

The association between duration of storage of transfused red blood cells and morbidity and mortality after reoperative cardiac surgery.

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Red blood cells (RBCs) undergo numerous changes during storage; however, the clinical relevance of these storage "lesions" is unclear. We hypothesized that the duration of storage of transfused RBCs is associated with mortality after repeat sternotomy for cardiac surgery, because these patients are at high risk for both RBC transfusion and adverse outcome. We retrospectively analyzed 434 patients who underwent repeat median sternotomy for coronary artery bypass graft or valve surgery and who received allogeneic RBCs. Three-hundred-twenty-one (74%) patients met the criteria for eligibility. After adjusting for the effects of confounders and the total number of RBC transfusions, the duration of storage of the oldest RBC unit transfused was found to be associated with both in-hospital mortality (Cox proportional hazard ratio (HR) = 1.151; $P < 0.0001$) and out-of-hospital mortality (HR = 1.116; $P < 0.0001$). The mean duration of storage of transfused RBCs was also an independent predictor of in-hospital mortality (HR = 1.036; $P < 0.0001$). Independent associations between the duration of storage of transfused RBCs and acute renal dysfunction and intensive care unit and hospital length of stay were also observed. The duration of storage of RBCs is associated with adverse outcome after repeat sternotomy for cardiac surgery. The clinical significance of this finding should be investigated in a large, randomized, blinded clinical trial.