** also significantly reduced the need for re-operation due to bleeding (RR=0.40: 95%CI: 0.25 to 0.66).

We found 18 trials of **tranexamic acid** (TXA) (1,342 participants). TXA reduced the rate of RBC transfusion by a relative 34% (RR=0.66: 95%CI: 0.54 to 0.81). This represented an ARR of 17.2% (95%CI: 8.7% to 25.7%). TXA use resulted in a saving of 1.03 units of RBC (95%CI: 0.67 to 1.39) in those requiring transfusion. We found four trials of epsilon aminocaproic **acid** (EACA) (208 participants). EACA use resulted in a statistically non-significant reduction in RBC transfusion (RR=0.48: 95%CI: 0.19 to 1.19).

- Comparisons between agents
- Eight trials made 'head-to-head' comparisons between TXA and **aprotinin**. There was no significant difference between the two drugs in the rate of RBC transfusion: RR=1.21 (95%CI: 0.83 to 1.76) for TXA compared to **aprotinin**.
- Adverse Effects
- **Aprotinin** did not seem to be associated with an excess risk of adverse effects, including thrombo-embolic events (thrombosis RR=0.64: 95%CI: 0.31 to 1.31) and renal failure (RR=1.19: 95%CI: 0.79 to 1.79). Fewer data were available for TXA and EACA.

Reviewers' Conclusions: From this review it appears that **aprotinin** reduces the need for red cell transfusion, and the need for re-operation due to bleeding, without serious adverse effects. However, there was significant heterogeneity in trial outcomes, and some evidence of publication bias. Similar trends were seen with TXA and EACA, although the data were rather sparse. The poor evaluation of these latter drugs is unfortunate as results suggest they may be equally as effective as **aprotinin**, but are significantly cheaper. The evidence reviewed here supports the use of **aprotinin** in cardiac surgery. Further small trials of this drug are not warranted. Future trials should be large enough to compare the efficacy and cost-effectiveness of **aprotinin** with that of TXA and EACA.

Background

Public concern regarding the safety of transfused blood has prompted a reconsideration of the role of allogeneic blood transfusion (whole blood or packed red cells from an unrelated donor). The risks associated with receiving transfusion of allogeneic blood that has been screened by a competent blood transfusion program are considered minimal, with very low risks of transmission of HIV, and hepatitis C ([Whyte 1997](#)). However, this only applies where there is a safe, plentiful, well-regulated supply. The majority of the world's population does not have access to such a system, and the risks of transfusion in developing countries may be much higher ([McFarland 1997](#)). Concerns of patients and clinicians regarding blood safety have