

Identification of Preoperative and Intraoperative Risk Factors for Short-Term Complications in Patients > 65 Years of Age Undergoing Elective Craniotomy

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Introduction

The world's population continues to grow at an unprecedented rate. Today, 8.5% of people worldwide (617 million) are 65 years or older. This is projected to jump to nearly 17% of the world's population by 2050 (1.6 billion). The population of the United States is also getting older. The elderly are projected to comprise 20.6% of the US population by 2030, compared to 14.5% in 2014. Neurosurgeons report an increase in patient age among their patients. With more patients over the age of 65 undergoing elective craniotomies, it is essential to identify risk factors within this demographic to safely choose surgical candidates in hopes of limiting perioperative complications and improving outcomes.

Methods

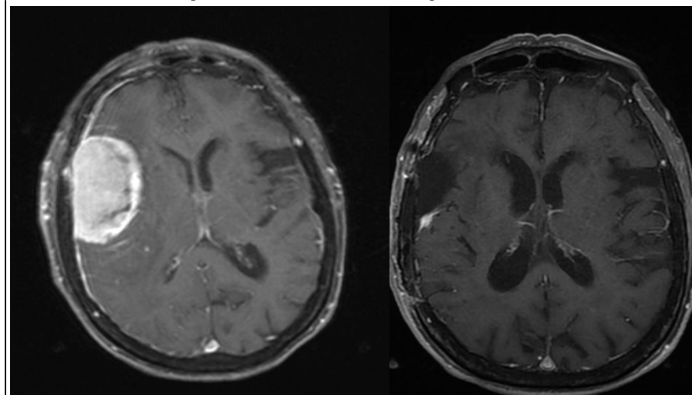
A retrospective review was conducted to identify all patients \geq 65 years of age who underwent an elective craniotomy at a single academic medical center from 2007-2015 to identify risk factors for 30-day morbidity/mortality. Key preoperative variables included age, comorbidities, and functional status based on the Karnofsky Performance Status (KPS) and modified Rankin Scale (mRS). Outcome variables included long-term care (LTC) complications, neurologic complications, systemic/infectious complications, length of stay (LOS), functional outcomes, and mortality.

Multivariable Analysis

Long-term care complications		
Factor	Adjusted odds ratio (95% CI)	p Value
Congestive Heart Failure	8.82 (2.28-34.12)	.002
Smoking History	6.04 (1.85-19.71)	.003
Neurologic complications		
Anesthesia Time (Units=30 minutes)	1.12 (1.03-1.22)	.01
Estimated Blood Loss (Units=50 cc)	1.03 (0.92-1.16)	.56
Systemic/Infectious complications		
Anesthesia Time (Units=30 minutes)	1.04 (0.96-1.12)	.35
Estimated Blood Loss (Units=50 cc)	1.12 (1.02-1.23)	.02

Assessing preoperative and postoperative risk factors for LTC, neurologic, and systemic/infectious complications

Preoperative and Postoperative MRI



91 year old female s/p Right frontal meningioma resection

Results

286 patients \geq 65 years underwent elective craniotomy at Loyola University Medical Center over 8 years. The mean age of the patients was 71.8 years (range: 65-92) and 160 (56%) were female. 223 patients (78%) had a craniotomy for tumor resection, while 63 (22%) of the craniotomies were for non-oncologic indications, including microvascular decompression (MVD) for trigeminal neuralgia (n=40), subdural hematoma (n=8), aneurysm (n=4) and 11 other miscellaneous non-tumor cases. 72 patients had a preoperative neurologic deficit and 95 patients had a systemic morbidity prior to surgery. Postoperative neurological and systemic morbidity was 14% and 23%, respectfully. 7% of patients developed a LTC complication and 5 patients (1.7%) died. Worse preoperative scores on both the KPS and mRS scale predicted increased LOS and mortality ($p < 0.05$). Univariable and multivariable analyses showed patients with preoperative motor deficit, altered mental status, congestive heart failure, smoking history, and chronic steroid use were all more likely to suffer a LTC complication, while increased anesthesia time and estimated blood loss increased risk for LTC, neurologic, and systemic/infectious complications.

Conclusions

This study identifies factors that predict perioperative complications for patients \geq 65 years of age undergoing an elective craniotomy, particularly congestive heart failure, smoking history, chronic steroid use, anesthesia time, and estimated blood loss. Age alone should not preclude elective craniotomy.