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Surgery in high-volume hospitals not commission on cancer accreditation leads to increased cancer-specific survival for early-stage lung cancer

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Abstract

BACKGROUND: Quality of oncologic outcomes is of paramount importance in the care of patients with non–small cell lung cancer (NSCLC). We sought to evaluate the relationship of hospital volume for lobectomy on cancer-specific survival in NSCLC patients treated in California, as well as the influence of Commission on Cancer (CoC) accreditation.

METHODS: The California Cancer Registry was queried from 2004 to 2011 for cases of Stage I NSCLC and 8,345 patients were identified. Statistical analysis was used to determine prognostic factors for cancer-specific survival.

RESULTS: A total of 7,587 patients were treated surgically. CoC accreditation was not significant for cancer-specific survival, but treatment in high-volume centers was associated with longer survival when compared with low- and medium-volume centers (hazard ratio 1.77, 1.474 to 2.141 and hazard ratio 1.23, 1.058 to 1.438).

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CONCLUSION: These data suggest that surgical treatment in high-volume hospitals is associated with longer cancer-specific survival for early-stage NSCLC, but that CoC accreditation is not.

Lobectomy with mediastinal lymphadenectomy is the standard of care for the treatment of early-stage non–small cell lung cancer (NSCLC). Although previous studies show a relationship between hospital procedural volume and perioperative outcomes, we sought to evaluate the relationship of hospital volume on cancer-specific survival in early-stage NSCLC patients treated in California, as well as the influence of facility on American College of Surgeons Commission on Cancer (CoC) accreditation on long-term outcomes.

In the modern era where perioperative outcomes are scrutinized and publicized, no one single measure of quality exists. Many studies have evaluated the relationship between hospital procedural volume and perioperative outcomes and have attempted to use hospital volume as a surrogate for quality.[1–9] In the United States and England, there is a trend of improved perioperative complications and mortality in high-volume centers.[1–6] European studies, in contrast, find that surgeon volume rather than hospital volume contributes to perioperative morbidity and that hospital volume should not be considered a substitute for quality outcomes.[7–9] Cancer-specific survival is rarely considered in these studies; however, cancer-specific survival is a key metric for all concerned with providing quality oncologic care.

Like hospital procedural volume, CoC accreditation is a measureable hospital characteristic; however unlike volume, the relationship between CoC accreditation and patient outcomes has not been well studied. The CoC is a conglomerate of over 50 organizations that focus on improving oncologic outcomes and quality of life for cancer patients.[10–13] The CoC provides standards, prevention, research, education, and quality monitoring, and accreditation is based on compliance and adherence to these guidelines.[10] CoC-accredited hospitals are more likely to have oncology-related services including screening programs, chemotherapy, radiation, survivorship, and hospice services and they are required to report to the National Cancer Data Base.[11] CoC accreditation is one method patients can use to assess healthcare quality. However, the association between performance on national quality indicators and CoC accreditation has not been firmly established.[11–13]

To provide patients with additional information from which to make informed healthcare decisions regarding the quality of oncologic outcomes in NSCLC, we analyzed data from the California Cancer Registry (CCR). We hypothesized that increased cancer-specific survival would be seen in high-volume centers and centers with CoC accreditation.

Methods

This was a University of California, Davis Institutional Review Board-approved, retrospective cross-sectional study of patients diagnosed with NSCLC through the CCR. Consent was waived because only deidentified data were included in the study. The CCR, a program of the California Department of Public Health, is a population-based registry that has collected cancer incidence and mortality data for the entire population of California since 1988. By law (Health and Safety Code, Section 103885), all new reportable cancer cases diagnosed in California residents must be provided to the CCR, and data are collected from diagnostic and treatment facilities.[14] To ensure current follow-up for vital status and cause of death, the CCR database is linked annually to death certificates, hospital discharge data, Medicare files, the Department of Motor Vehicles, Social Security, and other administrative databases. Linkage to the National Death Index ensures capture of deaths occurring outside California as well as cause of death, and follow-up is over 96% for patients diagnosed since 2000. The CCR is a participant in both the Centers for Disease Control National Program of Cancer Registries and the National Cancer Institute Surveillance Epidemiology and End Results program, which requires the highest standards of data quality, as judged by completeness, accuracy, and timeliness.

Data extracted from medical records include patient demographics (age, sex, race, socioeconomic status [SES]), year of diagnosis, tumor characteristics, stage at diagnosis, and hospital and physician information. Race/ethnicity in the CCR is based on information collected from medical records supplemented with linkage to algorithms to better identify Hispanics and Asian/Pacific Islanders. Race/ethnicity was categorized as non-Hispanic white, non-Hispanic black, Hispanic, and non-Hispanic Asian/other. Patient address at diagnosis is assigned to a census tract, and neighborhood SES was based on US Census characteristics combined into the summary Yost index,[15] categorized as low, medium, and high SES.

Only patients for whom NSCLC was the first or only cancer diagnosis were included. Patients diagnosed at autopsy were excluded from analysis. Stage at diagnosis was defined based on the Surveillance Epidemiology and End Results modification of the American Joint Committee on Cancer staging system, and only patients diagnosed as Stage I and treated with surgery were included in this analysis. Hospitals where definitive surgery was performed were categorized by CoC accreditation and average number