

## Effect of Smoking on the Perioperative Outcomes of Craniotomy for Intracranial Aneurysms

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### Introduction

Although smoking increases the risk of formation of intracranial aneurysms (ICA), rupture and vasospasm, the impact of smoking on the outcomes of craniotomy for ICA is unknown. The aim of this study was to assess the association between current and prior history of smoking and 30-day outcomes for patients undergoing craniotomy for ruptured and unruptured ICA.

### Methods

We identified 732 adult patients in the 2006-2012 American College of Surgeons National Surgical Quality Improvement Program (NSQIP), a prospectively-collected, multi-institutional, clinical database with established validity and reproducibility. Pre- and intraoperative characteristics and 30-day outcomes were stratified according to smoking status. We used standardized differences to identify variables that were unbalanced between smoking categories and used these to build propensity scores. We used 1:1 Greedy matching on propensity score to compare current vs never and prior vs never smokers. Regular and conditional logistic regression were used to predict adverse postoperative outcomes in the unmatched and matched cohorts respectively.

### Comparison of smoking status for adverse outcomes after surgery for intracranial aneurysm

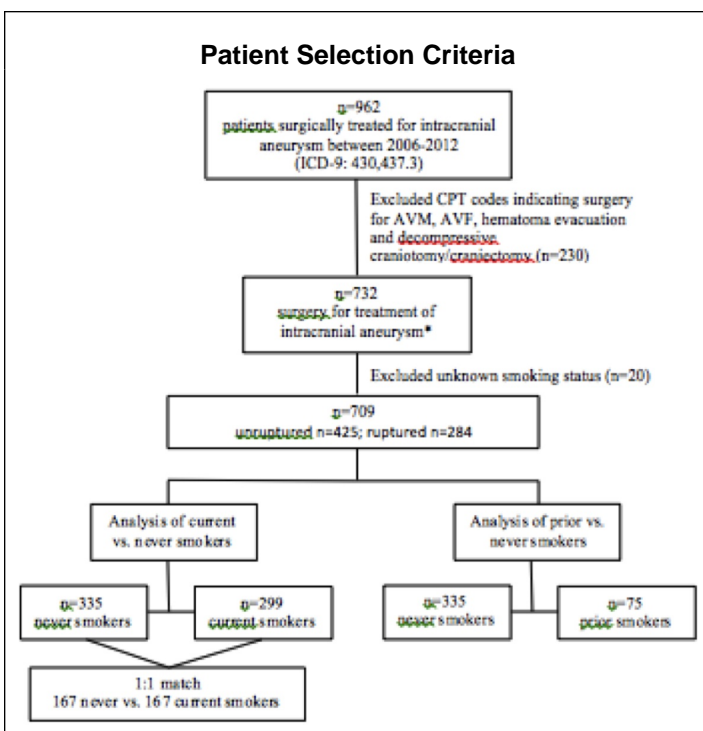
Adverse Outcomes	Odds Ratio (95% CI)		
	Never vs Current smokers		Never vs Prior smokers
	General cohort†	Matched cohort§	General cohort†
Prolonged LOS (>16 days)	<b>0.6 (0.4-0.8)</b>	0.7 (0.4-1.1)	<b>0.4 (0.2-0.8)</b>
Minor complications	<b>0.4 (0.2-0.6)</b>	<b>0.4 (0.2-0.8)</b>	0.9 (0.4-1.9)
Major complications	<b>0.6 (0.5-0.9)</b>	0.7 (0.4-1.2)	0.8 (0.4-1.3)
Any complications	<b>0.6 (0.4-0.9)</b>	0.7 (0.4-1.1)	0.7 (0.4-1.3)
30-day return to the OR	<b>0.4 (0.2-0.7)</b>	<b>0.3 (0.1-0.9)</b>	1.0 (0.5-2.0)
Required continued care	<b>0.5 (0.3-0.9)</b>	0.5 (0.2-1.5)	0.5 (0.2-1.2)
Readmission	1.6 (0.6-3.9)	n/a	2.7 (0.8-9.4)
30-day mortality	0.6 (0.3-1.1)	1.1 (0.4-2.9)	0.5 (0.1-1.7)

### Conclusions

Prior studies have shown that smoking increases the risk of ICA formation, rupture and vasospasm. However, we found no association between smoking and adverse outcomes for patients undergoing craniotomy for ruptured and unruptured intracranial aneurysms.

Our study has limitations. This is a sample of patients that were operated on, so clearly there is selection bias, and there are some known factors that affect ICA outcomes for which we do not have data including size and location of the aneurysm.

### Patient Selection Criteria



### Results

	Smoking status		
	Never (n= 335)	Current (n=299)	Prior (n=75)
Age, mean ± SD, years	58 ± 13	54 ± 10	61 ± 10
Caucasian	57.9%	68.8%	78.6%
Admitted from home	63.6%	77.9%	84.0%
>2 drinks per day	1.9%	9.6%	2.7%
Preoperative anemia	38.2%	27.4%	30.7%
Intra- and postoperative transfusion	18.2%	9.4%	16.0%
Emergency	33.4%	23.1%	16.0%
Ruptured aneurysm	47.5%	36.1%	22.7%

Unbalanced Preoperative Factors Compared Across Smoking Categories, Prior to Matching