

SCA 82

THE EFFICACY OF RETROGRADE AUTOLOGOUS PRIMING OF THE CARDIOPULMONARY BYPASS CIRCUIT IN REDUCING RED CELL REQUIREMENTS IN PATIENTS AT HIGH- AND LOW-RISK FOR PERIOPERATIVE TRANSFUSIONS

Murphy G, Szokol J, Nitsun M, Alspach D, Avram M, Vender J
*Evanston Northwestern Healthcare, Northwestern University
Feinberg School of Medicine, Evanston, IL, USA*

Introduction: Hemodilution during cardiopulmonary bypass (CPB) is a primary risk factor for blood transfusion in cardiac surgical patients. Priming of the CPB circuit with the patients' own blood (retrograde autologous priming (RAP)) is a technique used to limit hemodilution and reduce transfusion requirements. Up to 1,100 cc of crystalloid can be replaced by the patients' own blood using this process. Data from previous studies has suggested that RAP is more effective in reducing transfusion requirements in patients who are at high-risk of requiring packed red blood cells (PRBCs) during or after CPB (1,2). The aim of this investigation is to determine which patients derive the greatest benefit from RAP in a large, unselected population of adult patients presenting for cardiac surgery.

Methods: The medical records of all patients undergoing cardiac surgical procedures by a single surgeon during the study period were reviewed retrospectively. Data was collected for a 24-month period (2000-2002) when RAP was routinely used on patients undergoing CPB at our institution (RAP group, n=257) and during a 24-month period immediately preceding the introduction of RAP into the clinical practice (no RAP group, n=288). Subset analysis was performed on the data to determine if a particular group of patients predicted to be at high- or low-risk for perioperative transfusions benefited from RAP. High-risk patients included those who

were female, elderly (≥ 70 years), small (BSA < 1.7 m², weight < 70 kg), had a low initial hematocrit ($< 32\%$), or a long CPB time (≥ 120 minutes)(3,4). Low risk patients included those who were male, younger (< 70 years), larger (BSA ≥ 1.7 m², weight ≥ 70 kg), had a higher initial hematocrit ($\geq 32\%$), or a shorter CPB time (< 120 minutes).

Results: Overall, a smaller percentage of patients received PRBCs in the RAP group (44 % in RAP group vs. 51 % in no RAP group). However, this difference was not statistically significant (P = 0.083). The median total number of PRBC units administered was low in both groups and did not differ significantly (0 in RAP group vs. 1 in no RAP group, P = 0.150). In each of the high-risk subgroups of patients, no significant difference in the number of patients transfused PRBCs or in the number of units of PRBCs administered was observed between the RAP and no RAP groups. In the analysis of low-risk patients, we observed differences in PRBC transfusion only in patients with hematocrits $\geq 32\%$. In the no RAP group, a higher percentage of patients were administered PRBCs (44% vs. 32%, P = 0.014) and the relative risk of receiving a transfusion was increased (RR 1.38, 95% CI 1.06 - 1.80).

Conclusion: This investigation suggests that patients with a larger initial red blood cell mass may derive a greater benefit from the RAP technique. Retrograde autologous priming had little effect on PRBC use in small patients with low initial hematocrits, since there is a relatively limited ability of RAP to prevent excessive hemodilution in these patients.

References:

1. *J Thorac Cardiovasc Surg* 1998; 115: 426-39
2. *Ann Thorac Surg* 1998; 65: 724-30
3. *Ann Thorac Surg* 1996; 61(1): 27-32
4. *Thorac Cardiovasc Surg* 2003; 51(1): 17-21