



The Society of Thoracic Surgeons

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Late-Breaking Clinical Trial Abstracts

Monday, January 30, 2012
1:30 pm – 3:30 pm

Do Blood Transfusions Affect the Risk of Infections After Cardiac Surgery? Experience of the NIH/CIHR Cardiothoracic Surgical Trials Network

K. A. Horvath¹, M. A. Acker², H. Chang³, E. Bagiella³, P. K. Smith⁴, A. Iribarne³, I. L. Kron⁵, P. Lackner⁶, M. Argenziano⁷, D. D. Ascheim³, R. Michler⁸, D. Van Patten⁷, J. Puskas⁹, K. O'Sullivan³, D. Kliniewski², N. Jeffries¹, P. O'Gara¹⁰, A. J. Moskowitz³, E. Blackstone¹¹

¹National Heart, Lung, and Blood Institute, Bethesda, MD, ²University of Pennsylvania Medical Center, Philadelphia, PA, ³Mount Sinai School of Medicine, New York, NY, ⁴Duke University Medical Center, Durham, NC, ⁵University of Virginia Medical Center Health Sciences Center, Charlottesville, VA, ⁶Cleveland Clinic, Cleveland, OH, ⁷Columbia University Medical Center, New York, NY, ⁸Montefiore Medical Center, Albert-Einstein College of Medicine, New York City, NY, ⁹Emory University School of Medicine, Atlanta, GA, ¹⁰Brigham and Women's Hospital, Boston, MA, ¹¹Cleveland Clinic, Cleveland, OH

Purpose: The relationship between blood transfusions and adverse outcomes after cardiac surgery is controversial. The goal of this study was to characterize the relationship between blood transfusions and risk of major post-operative infection.

Methods: 5,184 adult cardiac surgery patients were prospectively enrolled in a 10 center cohort study to assess major/minor infections based on CDC/NHSN definitions. All infections were adjudicated by an independent committee of ID experts. Multivariable logistic regression and Cox modeling were used to assess the independent effect of blood and platelet transfusions on major infection (e.g. pneumonia, mediastinitis, blood stream infection) within 60±5 days of surgery, time to infection, LOS, and mortality.

Results: Packed red blood cells (PRBCs) and platelets were transfused in 48% (n=2,491; mean 4.1±5.0 units) and 31% (n=1,610; mean 5.9±13.8 units) of patients, respectively. The mean age was 64.4±13.2 and mean baseline hemoglobin was 13.2 mg/dL. The most common procedures were isolated CABG (31%; n=1,597) and isolated valve (30%; n=1,549) with a mean bypass time of 115.4 minutes; 1.4% were re-ops. PRBCs and platelets were independently associated with risk of major infection [Table 1]. There was a dose-dependent association between quantity of PRBC and risk of infection with the crude risk increasing by 31% with each PRBC unit (p<0.001) [Figure 1]. By contrast, platelet transfusion decreased the risk of infection. Among those receiving transfusions, the most common major infections were pneumonia (3.7%) and blood stream (2%); the risk of death was 3.2 times higher adjusting for overall risk for infection, and the risk of an additional day of stay was 1.32 times higher.

