Prevalence of Benign Disease Diagnosis After Lung Surgery Varied Widely by State

- Prevalence of benign lung disease ranged from 1.2 percent in Vermont to 25 percent in Hawaii.
- 2.1 percent of patients with a benign diagnosis died in the hospital after surgery.
- Benefits of lung cancer screening may differ widely by state.

WASHINGTON, D.C. — Benign disease diagnosis rates after surgery for suspected lung cancer varied widely by state, and the reasons for these variations could inform health policy and clinical guidelines for lung cancer screening, according to a researcher who presented the data at the AACR Annual Meeting 2013, held in Washington, D.C., April 6-10.

“Given the results of the National Lung Screening Trial (NLST), which demonstrated that low-dose computed tomography (CT) reduces lung cancer mortality, and the support for screening healthy, high-risk individuals with low-dose CT by clinical and patient advocacy groups, we will likely see screening for lung cancer in our near future,” said Stephen A. Deppen, a doctoral candidate in epidemiology and database analyst at Vanderbilt University in Nashville, Tenn.

Data from NLST revealed that low-dose CT screening led to a 20 percent reduction in lung cancer-related mortality compared with chest X-ray; however, 96 percent of the positive screening results were false positives and 24 percent of follow-up lung resections were negative for lung cancer.

“It was not known whether the prevalence of benign disease diagnosis after lung resection for suspected lung cancer is uniform across the United States,” said Deppen. “If prevalence differs by state or region of the country, then a national lung cancer screening program may have varying results.”

He and his colleagues, therefore, set out to determine the prevalence of benign disease diagnosis rates by state.
Using the Medicare Provider Analysis and Review (MedPAR) Hospital National Limited Data Set from 2009, Deppen and colleagues evaluated medical data from 25,362 patients who underwent lung surgery for known or suspected lung cancer.

They found that 2,312 patients (9.1 percent) had a benign disease diagnosis after surgery. About 2.3 percent of all patients died in the hospital after the procedure. For those who were found not to have lung cancer, the mortality rate was 2.1 percent.

In addition, there was a wide variation among states in the prevalence of benign disease diagnosis, from 1.2 percent in Vermont to 25 percent in Hawaii.

“States with a higher rate of false positives and higher benign disease prevalence may observe poorer performance of a screening program for lung cancer,” Deppen said. “The benefit of screening for lung cancer is finding early-stage disease and reducing mortality from lung cancer. Lung surgery is major surgery and has a much higher risk for death and complications compared with diagnostic operations for other cancers, such as breast and prostate cancer. So, more surgeries for benign disease will result in more deaths and harm from the diagnostic process and will reduce the benefit that was observed in the original NLST.”

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Presenter: Stephen A. Deppen

Title: Benign disease prevalence after surgical lung resection varies geographically in the US Medicare population, implications for lung cancer screening

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Purpose: The National Lung Screening Trial (NLST) demonstrated that screening computed tomography (CT) reduces mortality caused by lung cancer and clinical societies and patient advocacy groups have recommended screening high risk individuals. Screening CT scan of the chest reduced lung cancer mortality in this trial but 96% of anomalies were false positives, 24% of lung surgeries resulted in a benign diagnosis. The overall mortality rate from procedures was 1.2% in the trial. The benign disease prevalence after surgical biopsy is not known at the state level and if these prevalences differ across the United States, then a nationwide screening regimen may have geographically varying success. The purpose of this study is to determine the benign disease point prevalence after surgical lung resection at the state level using a national dataset.

Methods: We examined the point prevalence of benign disease after lung surgery in a retrospective cohort being evaluated for known or suspected lung cancer. The MEDPAR Hospital National Limited Data Set from 2009 was used to identify patients who had undergone lung surgery by ICD-9CM codes. Patients less than 19 years old or who had diseases not arising from a lung lesion were excluded. Malignancy and benign disease were determined by ICD-9CM codes. The benign diagnosis prevalence was estimated at the state level by dividing the total number of benign cases by the sum of the benign cases and malignant cases. Benign disease point prevalence was compared between states using Pearson chi-square test.

Results: There were 25,362 patients who had a lung operation for known or suspected lung cancer. Among these, 2,312 (9.1%) had a benign diagnosis. Benign diagnosis was more frequent among women (9.8%) than men (8.5%) after surgery. Crude in hospital mortality rate for all patients was 2.3%. The mortality rate for patients with benign disease was 2.1%. Prevalence of benign disease varied significantly (chi-sq p<0.001) across states from a low of 1.3% in Vermont to a high of 25.0% in Hawaii. Median benign disease by state was 8.8% (IQR: 7.8 - 10.9).

Conclusion: Benign disease prevalence after lung surgery varies widely by state and resulted in a mortality rate of 2.1 percent. Cause of observed differences is not known but may be due to practice variation or locally endemic lung diseases and should be investigated to determine the impact to a national lung cancer screening program.