Postoperative Complications Following Deep Brain Stimulation Surgery: Evidence from the National Surgical Quality Improvement Program (NSQIP)

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Introduction

-Postoperative complications and risk factors after deep brain stimulation (DBS) surgery have been reported in single institution series and clinical trials

-Reporting of complications from a national sample can provide more applicable statistics for routine care

-Our objective was to use the American College of Surgeons National Surgical Quality Improvement Program (ACS-NSQIP) to determine the prevalence of and risk factors for complications following DBS surgery

Methods

-Data on patients who underwent DBS surgery performed by neurosurgeons (CPT codes: 61850, 61860, 61863, 61864, 61867, 61868, 61870, 61875) was obtained from the 2005-2015 ACS-NSQIP

-Cases for revision or removal of intracranial neurostimulator electrodes were excluded

-The prevalence of postoperative complications was determined

-Multivariable logistic regression modeling was used to identify demographic, comorbid, and perioperative characteristics associated with any 30-day complication

Figure 1. Prevalence of postoperative complications

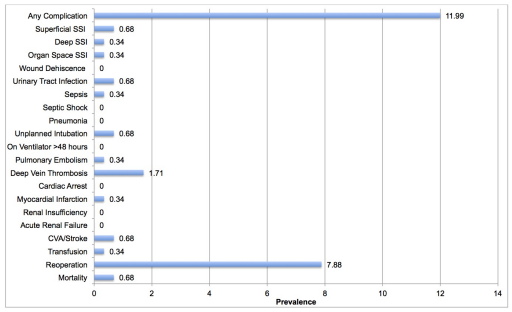

Table 1. Multivariate model for any complication

Variable		Any Complication OR	95% CI	P-value
Age				
	< 65	1.00	Reference	
	≥ 65	1.02	0.44-2.35	0.96
Female Sex		1.20	0.53-2.71	0.67
Race				
	White	1.00	Reference	
	Other	0.41	0.09-1.94	0.26
Body Mass Index				
	Normal-Underweight	1.00	Reference	
	Overweight	0.72	0.29-1.82	0.49
	Obese	0.45	0.17-1.24	0.12
Tobacco Use		5.48	1.88-15.91	0.002
Diabetes		0.71	0.18-2.79	0.62
Dyspnea		1.50	0.24-9.49	0.66
Dependent Functional Status		1.10	0.27-4.53	0.89
COPD		0.42	0.04-4.59	0.47
Hypertension		1.36	0.59-3.17	0.47
Steroid Use		2.54	0.22-28.88	0.45
Bleeding Disorder		0.71	0.07-6.92	0.77
ASA Classification				
	I-II	1.00	Reference	
	III-V	3.90	1.49-10.22	0.006
Duration of Surgery (hrs)		1.01	0.82-1.23	0.95
AUC			0.7039	

Results

-A total of 292 cases of DBS surgery were identified

-Of these, 35 (11.99%) cases had at least one complication and 2 (0.68%) patients died

-The two most common postoperative complications were:

- Reoperation (7.88%)
- Deep vein thrombosis (DVT; 1.71%)

-Multivariable logistic regression analysis demonstrated that predictors of at least one complication included:

- Tobacco use (OR: 5.48; 95% CI: 1.88-15.91; p=0.002)
- American Society of Anesthesiologists (ASA) class III-IV (OR: 3.90; 95% CI: 1.49-10.22; p=0.006)

-The multivariable model had an area under the curve value of 0.70

Conclusions

-The overall prevalence of any complication within 30 days of DBS surgery is relatively low, and most commonly due to reoperation (7.88%)

-Risk factors for any complication were tobacco use and higher ASA classification

-These risk factors have not been previously identified for this patient population and require further investigation in additional studies using a larger sample of patients undergoing DBS surgery