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Impact of a blood conservation program on 30-day morbidity and mortality: a cohort study

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ABSTRACT

Background: There are little published data on outcomes of blood conservation (BC) patients after noncardiac surgery. The objective of this study was to compare the surgical outcomes of patients enrolled in our BC program with that of the general population of surgical patients.

Methods: BC patients at our institution undergoing various surgical procedures were identified from the 2007–2009 National Surgical Quality Improvement Program database and compared with a cohort of conventional care (CC) patients matched by age, gender, and surgical procedure. Univariate and multiple logistic regression analyses were performed to evaluate 30-d postoperative outcomes.

Results: One hundred twenty BC patients were compared with 238 CC patients. The two groups were similar for all preoperative variables except smoking, which was lower in the BC group. On univariate analysis, BC patients had similar mean operating time (148 *versus* 155 min; $P = 0.5$), length of stay (5.9 *versus* 5.5 d; $P = 0.7$), and rate of return to the operating room (7.5% *versus* 5.5%; $P = 0.4$) compared with CC patients. BC and CC patients had similar 30-d morbidity (18% *versus* 14%; $P = 0.3$) and mortality rates (1.6% *versus* 1.3%; $P = 1.0$), respectively. On multivariable analysis, enrollment in the BC program had no impact on postoperative 30-d morbidity (odds ratio, 1.78; 95% confidence interval, 0.71–4.47) or 30-d mortality (unadjusted odds ratio, 1.33; 95% confidence interval, 0.22–8.05).

Conclusions: Short-term postoperative outcomes in BC patients are similar to the general population, and these patients should not be denied surgical treatment based on their unwillingness to receive blood products.

1. Introduction

Patients may refuse blood and blood product transfusion for a variety of reasons. Management of these patients may pose a dilemma for health care providers. To deny these individuals, the option of non-blood medical care is to deny them access to treatments that the rest of the population takes for granted. Knowledge of the outcomes in these patients would aid in the decision process for physicians, patients, and their families.

The existing literature related to outcomes for patients unwilling to receive blood is for the most part single-institution based with relatively small number of patients

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Table 1 – Preoperative demographics, laboratory data, and intraoperative parameters.

Parameter	CC (N = 238)	BC (N = 120)	P value
	N (%)	N (%)	
Sex			
Female	166 (69.7)	84 (70)	0.96
Male	72 (30.3)	36 (30)	
Transferred from			
Home	229 (96.2)	116 (96.7)	0.17
Acute care facility	4 (1.7)	4 (3.3)	
Chronic care facility	5 (2.1)	0	
Year of birth, mean (±SD)	62 (±13.6)	62 (±13.4)	0.98
BMI, mean (±SD)	33.08 (±9.23)	33.32 (±11.32)	0.27
Smoking	46 (19.3)	8 (6.7)	0.002
Alcohol	7 (2.9)	0 (0)	0.1
Anesthesia			
MAC	8 (3.4)	3 (2.5)	0.39
Regional	13 (5.5)	11 (9.2)	
General	217 (91.2)	106 (88.3)	
Wound class			
Clean	113 (47.5)	54 (45)	0.92
Clean–contaminated	105 (44.1)	55 (45.8)	
Contaminated	9 (3.8)	6 (5)	
Dirty	11 (4.6)	5 (4.2)	
Preoperative hematocrit, mean (SD)	39 (5.2)	39.7 (4.7)	0.18
Preoperative platelet count, mean (SD)	261 (93.2)	251 (84.4)	0.29
Preoperative PT, mean (SD)	13.5 (2.1)	13.4 (1.6)	0.89
Preoperative albumin, mean (SD)	3.9 (0.5)	3.9 (0.4)	0.92
Preoperative creatinine, mean (SD)	0.95 (0.66)	1.12 (1.3)	0.11
Postoperative lowest hematocrit, mean (SD)	30.1 (5.6)	31.1 (5.7)	0.15

BMI = body mass index in kilogram per meter square; MAC = monitored anesthesia care; PT = prothrombin time; SD = standard deviation. P value reflects univariate analysis: Pearson χ^2 test and analysis of variance F-test, comparing the preoperative variables between CC group and BC group, P value <0.05 is significant.

[1–3]. To date there is no published study evaluating outcomes of blood conservation (BC) patients undergoing various general, vascular, and cardiac procedures. The objective of this study was to use the National Surgical Quality Improvement Program (NSQIP) database to study the surgical outcomes of BC patients in our institution and to compare their results with that of our general surgical population.

2. Methods

2.1. Data

Data were extracted from the 2007–2009 NSQIP database of our hospital. The institution is a 334-bed, academic medical center and a state designated level I trauma center. The hospital has been a dedicated BC center since 1994 and has been accredited by the Association of Blood Conservation since 2007. The BC program enrolls approximately 1000 patients per year in one of the two levels for non-blood treatment. Level I patients are those who refuse blood and will not accept any type of blood transfusion under any circumstances. Level II patients are those who want bloodless medicine and surgery, but as a last resort, would take a blood transfusion if it is deemed a matter of life and death. Fifteen percent of the patients who participate in the program do so for nonreligious reasons.

The institution has participated in the NSQIP program since April 2006, originally as a low-volume multispecialty center and since January 2009 as a high-volume multispecialty center. Forty cases are collected per cycle, sampling from all surgical specialties, including general surgery, vascular surgery, cardiac surgery, otolaryngology, orthopedic surgery, gynecology, urology, thoracic surgery, and neurosurgery. Approximately 10%–15% of the patients enrolled in the BC program per year are admitted for a surgical procedure and of that group, 2.6% were included in the NSQIP random sampling process.

NSQIP collects data on 136 variables (135 in 2008), including preoperative and intraoperative variables and postoperative 30-d mortality and morbidity outcomes for patients undergoing surgical procedures in both the inpatient and outpatient setting. The design of NSQIP has been previously described in detail [4–6].

2.2. Patients and outcomes

All the BC patients from our institute who were included in the NSQIP data set were included in the present analysis. Conventional care (CC) patients were selected from the data set in a 2:1 ratio and matched by gender, surgical procedure, and year of birth (±1 y). If the exact surgical procedure was not available, a procedure in the same surgical specialty of similar intensity was selected. If patients of comparable age were