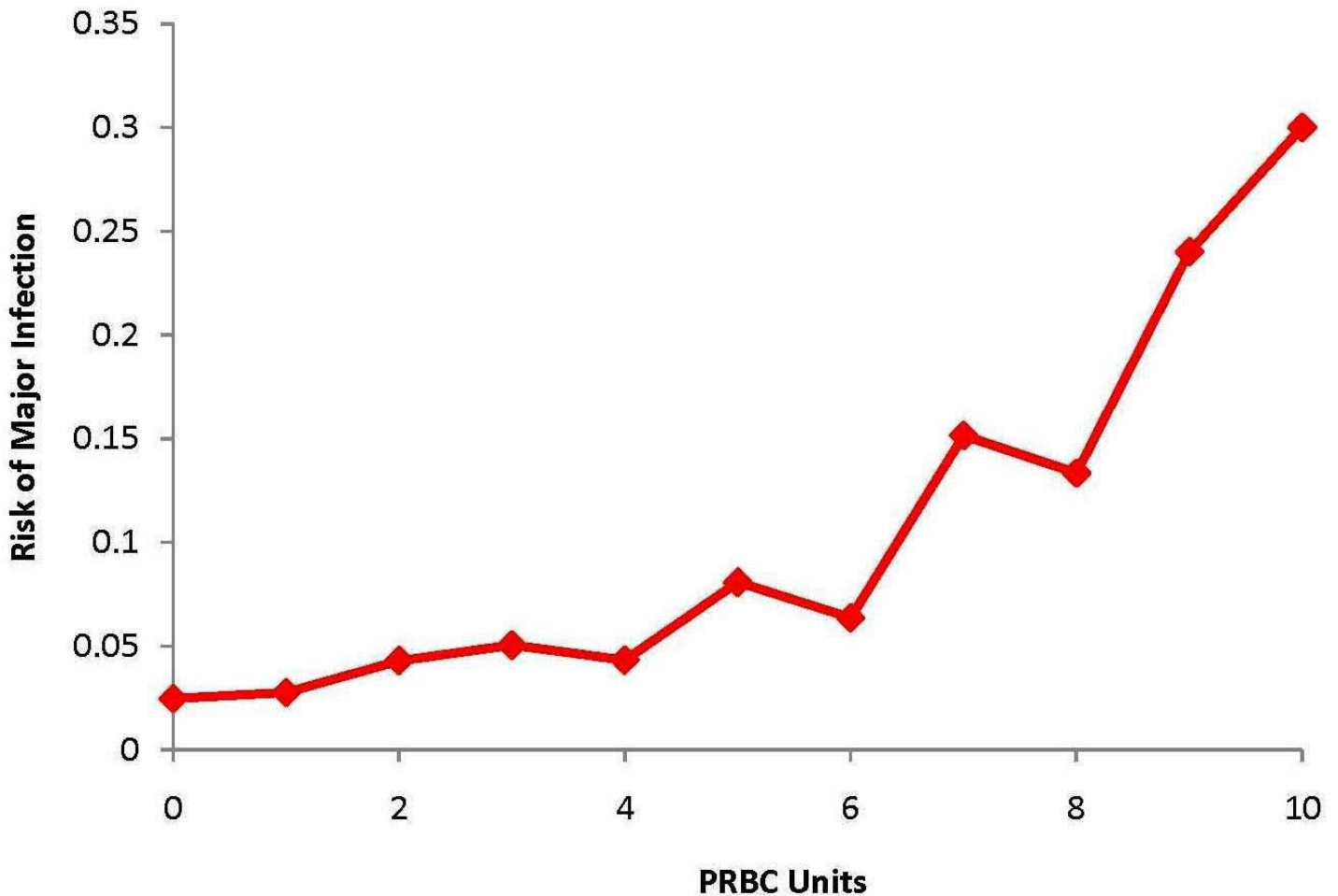
Conclusions: PRBCs are independently associated with increased risk of major infection after surgery. Efforts to reduce PRBC transfusions may significantly reduce the incidence of major post-operative infections.

Table 1 continued on next page

Table 1: Multivariable logistic regression of risk factors for post-operative infection

Risk factor	Odds Ratio	95% Confidence Interval
Packed red blood cells (per 1 unit)	1.27	1.20 . 1.33
Platelets	0.65 *	0.45 - 0.92
Bypass time (per 15 minutes)	1.06	1.03 . 1.10
CHF	1.5	1.13 . 2.00
COPD (severe)	2.1	1.07 . 4.12
Pre-op Creatinine .1.3 mg/dL	1.64	1.22 . 2.21
Pre-op WBC (.11x10 ³ mL)	1.83	1.18 . 2.83
Pre-op Corticosteroids	1.85	1.08 . 3.17

