Original Study

# Treatment Patterns and Health Resource Utilization Among Patients Diagnosed With Early Stage Resected Non–Small Cell Lung Cancer at US Community Oncology Practices

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## Abstract

**Data on adjuvant therapy in resected non–small cell lung cancer (NSCLC) in routine practice are lacking in the United States. This retrospective observational database study included 609 community oncology patients with resected stage IB to IIIA NSCLC. Use of adjuvant therapy was 39.1% at disease stage IB and 64.9% to 68.2% at stage II to IIIA. The most common regimen at all stages was carboplatin and paclitaxel.**

**Background:** Platin-based adjuvant chemotherapy has extended survival in clinical trials in patients with completely resected non–small cell lung cancer (NSCLC). There are few data on the use of adjuvant therapy in community-based clinical practice in the United States. **Materials and Methods:** This was a retrospective observational study using electronic medical record and billing data collected during routine care at US community oncology sites in the Vector Oncology Data Warehouse between January 2007 and January 2014. Patients aged ≥ 18 years with a primary diagnosis of stage IB to IIIA NSCLC were eligible if they had undergone surgical resection. Treatment patterns, health care resource use, and cost were recorded, stratified by stage at diagnosis. **Results:** The study included 609 patients (mean age, 64.8 years, 52.9% male), of whom 215 had stage IB disease, 130 stage IIA/II, 110 stage IIB, and 154 stage IIIA. Adjuvant systemic therapy after resection was provided to 345 (56.7%) of 609 patients, with lower use in patients with stage IB disease (39.1%) than stage II to IIIA disease (64.9-68.2%) ($P < .0001$). The most common adjuvant regimen at all stages was the combination of carboplatin and paclitaxel. There were no statistically significant differences in office visits or incidence of hospitalization by disease stage. During adjuvant treatment, the total monthly median cost per patient was $17,389.75 (interquartile range, $8,815.61 to $23,360.85). **Conclusion:** Adjuvant systemic therapy was used in some patients with stage IB NSCLC and in the majority of patients with stage IIA to IIIA disease. There were few differences in regimen or health care resource use by disease stage.

*Clinical Lung Cancer,* Vol. 16, No. 6, 486-95 

**Keywords:** Adjuvant chemotherapy, Electronic medical records, Health care costs, Retrospective database

## Introduction

Lung cancer is the leading cause of cancer deaths in the United States (US), with an estimated 159,480 deaths in 2013.[1] Approximately 84% of lung cancers are classified as non–small cell lung cancer (NSCLC).[1] The 5-year survival rate across all stages of NSCLC has been estimated at 16%, increasing to 52% for the 15% of cases diagnosed at a localized stage.[1] Complete surgical resection is the standard treatment for localized NSCLC.[2] Despite complete resection, the disease recurs in a high proportion of patients.[2,3] Adjuvant chemotherapy can help to reduce the risk of recurrence after surgery and has been investigated in several clinical trials.[4-8] Survival benefits have been demonstrated for patients with completely resected NSCLC receiving adjuvant chemotherapy with cisplatin-based regimens,[4] cisplatin plus vinorelbine,[5,6] and carboplatin plus paclitaxel in patients with resected stage IB NSCLC with

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Submitted: Oct 31, 2014; Accepted: Dec 23, 2014; Epub: Dec 31, 2014

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http://dx.doi.org/10.1016/j.cllc.2014.12.010

tumors ≥ 4 cm in diameter.[7] Platin-based adjuvant chemotherapy is now considered the standard of care in completely resected NSCLC for patients with good performance status.[2]

Few studies have investigated the extent to which these clinical trial findings have been taken up in routine community-based clinical practice, and data on treatment patterns are lacking for the US.

The purpose of the present study was to describe recent treatment patterns and health resource utilization (including cost) for patients with stage IB to IIIA NSCLC treated in community oncology practices in the US, who have undergone surgical resection of their disease. The primary objective was to describe patterns of systemic treatment (excluding neoadjuvant therapy) by disease stage at diagnosis. Secondary objectives included describing the clinical characteristics of patients by stage, disease-free survival, treatment patterns by starting date of adjuvant treatment from diagnosis (early compared to late), and health care resource utilization and cost by disease stage.

