



Lab resource

Impact of smoking on postoperative complications after anterior cervical discectomy and fusion [☆]Taylor E. Purvis ^a, Haroldo J. Rodriguez ^a, A. Karim Ahmed ^a, Christine Boone ^a, Rafael De la Garza-Ramos ^{a,b}, Benjamin D. Elder ^a, C. Rory Goodwin ^a, Daniel M. Sciubba ^{a,*}^a Department of Neurosurgery, Johns Hopkins University School of Medicine, Baltimore, MD, USA^b Department of Neurological Surgery, Montefiore Medical Center/Albert Einstein College of Medicine, New York, NY, USA

ARTICLE INFO

Article history:

Received 19 October 2016

Accepted 27 December 2016

Keywords:

Smoking

NSQIP

ACDF

Cervical

Spine

Outcomes

ABSTRACT

The relationship between smoking and the risk of postoperative complications among anterior cervical discectomy and fusion (ACDF) patients remains uncertain. We compared the postoperative complication rates following ACDF surgery among non-smokers, current smokers, and ever-smokers. Baseline and outcome data were obtained from the 2005– to 2014 American College of Surgeons National Surgical Quality Improvement Program (ACS-NSQIP) database for patients over the age of 18 who underwent non-emergent ACDF surgery. Information on current smoking and ever-smoking status was extracted. Outcomes included development of at least one complication, development of a major complication, in-hospital mortality, and length of stay. ACDF patients were either current smokers (7847, 30.3%) or not current smokers (18,022, 69.7%); 33.0% of all patients ($n = 8542$) had ever smoked. Current smoking status was not associated with increased odds of any one complication ($P = 0.584$) or any major complication ($P = 0.138$). In addition, using the number of pack-years as the primary independent variable, multivariate logistic regression analysis revealed that the number of pack-years was not significantly associated with greater odds of developing any one complication ($P = 0.276$) or any major complication ($P = 0.334$). However, ever-smoker status did present significantly higher odds of any major complication (OR, 1.333; 95% CI 1.007–1.764; $P = 0.044$) than for non-smokers. These results suggest that any patient with a prior smoking history should be considered a higher risk surgical candidate when attempting ACDF.

© 2016 Elsevier Ltd. All rights reserved.

1. Introduction

Anterior cervical discectomy and fusion (ACDF) is a widely practiced surgical procedure used to remove degenerative or herniated disks from the cervical spine. Although the anterior portion of the neck contains vital structures, this approach facilitates improved visualization and complete disk removal as opposed to a posterior approach [1]. However, the ACDF approach is associated with complications including recurrent laryngeal nerve damage, [2] vocal cord paralysis, [3] Zenker's diverticulum, [4] Horner's syndrome, esophageal perforation, [5] dysphagia, [6] failed fusion and instrumentation failure [7].

With these risks in mind, spine surgeons have sought to identify risk factors for poor outcomes, such as tobacco smoking, for patients undergoing ACDF. Smoking substantially increases the surgical risks already present during spine operations [8]. However, there is conflicting information about the relationship between smoking and risk of complications following ACDF. Several studies focusing on spinal procedures other than ACDF found no association between smoking and increased perioperative complication rates [8–10]. In contrast, Lau et al. found that among 160 ACDF patients, smoking was an independent risk factor for increased complication rates and longer lengths of stay [11].

The American College of Surgeons National Surgical Quality Improvement Program (ACS-NSQIP) database makes it possible to identify ACDF surgical outcomes within a large, nationally representative sample. To our knowledge, no studies have been performed among ACDF patients using a national database to evaluate the association between preoperative smoking status and perioperative complications. This study examines the postoperative complications

[☆] The manuscript submitted does not contain information about the medical device (s)/drug(s). No funds were received in support of this work. The authors have no conflicts of interest.

* Corresponding author at: 600 North Wolfe Street, Meyer 5-185, Baltimore, MD 21287, USA. Fax: +1 410 502 5768.

E-mail address: Dsciubba1@jhmi.edu (D.M. Sciubba).

following ACDF surgery among non-smokers and compares them to complication rates among smokers.

2. Methods

2.1. Data source

The ACS-NSQIP is a nationwide database that contains information on inpatient and outpatient surgical procedures in U.S. hospitals. This information is then risk-adjusted to permit equitable comparison among hospitals nationwide [12]. ACS-NSQIP has expanded to include 445 participating hospitals since its creation in 2004 [13]. As of 2014, the database contains more than 150 variables for each unique surgical procedure entered [14]. This study was approved by the Institutional Review Board.

2.2. Patients

Patients over the age of 18 undergoing ACDF, excluding emergency cases, from 2005 to 2014 were identified using American Medical Association Current Procedural Terminology (CPT) codes (Table 1) [15].

2.3. Collected data

The effect of smoking on overall morbidity was assessed. As ACS-NSQIP codes all patients over the age of 90 as “90+”, these individuals were assigned an age of 90. The Charlson Comorbidity Index (CCI) score was calculated from comorbidity information provided in the ACS-NSQIP database using the methods of Bohl et al. [16] and Charlson et al. [17].