* Decreased risk of infection



G. Ailawadi¹, J. Alexander², A. Iribarne³, M. Parides³, T. B. Ferguson⁴, H. Chang³, E. Moquete³, K. Gahring¹, V. Thouranis⁵, Y. J. Woo⁶, S. Robichaud⁷, J. J. DeRose⁸, A. M. Gillinov⁹, A. O'Neal⁴, W. C. Taddei-Peters¹⁰, M. Miller¹⁰, T. J. Gardner¹¹, A. Gelijns³, L. P. Perrault⁷

¹University of Virginia, Charlottesville, VA, ²Duke University Medical Center, Durham, NC, ³Mount Sinai School of Medicine, New York, NY, ⁴East Carolina Heart Institute at ECU, Greenville, NC, ⁵Emory University, Atlanta, GA, ⁶University of Pennsylvania Medical Center, Philadelphia, PA, ⁷Montreal Heart Institute, Montreal, Canada, ⁸Montefiore Medical Center, Albert-Einstein College of Medicine, New York, NY, ⁹The Cleveland Clinic Foundation, Cleveland, OH, ¹⁰National Heart, Lung, and Blood Institute, Bethesda, MD, ¹¹Christiana Care Health System, Wilmington, DE

Purpose: The causes and prevalence of pneumonia (PNA) after cardiac surgery remain poorly defined. The goal of this study was to prospectively examine the frequency and risk factors, including process of care (POC) measures, for post-operative PNA.

Methods: 5,184 adult cardiac surgery patients were prospectively enrolled in a cohort study in 10 centers to assess major/minor infections based on CDC/NHSN definitions. All infections were adjudicated by an independent committee of ID experts. Multivariable logistic regression and Cox modeling were used to assess the independent association of baseline characteristics and management practices on the development of PNA within 60±5 days of surgery, time to infection, LOS, and mortality.

Results: Pneumonia was the most common major infection, occurring in 2.4% (n=123) of enrolled patients. The mean age of the study population was 64.4±13.2 and 33% were women. The two most common procedures were isolated CABG (31%; n=1,597) and isolated valve (30%; n=1,549), with a median bypass time of 105 minutes. The median time to extubation was 0.62 days. The mean and median time to development of PNA was 14.3 and 8 days, respectively, with 68% of events occurring during the index hospitalization. Significant baseline and POC predictors of PNA are summarized in Table 1. There was no variation among sites in use of head elevation, nasopharyngeal decontamination, and aspiration of secretions, which eliminated them from the model. Adjusting for risk of infection, the risk of death was 9.4 times higher, and the risk of an additional hospitalization day was 2.4 times higher for patients with PNA.

Conclusions: Pneumonia was the most prevalent infection following cardiac surgery, with a significant impact on mortality and LOS. Adjusting for baseline risk, various POC measures significantly affected PNA. The identification of these practices should guide national quality improvement initiatives.

Table 1: Multivariable logistic regression of risk factors for post-operative pneumonia

Risk factor	Odds Ratio	95% Confidence Interval
Baseline & operative characteristics		
Surgery time (hours)	1.35	1.22 – 1.49
Creatinine ≥1.3 mg/dL	1.69	1.13 – 2.52
Corticosteroids	2.06	1.02 – 4.13
COPD (mild – moderate)	1.67	1.05 – 2.66
COPD (severe)	4.34	2.12 – 8.89
WBC (≥11x10 ³ mL)	1.92	1.07 – 3.44
CHF	1.87	1.27 – 2.74
Process of care		
Post-op antibiotics < 24 hours	0.46*	0.23 – 0.93
Post-op antibiotics 24 – 48 hours	0.30*	0.14 – 0.65
Post-op antibiotics > 48 hours	1.19	0.57 – 2.48
Post-operative dialysis	2.17	1.03 – 4.58
Nasogastric tube	2.13	1.26 – 3.61
Packed red blood cells (per 1 unit)	1.12	1.05 – 1.20
Prolonged ventilation (> 72 hours)	3.57	2.18 – 5.85

*Decreased risk of infection

