Prophylactic platelet transfusion for haemorrhage after chemotherapy and stem cell transplantation

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Background
Platelet transfusions are used in modern clinical practice to prevent and treat bleeding in thrombocytopenic patients with bone marrow failure. Although considerable advances have been made in platelet transfusion therapy in the last 30 years, some areas continue to provoke debate, especially the use of prophylactic platelet transfusions for the prevention of thrombocytopenic bleeding.

Objectives
To determine the optimal use of platelet transfusion for the prevention of haemorrhage (prophylactic platelet transfusion) in patients with haematological malignancies undergoing chemotherapy or stem cell transplantation.

Search strategy
Randomised controlled trials (RCTs) were searched for in the Cochrane Central Register of Controlled Trials (CENTRAL). Searching was also undertaken on the OVID versions of MEDLINE and EMBASE using an RCT search filter strategy.

Selection criteria
Randomised controlled trials involving transfusions of platelet concentrates, prepared either from individual units of whole blood or by apheresis, and given prophylactically to prevent bleeding in patients with haematological malignancies and receiving treatment with chemotherapy and/or stem cell transplantation.

Data collection and analysis
All electronically derived citations and abstracts of papers identified by the review search strategy were initially screened for relevancy by one reviewer. Studies clearly irrelevant were excluded at this stage. The full text of all potentially relevant trials was then formally assessed for eligibility by two reviewers independently. Two reviewers completed data extraction independently. Missing data were requested from the original investigators, as appropriate. Disagreements were resolved by discussion with the other reviewers.

Main results
Eight completed published trials, with a total of 390 participants in the intervention groups and 362 participants in the control groups, were included in the review for further analysis.

The eight studies were classified as:
- three trials relevant to prophylactic platelet transfusions versus therapeutic platelet transfusions;
- three trials relevant to prophylactic platelet transfusion with one trigger level versus prophylactic platelet transfusion with another trigger level;
- two trials relevant to prophylactic platelet transfusion with one dose schedule versus prophylactic platelet transfusion with another dose schedule.

The few reports of controlled trials addressing prophylactic versus therapeutic transfusions contained small numbers of patients and were all undertaken over 25 years ago. None of these three studies explicitly clarified whether the lack of a reported difference was a reflection of insufficient power in the trials. The findings of the meta-analyses for this group of three small studies must be interpreted with caution.

In contrast, more contemporary trials addressed the question of what platelet count thresholds should apply for prophylactic transfusion; three identified studies broadly compared platelet transfusion thresholds of 10 versus 20 x 109/litre for different clinical groups of patients. There were no statistically significant differences between the groups with regards to mortality, remission rates, number of participants with severe bleeding events or red cell transfusion requirements. However, it was unclear whether the studies had sufficient power to demonstrate in combination non-inferiority in terms of safety of the lower threshold, 10 x 109/litre.

Insufficient randomised trials have been undertaken to make clinically relevant conclusions about the effect of different platelet doses.

Authors′ conclusions

There are no reasons to change current practice but uncertainty about the practice of prophylactic transfusion therapy should be recognised, particularly in the light of concerns about the scenario that blood products, including platelets, could become an increasingly scarce resource in the future and for which adequate alternatives do not exist. Consideration should be given to developing adequately powered trials comparing strategies of prophylaxis versus therapeutic platelet transfusion.