



Newsletter

Literature Reviews

Effect of blood transfusion on long-term survival after cardiac operation.

Engoren MC, Habib RH, Zacharias A, Schwann TA, Riordan CJ, Durham SJ. *Ann Thorac Surg* 2002;74:1180-186.

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Recently, there has been increased attention placed on the association between blood transfusion and increased mortality. In this study, the effects of blood transfusion on outcome for 1,953 first time coronary artery bypass grafting patients performed using cardiopulmonary bypass patients were retrospectively analyzed. Outcome at 2 years was assessed in 1,915 patients.

An extensive statistical analysis was performed to control for numerous variables, adjust for the retrospective nature of the study, and the lack of standard criteria for blood transfusion practice. Thirty-two perioperative variables were analyzed for outcome and association with blood transfusion. Univariate analysis was performed for categorical variables using Fischer's exact test or Chi-square tests, while continuous variables were analyzed using unpaired t-tests or Mann-Whitney rank sum tests. A 'p' value less than 0.05 was considered significant.

Fifteen variables were found to be significant ($p < 0.05$) predictors of transfusion and were used to calculate a propensity score. Each transfused patient was then matched, using propensity scores, to a non-transfused patient. Five hundred and forty-six transfused patients were matched to analyze the impact of blood transfusion on survival while controlling for co-morbidities.

Of 1,915 patients, 659 (34%) were transfused. Transfused patients had a mortality of 15% compared to 6% for non-transfused patients. After correction for co-morbidities, transfused patients had a 70% increased risk of long-term mortality with an odds ratio of 1.7 (95% confidence interval 1.4-2.0; $p = 0.001$). Multivariate analysis showed that older age (> 65 years old), peripheral vascular disease (PVD), chronic obstructive pulmonary disease (COPD), poor functional class, and blood transfusion were predictive for mortality. COPD and PVD were the most significant risk factors for mortality.

After matching transfused with non-transfused patients using the propensity score, perioperative transfusion remained a significant risk factor for death with an odds ratio of 1.35 (95% confidence interval 1.18-1.54; $p < 0.001$). While intraoperative transfusion did not remain a significant risk factor, postoperative transfusion, or any transfusion was significant.

Comment: The authors are to be commended for a well thought out statistical analysis of this retrospective study. While a number of risk factors for long-term mortality were identified, the use of a propensity score to match transfused to a non-transfused group of patients allowed a more focused analysis on the impact of blood transfusion. The data suggested a strong association between outcome and transfusion. Although an association between blood transfusion and outcome has been shown, it was unclear whether blood transfusion was a marker of a more complicated case, or was and independent a cause of mortality.