

SCA 8

BLOOD CONSERVATION IS SAFE AND EFFECTIVE FOR PRIMARY CORONARY ARTERY BYPASS GRAFTING

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Introduction: Cardiac surgery is responsible for 10-20% of all transfusions in the United States. (1) This practice continues despite recent data demonstrating that transfusions are independently linked to increased short- and long-term morbidity and mortality. (2) The ideal hemoglobin for critically ill surgical patients remains in debate; therefore, transfusion decisions are made not based on evidence, but on local and regional cultural practice patterns and personal comfort level about the lowest acceptable hemoglobin level for each particular patient.

Further compounding this problem is the lack of evidence-based research on the safety and efficacy of blood transfusion. Until such studies are available, transfusion practice will have to be decided by the risk/benefit ratio in each specific clinical scenario. Due to modern screening techniques, the infectious risks of transfusion have decreased, but the inflammatory and immunomodulatory risks are becoming more widely recognized. Furthermore, the assumed benefits of transfusion remain not clearly defined in the literature. More often than not, clinicians' decisions to transfuse are based on out-dated and insufficient knowledge of risks and based on

In October of 1999, a blood conservation program was begun in cardiac surgery at VCU. This program consisted of a comprehensive education and awareness program requiring that all transfusions be limited to appropriate clinical indications, such as evidence of an oxygen delivery debt, rather than any single bin level. The objective of the program was to reduce unnecessary transfusions and promote cost savings.

Methods: After IRB approval, data were collected from 477 consecutive patients undergoing primary CABG from 10/99 until 1/02, after the implementation of the blood conservation program. Patients were compared to 521 historical controls that had surgery from 1/97 until 9/99 before the implementation of the blood con-

servation program. Data were analyzed by Chi-square, t-tests, Komolgorov-Smirnoff and ANOVA for repeated measures for significance where appropriate.

Results: Demographic data were similar between groups. Results are summarized in table 1. *= $p < 0.05$

Discussion: These results suggest that blood conservation is safe and is associated with less adverse outcomes for patients undergoing primary CABG. This study adds to the growing body of literature that suggests that allogeneic transfusion may be deleterious to outcome. Given the known risks, limited supply, and substantial costs of transfusion therapy, it seems prudent to recommend blood conservation until a definitive prospective, randomized, controlled trial is completed.

References: 1. Boyle E, Verrier E, Spiess B. Endothelial Cell Injury in Cardiovascular Surgery: The Procoagulant Response. *Ann Thorac Surg* 62:1549-1557, 1996. 2. Spiess B. Transfusion and Outcome in Heart Surgery. *Ann Thorac Surg* 74:986-7, 2002.

Table 1. Comparison of Transfusion Rates, Hemoglobin (Hb) Levels, and Adverse Outcomes between the Control Group and Blood Conservation Group

	Control	Conservation
Number of patients (n)	521	477
All blood products (%)	79	39 *
RBC's transfused (%)	35	16 *
Preop Hb (gm/dl)	12.2	12.2
ICU Entry Hb (gm/dl)	10.8	9.2 *
Discharge Hb (gm/dl)	10.8	9.2 *
Any adverse outcome (%)	51.8	33.5 *
MI (%)	0.5	0.4
Respiratory failure (%)	9.7	8.3
Infection (%)	5.9	5.4
Death (%)	7.7	7.3
Balloon pump required (%)	15	6.1 *
2 or more catecholamines (%)	43.1	23.3 *
Renal failure (%)	5.1	2.8 *
Reoperation for bleeding (%)	4.8	1.4 *