## Materials and Methods

### *Study Design*

This was a retrospective observational study (GSK study identifier: HO-13-13748) of treatment patterns, using data collected between January 2007 and January 2014 as part of routine care for adult patients with a primary diagnosis of NSCLC in community oncology settings in the US. Data were obtained from the Vector Oncology Data Warehouse, which contains electronic medical records and billing data collected at a network of community oncology practices mainly in the Southern and Midwestern US.

### *Study Endpoints*

The primary endpoint was treatment pattern by stage at initial diagnosis. Other endpoints included demographic and clinical characteristics, disease-free survival, and health care resource use and cost, stratified by disease stage at diagnosis.

### *Patient Population*

All potentially eligible patients in the database were screened for inclusion, and patients who met the eligibility criteria were accrued in random order until the target number of 600 patients was met. Patients were drawn from the Vector Oncology Data Warehouse, and the study sample consisted of those diagnosed with NSCLC between January 1, 2007, and September 1, 2013.

Eligible patients met the following criteria: confirmed diagnosis of lung cancer, indicated by a statement in the medical record and an International Classification of Diseases Ninth Revision (ICD-9) diagnostic code of 162.2 to 162.9; confirmed non−small cell disease type; aged at least 18 years at time of diagnosis; and staged clinically or pathologically at stage IB to IIIA. In addition, for inclusion, patients had to have undergone a qualifying surgical resection, defined as any surgical resection other than a wedge resection or segmentectomy for curative treatment of NSCLC as of the date of data collection. Patients who underwent a qualifying surgical resection within 30 days after a wedge resection or segmentectomy qualified for inclusion.

Patients with stage IA disease, or with disease first diagnosed at stage IIIB or IV, were excluded from the study.

### *Data Collection*

Patients were initially identified by Structured Query Language (SQL) database queries, and eligibility was confirmed through review of medical records by a clinical research nurse. Data were extracted partly by SQL queries and partly by visual review of records by clinical research nurses.

The extracted data included: date of birth; date of death; date of last office visit for patients with no recurrence; ethnicity and gender; date of initial NSCLC diagnosis; date and type of resection; whether the patient received radiotherapy and/or neoadjuvant therapy (with the start and end date of radiotherapy if used, and whether radiotherapy was concurrent with systemic therapy); disease stage (initial stage if sequential progressive stages were recorded, and pathologic stage preferred to clinical stage if both were available); details of any oral, subcutaneous, or intravenous chemotherapy, targeted therapy, or hormone therapy after resection up to and including the first systemic therapy after disease recurrence or the end of the medical record, whichever occurred first; date and type (local, regional, or distant) of first disease recurrence after resection; biomarker tests for epidermal growth factor receptor (EGFR), anaplastic lymphoma kinase (*ALK*), melanoma-associated antigen 3 (*MAGE-A3*), Kirsten rat sarcoma viral oncogene (*KRAS*), or receptor tyrosine kinase (*ROS1*); and billing record data.

The extracted data were used to derive the patient's age at diagnosis, treatment regimens used, cost of treatment (directly obtained from the database for injectable therapies, estimated from unit costs and duration of therapy for oral agents), and duration of therapy. A treatment regimen was defined as 1 or more anticancer agents provided over a period of time, provided that all agents started within 30 days of the start of the first agent and that no agent was discontinued and replaced within 30 days of the start of the first agent. Adjuvant therapy was defined as the first systemic therapy delivered after diagnosis and resection. Therapy after disease recurrence was defined as the first systemic therapy delivered after the first disease recurrence.

The study sample was divided into 3 cohorts on the basis of the timing of their adjuvant treatment start date relative to their date of diagnosis: early, late, and no adjuvant therapy administered. The median time between date of diagnosis and date of start of therapy for those who were administered adjuvant therapy was used to divide patients into early versus late treatment initiation.

### *Data Analysis*

Study variables were analyzed using descriptive statistics (eg, mean, standard deviation [SD], standard error [SE], frequency, and percentage). The Kaplan-Meier product limit estimator was used to describe time-to-event outcomes (eg, duration of therapy and disease-free survival). For time-to-event analyses that included patients who did not receive systemic therapy, the time origin was the date of resection. For analyses that included only patients who received systemic therapy, the time origin was the start of systemic therapy after diagnosis and resection.

Cost of care included only services delivered through the oncology practice, including systemic therapy, other drugs, office visits, and other procedures. Costs (except the cost for oral therapies) were taken from the amount charged by the oncology practice as indicated by the billing system records, inflated to 2013 US$