

## Does obesity affect the outcomes of pulmonary resections for lung cancer? A National Surgical Quality Improvement Program analysis

Benedetto Mungo, MD,<sup>a</sup> Cheryl K. Zogg, MHS,<sup>b</sup> Craig M. Hooker, MPH,<sup>a</sup> Stephen C. Yang, MD,<sup>a</sup> Richard J. Battaferano, MD,<sup>a</sup> Malcolm V. Brock, MD,<sup>a</sup> and Daniela Molena, MD,<sup>a</sup> Baltimore, MD

**Background.** Obesity has increased dramatically in the American population during the past 2 decades. Approximately 35% of adults are obese. Although obesity represents a major health issue, the association between obesity and operative outcomes has been a subject of controversy. We queried the National Surgical Quality Improvement Program (NSQIP) database to determine whether an increased body mass index (BMI) affects the outcomes of pulmonary resection for lung cancer.

**Methods.** We identified 6,567 patients with a diagnosis of lung cancer who underwent pulmonary resection from 2005 to 2012 in the NSQIP database. We stratified this population into 6 BMI groups according to the World Health Organization classification. The primary outcome measured was 30-day mortality; secondary outcomes included length of stay (LOS), operative time, and NSQIP-measured postoperative complications. We performed both unadjusted analysis and adjusted multivariable analysis, controlling for statistically significant variables.

**Results.** Adjusted multivariable logistic regression showed no increase in 30-day mortality, overall morbidity, and serious morbidity among obese patients. Adjusted Poisson regression revealed greater operative times for both obese and underweight patients compared with normal weight patients. Overall, obese patients were younger and had a greater percentage of preoperative comorbidities, including diabetes, hypertension, dyspnea, renal disease, and history of previous cardiac surgery. The prevalence of active smokers was greater among patients with low and normal BMI. Underweight patients had a greater risk-adjusted LOS relative to normal weight patients, whereas overweight and mildly obese patients had lesser risk-adjusted LOS.

**Conclusion.** The results of our analysis suggest that obesity does not confer greater mortality and morbidity after lung resection. (Surgery 2015;157:792-800.)

From the Division of Thoracic Surgery, Department of Surgery,<sup>a</sup> Johns Hopkins University School of Medicine; and Johns Hopkins Bloomberg School of Public Health,<sup>b</sup> Baltimore, MD

LUNG CANCER IS THE LEADING CAUSE OF CANCER MORTALITY in the United States and represents the third most common cancer in both sexes, with more than 228,000 new estimated cases in 2013.<sup>1</sup> The prevalence of obesity also dramatically increased during the last few decades; recent reports indicate

that in 2011–2012, more than two-thirds of US adults were either overweight or obese (approximately 35% were obese).<sup>2</sup> As a consequence, performing procedures for lung cancer in a patient with a high body mass index (BMI) has become part of everyday practice for thoracic surgeons. These patients have numerous comorbidities, including hypertension, diabetes, and coronary artery disease, conditions that can negatively affect outcomes of surgery.<sup>3</sup> Previous studies on the association between obesity and surgical outcomes have led, thus far, to inconsistent and often-contradictory results. Moreover, reports on this topic are heterogeneous, with considerable variability in key aspects, such as the definition of

Accepted for publication October 31, 2014.

Reprint requests: Daniela Molena, MD, Division of Thoracic Surgery, Department of Surgery, Johns Hopkins University, 600 N Wolfe Street, Blalock 240, Baltimore, MD 21287. E-mail: [dmolena2@jhmi.edu](mailto:dmolena2@jhmi.edu).

0039-6060/\$ - see front matter

© 2015 Elsevier Inc. All rights reserved.

<http://dx.doi.org/10.1016/j.surg.2014.10.016>

obesity, study type, treated disease, types of surgical procedures and specific outcomes studied.<sup>4</sup> Only a few studies in the literature have analyzed specifically the outcomes of resections for lung cancer in obese patients. Several single-center series described no BMI-related differences in outcomes, whereas other authors reported that pulmonary resections for lung cancer in obese patients are associated with a greater incidence of adverse perioperative events, such as respiratory complications or prolonged operative time.<sup>5-8</sup> The use of a large national database has the potential to yield a more meaningful perspective on the topic by providing complementary information to previously reported studies. We queried the American College of Surgeons National Surgical Quality Improvement Program (ACS-NSQIP) database to analyze the effects of obesity on the early operative outcomes of pulmonary resections for lung cancer.

