

The ASA Score as a Predictive Tool for Perioperative Transfusion in Trauma

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Purpose: The number of blood transfusion units required during orthopaedic trauma surgery is very difficult to predict. Identifying patient-specific risk factors that predict the amount of blood units required during surgery can help ensure an adequate supply of blood while reducing wastage. In this study, we determined whether individual patient factors, including comorbid conditions, are correlated to blood transfusion requirements during orthopaedic trauma surgery and can be utilized in current maximum blood-ordering schedules (MSBOS).

Methods: All patients who presented to a Level I trauma center with an orthopaedic trauma injury from January 1, 2005 to December 31, 2010 were identified using CPT code searches. A total of 7338 patients were identified. Medical records were reviewed to gather demographic information such as age, gender, race, American Society of Anesthesiologists (ASA) score and type of fracture. Perioperative data such as red blood cell (RBC) transfusion and 21 individual comorbidities (ie, presence of heart disease or diabetes, substance abuse, etc) were gathered from the institution's operative warehouse. Patients without isolated fractures (ie, no other injuries other than fracture) and patients without complete medical records were eliminated from analysis. A stepwise linear regression was conducted to identify significant predictive associations between individual patient factors and blood transfusion. Results were further stratified by upper extremity, lower extremity, and pelvic fractures.

Results: A total of 1819 patients with isolated fractures met inclusion criteria for analysis. 485 patients had pelvis, acetabular, or hip fractures; 1162 patients had lower extremity fractures; and 172 had upper extremity fractures. After running a stepwise linear regression with basic demographics and 21 individual comorbidities, ASA score was found to have a significant relationship ($P < 0.001$) with blood transfusion after controlling for age, gender, race, and type of fracture. Compared to patients with an ASA score of 1, patients with an ASA score of 2 were 2.45 times as likely to receive a RBC transfusion, patients with an ASA score of 3 were 6.00 times as likely to receive RBCs, and patients with an ASA score of 4 were 14.71 times as likely to receive a RBC transfusion. The percentage of patients receiving transfusion increased significantly as ASA score increased (figure). A significant association was also found when grouping by lower extremity, upper extremity, and pelvic fractures ($P < 0.001$).

Conclusion: Our results demonstrate that patients' ASA scores are strong predictors of the number of blood units required for transfusion during orthopaedic trauma surgery even after controlling for type of surgery. The inclusion of ASA scores in institution-specific blood-ordering procedures may minimize wastage due to outdated while ensuring adequate cross-matching of blood units among the orthopaedic trauma population.

- The FDA has not cleared this drug and/or medical device for the use described in this presentation (i.e., the drug or medical device is being discussed for an "off label" use). For full information, refer to page 600.

