Holena, D.N., Netzer, G., Localio, R., Gallop, R.J., Bellamy, S.L., Meyer, N.J., Shashaty, M.G.S., Lanken, P.N., Kaplan, S., Reilly, P.M., Christie, J.D.

The association of early transfusion with acute lung injury in patients with severe injury

Abstract
BACKGROUND: Packed red blood cell (PRBC) transfusion is associated with acute lung injury (ALI) development after trauma, but this risk may not be constant through time after trauma. We hypothesized that the relationship between PRBC delivery and ALI risk varies through time after injury. METHODS: Data were collected prospectively from 1999 to 2006. Inclusion criteria include the following: older than 13 years, surgical intensive care unit admission, and Injury Severity Score of 16 or greater. Exclusion criteria included discharge/death within 24 hours of admission. Patients were followed up prospectively for ALI development for 5 days after trauma. Discrete time models were fit to test the association of timing of PRBC delivery with the development of ALI while controlling for patient demographics, resuscitation variables, Injury Severity Score, and Acute Physiology and Chronic Health Evaluation III scores.

RESULTS: At total of 602 patients were included. Median age was 33 years, 77% were male, and 50% were African American. Using a discrete time-survival model, the relation between transfusion and ALI development was found to vary by transfusion time window (p < 0.0001). The major effect of PRBC delivery on ALI risk occurred in the first 24 hours after trauma; this finding persisted in multivariable modeling (adjusted odds ratio, 1.07 per unit; 95% confidence interval, 1.02-1.11, p < 0.001). Cumulative incidence of ALI approached 50% in patients receiving 6 U of PRBC or more in the first 24 hours. CONCLUSION: The association between PRBC transfusion and ALI development in patients with trauma is time dependent, with PRBC delivery in the first 24 hours after injury driving the overall relation. Each PRBC unit during this period increases odds of subsequent ALI development by 7%. LEVEL OF EVIDENCE: Prognostic/epidemiologic study, level II. © 2012 Lippincott Williams & Wilkins.

Author Keywords
Acute lung injury; time dependency; transfusion; trauma

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