Peer Review File

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Reviewer A

Reviewer A Question #1:

"*This is a large retrospective study that uses the NCDB to assess the total number of lung cancer resections performed annually in the United States. Based on this national analysis, the authors approximate that a total of 56,000 to 57,000 lung cancer resections are performed in the U.S. annually, with lobectomies being the most common lung cancer operation."*

RESPONSE:

We thank the reviewer for their time reviewing the manuscript and deeply appreciate their detailed review of the manuscript and their insightful suggestions.

Reviewer A Question #2:

"*I'm not sure what the significance of the study findings is. It is nice to know that there are north of 50,000 lung cancer operations performed in the US annually, but what is the reader expected to do with this information*?"

RESPONSE:

We thank the reviewer for this excellent question. Our primary objective in the present proposal was to estimate the number of lung cancer operations performed in the U.S. annually. While the incidence of lung cancer in the U.S. is well-characterized, the number of lung cancer resections performed each year is unknown. Understanding that over 50,000 individuals in the U.S. undergo lung cancer operations each year annually is important as it supports the relevance of ongoing and future research to improve surgical care for patients diagnosed with lung cancer.

Reviewer A Question #3:

"It would be nice to see a trend in the number of operations performed. This would require the study of more than just 2016 and 2017. Why was the time period limited to just these 2 years? The NCDB currently has data spanning from 2004 to 2018."

RESPONSE:

We thank the reviewer for their insightful comments and questions. In the present study, we only included patients diagnosed with lung cancer in 2016 and

2017 because we wanted to estimate the number of lung cancers performed annually using the most recent data available. Of note, at the time of this writing, we only had data available until 2017. We completely agree with the reviewer that it would be interesting to see whether there is a trend in the number of lung cancer operations performed over time. We will certainly look into evaluating trends in the number of lung cancer operations performed over time in future research.

Reviewer A Question #4:

"How was T-stage reclassified from AJCC 6/7 to AJCC 8? Aside from tumor size, the database does not include information on atelectasis, pneumonitis, distance to carina, and diaphragmatic invasion to fully reclassify T-stage."

RESPONSE:

We thank the reviewer for their insightful question. In the National Cancer Database, for the years 2016 and 2017, clinical and pathologic staging were recorded using the AJCC 7th edition criteria. In the present study, we reclassified the staging according to the AJCC 8th edition criteria using best available data. In order to reclassify T status, we used tumor size information. As the reviewer noted, the National Cancer Database does not include data on atelectasis, pneumonitis, distance to carina, and diaphragmatic invasion to fully reclassify T-stage. This is an important limitation which we have been sure to acknowledge in the limitations section.

CHANGES MADE:

Since clinical and pathologic staging for patients diagnosed with lung cancer in the National Cancer Database in 2016 and 2017 were recorded using 7th edition criteria only (not 6th edition), we have changed "AJCC 6th and 7th edition" in the Methods Section to "AJCC 7th edition."

We have also added the following to the Limitations Section:

"In addition, in the present study, we reclassified the clinical and pathologic staging information according to the AJCC 8th edition criteria using best available data. It is important to note, however, that the NCDB does not include data on atelectasis, pneumonitis, distance to carina, and diaphragmatic invasion to fully reclassify T status."

Reviewer A Question #5:

"*Lines 136-143 - Please report p-values*." RESPONSE:

We thank the reviewer for their excellent suggestion.
CHANGES MADE:
We have added P-values to that section of the manuscript (now lines 157-163).

Reviewer A Question #6:
"Table 3 is potentially interesting. I believe the objectives of the study need to be expanded to involve trends exploring surgical approach/treatment modality/oncologic quality of operation/survival to be more impactful. I believe the current objectives do not appear to spark much interest in the reader or answer any pertinent questions about thoracic surgery."
RESPONSE:
We thank the reviewer for their insightful suggestions, and we deeply appreciate their efforts to improve our manuscript. The main objective of our study was to estimate the number of lung cancer operations performed annually. Thus, our analysis of baseline characteristics and perioperative outcomes of patients in the study cohort was intended to complement our primary analysis and provide readers with additional insight into the characteristics of patients undergoing lung cancer operations. As the reviewer mentioned, we completely agree that it would be interesting to dive deeper and explore trends in surgical approach, treatment modality, and the oncologic quality of operations. We will certainly look into this further in future studies.

Reviewer A Question #7:
"*The methodology seems novel and should be used to study trends as mentioned above over a greater number of years to create an impact on the field/reader*."
RESPONSE:
We thank the reviewer for their thoughtful feedback and excellent suggestion. Since the main objective of the present study was to estimate the number of lung cancer operations performed annually using the most recent data that was available, we included patients diagnosed with lung cancer in 2016 and 2017. We completely agree with the reviewer that examining trends over a greater time period would yield valuable insights into the current field of thoracic surgery; we will look into exploring these trends in a future analysis.

Reviewer B

Reviewer B Question #1:

"*Overall well written paper with interesting results. Novel study presenting data not previously presented well in the literature*."

RESPONSE: We thank the reviewer for their kind words and time spent reviewing our manuscript.

