

## 2<sup>nd</sup> International Conference on **Hematology & Blood Disorders**

September 29-October 01, 2014 DoubleTree by Hilton Baltimore-BWI Airport, USA

### Risk associated with red blood cell transfusion in cranial surgery

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**Introduction:** Transfusion of red blood cells (RBC) is associated with less optimal postoperative outcomes in patients who undergo a variety of surgeries. However, the effect of RBC transfusion on patients who undergo craniotomy, electively or emergently, is not well described. We assessed the impact of intra- and postoperative RBC transfusion on postoperative morbidity and mortality in cranial surgery.

**Methods:** 8,924 adult patients who underwent craniotomy were identified in the 2006-2011 American College of Surgeons (ACS) National Surgical Quality Improvement Program (NSQIP) database. Patients undergoing a biopsy, radiosurgery, or outpatient surgery, were excluded. Propensity scores were calculated for demographic variables, comorbidities and preoperative laboratory values. Patients who had received RBC transfusion were matched to those who did not, by propensity score, preoperative hematocrit level, and by length of surgery, as an indirect measure of potential intraoperative blood loss. Logistic regression was used to predict adverse postoperative outcomes.

**Results:** 625 (7%) patients received transfusion with one or more units of packed RBCs. Upon matching, preoperative hematocrit, length of surgery, and emergency status were no longer different between transfused and non-transfused patients. RBC Transfusion was associated with prolonged length of hospitalization (OR 1.6, 95% CI 1.2-2.2), postoperative complications (OR 2.8, 95% CI 2.0-3.8), 30-day return to operation room (OR 2.0, 95% CI 1.3-3.2) and 30-day mortality (OR 4.3, 95% CI 2.4-7.6).

**Conclusions:** RBC transfusion is associated with substantive postoperative morbidity and mortality in patients undergoing both elective and emergency craniotomy. These results suggest judicious use of transfusion in cranial surgery, consideration of alternative means of blood conservation, or pre-operative restorative strategies in patients undergoing elective surgery, when possible.

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