Association of Travel Distance, Surgical Volume, and Receipt of Adjuvant Chemotherapy with Survival among Patients with Resectable Lung Cancer

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Objectives
Regionalization of surgery for non-small-cell lung cancer (NSCLC) to high-volume centers (HVCs) improves perioperative outcomes but increases travel distance for patients who receive care at these centers. Increased distance may decrease rates of adjuvant chemotherapy (AC). However, the relationship of travel distance, surgical volume, and receipt of AC with outcomes is unknown. The purpose of this study is to evaluate the association of distance, volume, and receipt of AC with overall survival among patients with NSCLC.

Methods
Patients with stage II-IIIA (N0-1) NSCLC were identified between 2004-2018 using the National Cancer Database. Patient travel distance to their surgical facility was categorized into quartiles [<6.4, 6.4 to <14.7, 14.7 to <35.1, and ≥35.1 miles], and HVCs were defined in accordance with Leapfrog criteria as those performing ≥40 annual resections. Patient characteristics and odds of receiving AC at any center were determined. Survival analysis was performed using Kaplan-Meier curves and adjusted Cox Proportional Hazards models.

Results
Overall, 48,226 patients with surgically resected stage II-IIIA (N0-1) NSCLC met criteria for inclusion. Of the cohort, 51.7% received AC. 16.7% traveled <6.4 mi to LVCTs, and 15.2% traveled ≥35.1 mi to HVCS (p < 0.001). Among stage II-IIIA patients who traveled ≥35.1 mi to HVCS, 46.0% received AC vs 54.1% who traveled <6.4 mi to LVCTs (aOR = 0.66, 95% CI 0.58-0.74; p < 0.001; reference). Patients with Stage II-IIIA NSCLC who traveled ≥35.1 mi were more likely than patients who traveled <6.4 mi to be male (57.2% vs 49.5%), from rural areas (40.6% vs 1.6%). For patients who traveled <6.4 miles and received treatment at an LVCT, the median time to initiation of adjuvant chemotherapy was 45 (IQR 35-60) days. Patients with Stage II-IIIA NSCLC who traveled ≥35.1 mi to HVCS and did not receive AC had higher mortality than those who traveled <6.4 mi to LVCTs and received AC (aHR for mortality 1.31, 95% CI 1.21-1.42). Median overall survival was lower for patients who traveled long distances (35.1 to 250 miles) for surgical treatment at HVCS and did not receive AC (median OS 38.8 months) compared with patients who traveled short distances (<6.4 miles) and were surgically treated at LVCTs and received AC (median OS 54.6 months, reference).

Conclusions
Longer travel distance is associated with decreased odds of receiving adjuvant chemotherapy. Furthermore, patients with stage II-IIIA (N0-1) NSCLC who traveled ≥35.1 mi to high-volume centers for surgery and did not receive adjuvant chemotherapy had lower overall survival compared to patients who traveled <6.4 mi to low-volume centers for surgery but received adjuvant chemotherapy. Understanding the reasons for lack of receipt of adjuvant chemotherapy is necessary to improve delivery and maximize the benefit of travel to high-volume centers for surgery.

References