

# Predictors of Surgical Site Infection After Non-Emergent Craniotomy: A Nationwide Readmission Database Analysis

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## Introduction

Introduction: Surgical site infections after craniotomy harm patients and increase healthcare expenditures. Reported infection rates are heterogeneous and few predictors of infection have been identified. We sought to identify risk factors associated with readmission for surgical site infections after non-emergent craniotomy.

## Methods

Methods: The 2010-2014 cohorts of the Nationwide Readmission Database were analyzed. Index admissions were defined as adults who underwent non-urgent craniotomy with at least 30 days of follow-up. Surgical site infection was determined by ICD-9CM diagnosis code. The rate of readmission was determined using de-identified linkage numbers permitting the tracking of patient readmissions at any hospital within the state of their index admission. Patient, hospital-level, and admission factors associated with surgical site infections were explored in multivariable analysis.

## Results

Results: Of 93,920 index admissions, 2.2% were readmitted for surgical site infections within 30 days and 0.9% required an operation. The median time to readmission was 13 days. The total cost of these readmissions was \$206,519,262. 3.3% of patients died during their readmission. Patients with diabetes mellitus had increased odds of readmission (OR 1.29, 1.14-1.46). Patients undergoing craniotomy for benign (OR 1.93, 1.66-2.24) and malignant (OR 1.46, 1.26-1.68) tumors were more likely to be readmitted than patients operated for cerebrovascular disease or epilepsy. Patients who initially received a ventriculostomy had greater odds of readmission (OR 1.33, 1.07-1.67). Patients with Medicaid had increased odds of readmission (OR 1.29, 1.13-1.47) compared to those privately insured.

## Conclusions

Conclusions: Although readmissions for infection after craniotomy are rare, readmissions generate over \$41 million in annual costs and carry a substantial risk of in-hospital death. Patient factors, such as tumor surgery, the use of a ventricular drain, and diabetes raise the risk of infection. Patients with Medicaid and concomitant lower household income have increased infection rates. Identifying these factors may assist quality improvement efforts in neurosurgery.

## Learning Objectives

Understand that adult patients undergoing non-emergent craniotomy are more likely to develop a surgical site infection in the presence of an external ventricular drain.

Understand that patients who receive craniotomies for tumors are more likely to be readmitted for infection compared to those undergoing craniotomies for other purposes.

Identify insurance type as a predictor of 30-day readmission for surgical site infection in adult patients undergoing non-emergent craniotomy.