

SCA 19
PREDICTORS OF TRANSFUSION REQUIREMENTS FOR MAJOR CARDIAC SURGICAL PROCEDURES IN A PROGRAM DEDICATED TO BLOOD CONSERVATION

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Background: The purpose of this study is to define the perioperative determinants for allogeneic transfusions (AT) of blood in patients presenting for CABG, valve, and combined (CABG + valve) procedures in a center that practices blood conservation perioperatively.^{1,2}

Methods: Consecutive patients who presented for cardiac surgery from July 1, 2000 to December 31, 2001 were eligible for this study. A broad based blood conservation program was utilized on all patients perioperatively. To identify risk factors for AT requirements, 69 variables were selected. An equation based on multivariate analysis was developed to estimate the risk of AT. Using this equation, patients who had a calculated risk score ≥ 0.05 were deemed high-risk for AT. Multivariate analysis in these patients was used to define the intraoperative predictors for AT.

Results: The study population consisted of a consecutive series of 307 patients; including 199 patients who underwent CABG, 58 with valve surgery and 50 patients undergoing combined CABG/valve surgery. A total of 35 patients required intra- or postoperative AT (11.4%). The overall mortality was 3.6% and only 2 patients required re-exploration for bleeding (0.7%). Multivariate analysis identified 6 preoperative factors as independent predictors for AT

(see Table and Equation). In the 150 patients with a calculated risk score ≥ 0.05 , multivariate analysis identified 4 intraoperative variables to be additional independent predictors for AT (Table).

Conclusion: A multi-modality approach for blood conservation in cardiac surgery has resulted in an 11% perioperative AT rate. Clinically significant variables are defined and an equation was developed to predict the risk of perioperative AT for patients undergoing the major cardiac surgical procedures at a center with a blood conservation program.

*Table: (*Bolded values are negative predictors of transfusion)*

Equation:

Risk Factors	Multivariate p value	CI	OR
PREOPERATIVE:			
RBC mass	0.0012	0.997-0.999	0.998
Type of operation (CABG+Valve)	0.0087	1.416-10.964	3.940
Urgency	0.0167	1.254-9.782	3.503
# of diseased vessels (>1)	0.0296	1.191-28.548	5.831
Preop PT	0.0136	1.083-2.0	1.472
Creatinine (≥ 1.3)	<0.0001	2.561-14.523	6.099
INTRAOPERATIVE:			
CPB time	0.001	1.005-1.020	1.013
# bypass grafts (>3)	0.0626	0.138-1.052	0.381
Total crystalloid (≥ 2500 ml)	0.0282	1.181-18.961	4.732
Total ANH	0.0049	0.998-1.0	0.999

Transfusion Risk = $1/[1 + e^{-S}]$

$S = (0.39 \times \text{preop PT}) - (0.0016 \times \text{RBC mass}) + 1.81$ (if creatinine > 1.3) + 1.76 (if # of diseased vessels > 1) + 1.37 (if procedure valve+CABG) + 1.25 (if emergent or urgent) -7.82

References:

1. Cosgrove, et al. Ann Thorac Surg 1985;40:380-4.
2. Stover, et al.. Anesthesiology 1998;88:327-33.