Reviewer B Question #2:

"Interesting that almost 20% of patients received non-anatomical sublobar resection in contemporary thoracic surgery practice despite high-quality evidence showing its oncological inferiority. This needs further discussion and analysis."

RESPONSE:

We thank the reviewer for their insightful comments and suggestions. With the increasing adoption of lung cancer screening in the U.S., the number of early-stage, small nodules identified is growing. There is an increasing body of evidence supporting that sublobar resection, including wedge resection and segmentectomy, may be considered for these small nodules. For example, the recent randomized trial--JCOG0802—found that segmentectomy was associated with improved overall survival for stage IA (< 2 cm) peripheral non-small-cell lung cancer. In addition, several high-quality studies have shown that, for select patients with early-stage non-small-cell lung cancer, sublobar resection is associated with at least equivalent overall survival compared to lobectomy (Saji et al., 2022). The growing number of studies supporting the noninferiority of sublobar resection for select patient populations, paired with the understanding that many lung cancer patients are older and sicker and thus may not be candidates for lobectomy, likely explains the significant proportion of patients in our cohort who received sublobar resection.

Reviewer B Question #3:

"*The impact of missing VA data also needs clarifying: what proportion of overall healthcare is provided by VA, so that authors can appreciate the potential over/under-estimation of the results you have provided*."

RESPONSE:

We thank the reviewer for their excellent question and suggestion. The National Cancer Database does not include data reported from VA hospitals. The United States Cancer Statistics Database includes some data from VA hospitals.

However, the precise number of patients in the United States Cancer Statistics Database is unknown. A 2014 survey found that no data was submitted by VA hospitals in eighteen states, while eight states reported incomplete VA facility data submission to their cancer registry (Mallin et al., 2019). In the present study, to obtain the indirect multiplier, we first divided the number of cases captured in the NCDB in a given year divided by the number of cases in the United States Cancer Statistics

Database in that given year (which represents the total number of lung cancer cases in the U.S.). We then divided the number of lung cancer resections in the NCDB in that given year by the indirect multiplier calculated in the previous step to estimate the total number of lung cancer resections in the NCDB. Since the United States Cancer Statistics Database includes some, but not all, data from VA hospitals, it is possible that the number of lung cancer cases captured in the United States Cancer Statistics Database slightly underestimates the total number of lung cancer cases diagnosed in the U.S. each year. As such, it is a possibility that the percentage of lung cancer cases captured in the National Cancer Database was overestimated, leading to an underestimation of the total number of lung cancer resections performed each year. Due to the small number of lung cancer cases from the VA that are not reported to the United States Cancer Statistics Database, the extent of this underestimation should be very small. We have made sure to discuss the impact of missing VA data on our estimation of the number of lung cancer resections performed annually in the Limitations Section.

CHANGES MADE:

We have added the following to the Limitations Section:

“Since the United States Cancer Statistics Database includes some, but not all, data from VA hospitals, it is possible that the number of lung cancer cases captured in the United States Cancer Statistics Database slightly underestimates the total number of lung cancer cases diagnosed in the U.S. each year. As such, it is possible that the percentage of lung cancer cases captured in the National Cancer Database was overestimated, leading to an underestimation of the total number of lung cancer resections performed each year. Due to the small number of lung cancer cases from the VA that are not reported to the United States Cancer Statistics Database, the extent of this underestimation should be very small.”

Reviewer B Question #1:

"This neat, succinct paper provides an important estimate on the number of lung resections carried out in the US annually from lung cancer."

RESPONSE:

We thank the reviewer for their time and effort reviewing our manuscript and are grateful for their insightful comments and suggestions.

Reviewer B Question #2A:

"While I understand there are often limitations when working with large databases, three important questions to address are: Does the breakdown of extent of resection differ between private and academic institutions: Although the breakdown of academic facility type is quantified for each type of resection, the numbers specifically for private facilities are not known in this data set, given the other mentioned Facility Types are either public/national or only specified as 'other.'"

RESPONSE:

We thank the reviewer for their insightful comments and excellent suggestions. We unfortunately do not have data on whether a hospital is a private facility. As the reviewer noted, we did examine the distribution of patients treated at each facility type (e.g., community cancer program, comprehensive community cancer program, academic institution, and integrated cancer network) stratified by the extent of the operation. We will certainly try to look into examining the breakdown of the extent of resection between private and academic institutions in future research.

Reviewer B Question #2B:

"Demographics and staging of patients getting various resections, particularly wedge resections"

RESPONSE:

We thank the reviewer for their excellent question. We did examine the baseline characteristics of patients, tumor characteristics, treatment characteristics, and perioperative outcomes stratified by the extent of resection (e.g., wedge, segmentectomy, lobectomy, etc.). The results of this analysis are detailed in Tables 2 and 3.

Reviewer B Question #2B:

“Surgical approach: what proportion of patients have a minimally invasive approach?”

RESPONSE:

We thank the reviewer for their insightful question. In 2016 and 2017, 20,195 (56.2%) and 21,552 (60.7%) of patients underwent a minimally invasive operation in our cohort. The percentage of operations performed via VATS and robotic approaches, stratified by surgery type, are detailed in Table 1.