Comparison between liberal transfusion, acute normovolemic hemodilution, and rotational thromboelastometry to optimize use of blood products in cardiac surgery

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Abstract

Background: The objective of this study was to compare liberal and prophylactic transfusion, acute normovolemic hemodilution plus a restrictive on-demand regimen and ROTEM®-guided transfusion protocols to optimize use of blood products and in-hospital outcomes in adult cardiac surgery. Methods: Three cohorts of patients were retrospectively analyzed: 131 patients undergoing all types of cardiac surgery were assigned to liberal transfusion, 117 to normovolemic hemodilution, and 100 to ROTEM-guided transfusion. Eligibility for one or the other protocol was based on the anesthesiologists' preferences. Results: Utilization of total packed red blood cells was significantly higher in the liberal transfusion protocol (2 units IQR 1-3), with respect to hemodilution and ROTEM® protocols (1 unit, IQR 0-3 and 1 unit, IQR 0-2, respectively) ($p<0.001$). Median utilization of fresh-frozen plasma was 2 (IQR 1-2), 0 (IQR 0-0), and 0 (IQR 0-0) units in the liberal, hemodilution, and ROTEM® groups ($p<0.001$), whereas median consumption of platelets was 6 (IQR 5-7), 0 (IQR 0-6), and 0 (IQR 0-0) units, respectively ($p<0.001$). Hematocrit and hemoglobin levels at discharge were similar in all groups. Reduction in use of blood products did not affect early surgical outcomes. Conclusions: Two combined protocols including restrictive on-demand transfusion associated with acute hemodilution or ROTEM®-guided transfusion decisions significantly decreased total blood product consumption in adult cardiac surgery compared with liberal transfusion. Considering the three approaches, the ROTEM®-guided transfusion protocol was associated with the lowest transfusion requirement for any blood product. This reduction in blood product utilization did not affect early surgical outcomes.

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