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# Blood transfusions in craniotomy for tumor resection: Incidence, risk factors, and outcomes

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## Abstract

**Background:** Blood transfusions (BT) are often needed in neurosurgical procedures, especially craniotomies for tumor resections, due to risks of anemia, ischemic brain injury, and hemorrhage. However, BT may increase the risk of perioperative complications. This study aimed to determine the incidence, associated factors, and outcomes of BT in patients undergoing craniotomy for intracranial tumor resection.

**Methods:** A retrospective cohort study was conducted using data from the National Surgical Quality Improvement Program (NSQIP). We included adult patients who underwent elective craniotomy for tumor resections from 2005 to 2021. Multivariable logistic regression was used to identify factors associated with BT as well as complications associated with receipt of BT within 30 days of surgery.

**Results:** Among 40,883 patients, 3.65 % required BT. Significant factors associated with BT included age > 60 years (OR 1.28 [95 % CI 1.03-1.60]), female sex (1.41 [1.22-1.62]), underweight body mass index (BMI) (1.81 [1.27-2.57]), American Society of Anesthesiologists (ASA) class 3-4 (1.64 [1.39-1.95]), diabetes (1.23 [1.02-1.48]), chronic obstructive pulmonary disease (COPD) (1.64 [1.20-2.23]), preoperative anemia (2.84 [2.49-3.26]), bleeding disorders (2.37 [1.63-3.46]), preoperative transfusion (16.96 [8.09-35.56]), and meningioma indication (1.28 [1.03-1.60]). Patients with obesity were less likely to require BT (0.82 [0.69-0.98]). Patients requiring BT had higher odds of the following complications: prolonged ventilator use (OR 2.37 [1.60-3.50]), urinary tract infection (1.76 [1.03-3.00]), unplanned reoperation (1.49 [1.14-1.93]), prolonged length of stay (1.88 [1.60-2.21]), major morbidity (1.79 [1.32-2.44]), and all-cause mortality (1.34 [1.16-1.55]).

**Conclusion:** In craniotomy patients for tumor resection, factors associated with BT include age > 60, female sex, underweight BMI, ASA class 3-4, COPD, anemia, bleeding disorders, preoperative transfusion, and meningioma. BT is further associated with higher risks of major morbidity, mortality, longer hospital stays, and unplanned reoperations following surgery.

**Keywords:** Blood transfusion; Brain Tumor Resection; Craniotomy.

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