## METHODS

**Data source.** The study was conducted as a retrospective analysis using the ACS-NSQIP database from 2005 through 2012. NSQIP is a large, nationally validated, risk-adjusted, outcomes-based program used to measure and thereby improve the quality of surgical care. Nearly 500 hospitals that vary in size and academic affiliation participate in NSQIP.<sup>9</sup> The program uses a prospective, systematic data collection on 135 preoperative and intraoperative variables, as well as 30-day postoperative morbidity and mortality. The data are collected from clinical records by trained surgical clinical reviewers. Details of ACS-NSQIP are described elsewhere.<sup>10</sup> This study was deemed exempt by the Institutional Review Board of the Johns Hopkins University School of Medicine.

**Inclusion criteria.** The study was restricted to patients  $\geq 18$  years old with a primary diagnosis of lung cancer (according to the *International Classification of Diseases*, 9th revision) who underwent pneumonectomy (defined as Current Procedural Terminology codes of 32,440, 32,442, 32,445, 32,488, 32,671), lobectomy (32,480, 32,482, 32,486, 32,503, 32,504, 32,663, 32,670), or segmentectomy (32,484, 32,669).

**Baseline characteristics of patients.** The baseline characteristics of the patients (Table 1) were compared by categorical BMI group (underweight:  $< 18.5$  kg/m<sup>2</sup>, overweight: 25.0–29.9 kg/m<sup>2</sup>, obese class I: 30.0–34.9 kg/m<sup>2</sup>, obese class II: 35.0–39.9 kg/m<sup>2</sup>, and obese class III:  $\geq 40.0$  kg/m<sup>2</sup>) relative to normal BMI (18.5–24.9 kg/m<sup>2</sup>). BMI groups were created according to the BMI classification of the World Health Organization.<sup>11</sup>

**Outcomes.** Intraoperative and postoperative outcomes by BMI group were compared. In addition, a focused comparison between perioperative outcomes of obese (BMI  $\geq 30$ ) and nonobese (BMI  $< 30$ ) patients was performed. Thirty-day mortality was the primary outcome of interest. Secondary outcomes included overall and serious morbidity, length of hospital stay (LOS), and total operative time. Overall morbidity was defined by presence of at least one of the following NSQIP complications: wound infection, pneumonia, urinary tract infection, return to the operating room (OR), venous thromboembolic events, cardiac complication, shock/sepsis, unplanned intubation, bleeding requiring transfusion, renal complication, or ventilator dependency  $> 48$  hours. Serious morbidity included occurrences of the following NSQIP complications: return to the OR, cardiac complication, shock/sepsis, unplanned intubation, and ventilator dependence for  $> 48$  hours. Similar NSQIP measured intraoperative and postoperative complications were combined into groups as follows: the wound infection variable was classified as superficial wound infection, deep incisional superficial surgical-site infection, and wound disruption; the cardiac complication variable included cardiac arrest requiring cardiopulmonary resuscitation and myocardial infarction; the renal complication variable was defined as a postoperative acute failure or progressive renal insufficiency; and the venous thromboembolic event variable consisted of deep vein thrombosis/thrombophlebitis and pulmonary embolism.

**Statistical analysis.** Patient baseline characteristics and outcomes were compared among BMI groups with the Pearson  $\chi^2$  test for categorical variables and nonparametric median tests for non-normally distributed continuous variables. The Fisher exact test was used when appropriate. Collinearity/multicollinearity was assessed for adjusted models via calculation of variance inflation factors all well less than a critical threshold of 10. Multivariable logistic regression was used to predict 30-day mortality and overall, serious, and constituent morbidities. Multivariable Poisson regression was applied to assess incidence rate ratio differences in LOS and total operative time. Use of Poisson regression was determined via modified Park tests to account for the non-normally distributed distributions. Models were adjusted for clinically relevant and statistically significant patient factors. Respective model fits were validated via goodness of fit/ $\chi^2$  tests as appropriate. All data analyses and management were performed using Stata/

Download English Version:

<https://daneshyari.com/en/article/4307187>

Download Persian Version:

<https://daneshyari.com/article/4307187>

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