Transfusion and pneumonia in the trauma intensive care unit: an examination of the temporal relationship.

BACKGROUND: Transfusion has been demonstrated to be associated with pneumonia in injured patients, and blood of older storage age may potentiate this morbidity. It remains unclear, however, whether this association is causal, as prior studies have not accounted for prepneumonia versus postpneumonia transfusion. We sought to evaluate the temporal relationship between transfusion and pneumonia and the influence of blood age on this relationship.

METHODS: Admissions to a Level I trauma center between July 2004 and October 2007 with the following characteristics were selected for inclusion: overall length of stay of > or = 4 days; intensive care unit length of stay of > or = 1 day; and > or = 1 ventilator days. Date(s) of transfusion and blood storage age defined as "old" > or = 14 days and "young" < 14 days were obtained. Pneumonia was diagnosed by bronchoalveolar lavage (> 10^5 colonies/mL). Risk ratios (RR) and 95% confidence intervals (CIs) were calculated for the association between pneumonia and both date (in relation to pneumonia) and age of blood transfused, adjusted for age, gender, injury severity, mechanism of injury, ventilator days, and transfusion volume.

RESULTS: A total of 1,615 patients met study criteria. Adjusted RR (CI) for the association between pneumonia and receipt of blood at any time was 1.99 (1.39-2.86). However, when
postpneumonia transfusions were disregarded, no association was observed (RR 1.33; CI 0.98-1.80). Analysis by blood age, however, demonstrated that prepneumonia transfusion of exclusively older blood was significantly associated with an increased risk of pneumonia (adjusted RR 1.42; CI 1.01-2.02), whereas transfusion of exclusively younger units (adjusted RR 1.02; CI 0.62-1.67) or mixed units (adjusted RR 1.35; CI 0.98-1.87) were not.

**CONCLUSIONS:** Prior reports of an association between transfusion and pneumonia may reflect transfusions received after pneumonia rather than etiologically relevant transfusions received before the onset of pneumonia. Transfusion of exclusively older blood, however, increased the risk of pneumonia, further suggesting the importance of blood age with respect to outcomes in trauma patients.

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