

Transfusion of Packed Red Blood Cells in Hip Fracture Patients: Is There an Optimal Threshold?

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Purpose: The purpose of this study is to identify optimal threshold hemoglobin and hematocrit lab values to begin transfusions of packed red blood cells (PRBCs) to hip fracture patients.

Methods: A trauma database from 1 academic medical center was queried for hip fracture patients (OTA / AO 31A / B, 32A / B / C or periprosthetic) from October 2014 to February 2020. Demographic, clinical, quality, and cost data were obtained for each patient. A validated trauma risk score was calculated for each patient from age, comorbidity, and acute injury status variables. Patients receiving an allogenic transfusion of PRBCs were stratified to octiles based on last hematocrit or hemoglobin value prior to first transfusion. Logistic regression with independent variables of trauma risk score, anticoagulant use, and hemoglobin or hematocrit octile were performed to determine correlates of "good outcomes". "Good outcomes" were defined as admissions satisfying: (1) no major complications, (2) length of stay below top tertile, (3) cost below median, (4) no mortality within 30 days, and (5) no readmission within 30 days. Odds ratios (ORs) for "good outcomes" were calculated for each hemoglobin and hematocrit octile controlling for trauma risk score and anticoagulant use.

Results: 1496 hip fracture patients were identified with 598 (40%) transfused PRBCs. Patients first transfused at hemoglobin values from 7.55 to 7.85 g/dL (OR = 2.70 [95% confidence interval (CI) = 1.03-7.25], P = 0.043) or hematocrit values from 22.7% to 23.8% (OR = 2.63 [95% CI = 1.03-7.15], P = 0.048) had higher odds to achieve good outcomes relative to patients first transfused at the lowest octile of hemoglobin values from 4.85 to 6.85 g/dL or hematocrit values from 15.3% to 20.4%. No other lab value thresholds to begin transfusion demonstrated higher odds of achieving good outcomes.

Conclusion: Patients receiving first PRBC transfusions at hemoglobin values from 7.55 to 7.85 g/dL or hematocrit values from 22.7% to 23.8% have significantly better odds of achieving good outcomes relative to other thresholds to begin transfusing PRBCs to hip fracture patients. Further investigation of hemoglobin and hematocrit lab values to begin PRBC transfusion are warranted to guide surgeons wishing to more frequently achieve good outcomes in patients with hip fractures following recent studies suggesting that transfusion be guided by hemoglobin and hematocrit lab values rather than timing relative to surgery.