

How Does Preoperative Smoking History Impact Anterior Cervical Discectomy and Fusion Outcomes?

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Introduction

- There is conflicting information about the relationship between smoking and risk of complications following spine surgery.
- To our knowledge, no studies have been performed among anterior cervical discectomy and fusion (ACDF) patients using a national database to evaluate the association between preoperative smoking status and perioperative complications.

Objective:

To examine the postoperative complications following anterior cervical discectomy and fusion (ACDF) surgery among non-smokers and compare them to complication rates among smokers.

Subjects:

A total of 25,869 patients undergoing ACDF were identified; 7,847 (30.3%) current smokers and 18,022 (69.7%) not currently smoking.

Protocol:

- The American College of Surgeons National Surgical Quality Improvement Program (ACS-NSQIP) database was queried for adults who underwent non-emergent ACDF surgery between 2005 and 2014.
- ACS-NSQIP defines “smokers” as patients who have smoked cigarettes in the year before admission for surgery.
- 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.
- Outcomes assessed included in-hospital mortality, development of a major complication, development of at least one complication, and length of hospital stay (LOS).
- Major complications included: mortality, intraoperative events (myocardial infarction or cardiac arrest requiring resuscitation), acute renal failure, ventilator use over 48 hours, pulmonary embolism, cerebrovascular accident or stroke, myocardial infarction, cardiac arrest, sepsis, septic shock, coma for over 24 hours, and unplanned re-intubation.

Results

A total of 25,869 patients undergoing ACDF were identified; 7,847 (30.3%) current smokers, 18,022 (69.7%) not currently smoking, and 8542 (33.0%) ever -smokers.

*Univariate Analysis*

- Fewer smoking patients than non-smoking patients experienced 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, more smokers experienced organ space surgical site infection than did non-smokers (n=4 [0.1%] vs. n=2 [0.0%]; P=0.046).

*Multivariate Analysis*

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).

Pack-Year History

- There were 8542 (33.0%) patients who could be considered “ever-smokers”.
- Multivariate logistic regression analysis demonstrated that an ever-smoker status was not significantly associated with greater odds of developing any one complication (OR, 1.035; 95% CI, 0.858-1.249); P=0.718) compared to non-smokers.
- However, ever-smoker status was significantly associated with a higher risk of any major complication (OR, 1.333; 95% CI 1.007-1.764; P=0.044) than for non-smokers.
- Using the number of pack-years as the primary independent variable, multivariate logistic regression analysis revealed that pack-years were not significantly associated with greater odds of developing any one complication (OR, 0.992; 95% CI, 0.978-1.006; P=0.276) or any major complication (OR, 0.991; 95% CI, 0.972-1.010; P=0.334).

Conclusion

- A current positive smoking status was not significantly associated with the occurrence of any one complication or any major complication, after adjusting for potential confounders.
- For those patients who were ever-smokers, there was an association between ever-smoker status and the odds of developing any major complication.
- Given the potential deleterious effects of a positive ever-smoker status, as well as the continued debate in the spine literature over the effect of smoking on long-term fusion success, patients with a prior smoking history, whether currently smoking or not, should be considered higher risk patients than never-smokers.