ACS-NSQIP defines “smokers” as patients who have smoked cigarettes in the year before admission for surgery. Patients who smoke mechanical or electronic cigarettes, cigars, pipes, or chewing tobacco are considered non-smokers. The number of pack-years of smoking (defined as the product of the number of packs of cigarettes smoked daily and the years the patient has smoked) is also recorded for both previous and current smokers.

The primary outcome measure was the development of at least one perioperative complication during the 30 days following surgery. These complications included major complications (mortality, intraoperative events [myocardial infarction or cardiac arrest requiring resuscitation], acute renal failure, ventilator use over 48 h, pulmonary embolism, cerebrovascular accident or stroke, myocardial infarction, cardiac arrest, sepsis, septic shock, coma for over 24 h, and unplanned re-intubation), in-hospital mortality, and length of stay (LOS).

2.4. Statistical analyses

The statistical association of smoking with age, operative time, body mass index (BMI), and LOS was tested using the Mann–Whitney

U test or independent samples *t*-test. The association of smoking with gender, race, ASA class, CCI score, osteotomy status, revision status, number of anterior instrumented levels, transfusion occurrence, and presence of any preoperative co-morbidity was tested using the chi-square test. Logistic regression was used to test the effect of smoking on morbidity, while controlling for the following potential confounding factors: age, gender, race, American Society of Anesthesiologists (ASA) class, CCI score, BMI, osteotomy status, operative time, and LOS. Logistic regression models were repeated to test the effect of number of pack-years on morbidity. Variables with a *P*-value less than 0.1 in univariate analyses were included in the multivariate logistic regression model. Results of logistic regression analysis are presented as odds ratios (OR) with 95% confidence intervals (CI). A *P*-value of less than 0.05 was considered to be statistically significant.

3. Results

3.1. Patient characteristics

A total of 25,869 patients undergoing ACDF were identified (Table 2); 7847 (30.3%) current smokers and 18,022 (69.7%) not currently smoking. Smokers were more likely to be younger (mean [SD], 50.15 [9.91] vs. 54.88 [11.88]; $P < 0.0001$), male ($n = 4602$ [58.7%] vs. $n = 10,249$ [56.9%]; $P = 0.008$) and have a lower BMI (mean [SD], 28.95 [6.38] vs. 30.56 [6.64]; $P < 0.0001$) compared to non-smokers. The proportion of patients in each racial category ($P < 0.0001$) and CCI group ($P < 0.0001$) differed between smokers and non-smokers. A higher proportion of smokers than non-smokers were given an ASA score between 3 and 5 ($n = 3193$ [40.7%] vs. 6887 [38.3%]; $P < 0.0001$). A smaller proportion of smokers than non-smokers underwent osteotomy ($n = 59$ [0.8%] vs. $n = 205$ [1.1%]; $P = 0.005$) and smokers demonstrated shorter LOS (mean [SD], 1.94 [5.13] vs. 2.12 [7.57]; $P < 0.0001$).

3.2. Complications

The impact of smoking status on 30-day outcomes was then assessed (Table 3). Smoking patients were significantly less likely than non-smoking patients to experience any one perioperative complication ($n = 187$ [2.4%] vs. $n = 515$ [2.9%]; $P = 0.031$), including urinary tract infection ($n = 31$, [0.4%] vs. $n = 113$ [0.6%]; $P = 0.021$), pulmonary embolism ($n = 5$, [0.1%] vs. $n = 39$ [0.2%]; $P = 0.006$), and deep vein thrombosis ($n = 11$ [0.1%] vs. $n = 55$ [0.3%]; $P = 0.016$). However, smokers were more likely to experience organ/space SSI ($n = 4$ [0.1%] vs. $n = 2$ [0.0%]; $P = 0.046$). After adjusting for age, gender, race, BMI, ASA class, CCI score, osteotomy status, operative time, and LOS, logistic regression analysis revealed that smoking status was not significantly associated with the occurrence of any one complication (OR, 1.054; 95% CI, 0.874–1.271; $P = 0.584$) or any major complication (OR, 1.233; 95% CI, 0.935–1.627; $P = 0.138$).

Table 1

Current Procedural Terminology (CPT) codes queried for anterior cervical discectomy and fusion (ACDF) and the number of anterior instrumented levels.

Procedure name	CPT code
Anterior interbody fusion, with discectomy and decompression; cervical below C2	22551
Arthrodesis, anterior interbody technique, including minimal discectomy to prepare interspace (other than for decompression); cervical below C2	22554 ^a
Discectomy, anterior, with decompression of spinal cord and/or nerve root(s), including osteophyctomy; cervical, single interspace	63075 ^a
Anterior instrumentation	
2–3 vertebral segments	22845
4–7 vertebral segments	22846
8 or more vertebral segments	22847

^a Prior to 2011, codes 22554 and 63075 were both required to indicate ACDF. Starting in 2011, these two procedure codes were combined into the single 22551 code.

Download English Version:

<https://daneshyari.com/en/article/5629804>

Download Persian Version:

<https://daneshyari.com/article/5629804>

[Daneshyari.com](https://daneshyari.com)