Predictors of Survival in Patients With Non-Small Cell Lung Cancer

Juhua Luo, PhD, Yea-Jyh Chen, PhD, RN, Georgia L. Narsavage, PhD, APRN-BC, FAAN, and Alan Ducatman, MD, MSc

Lung cancer is the leading cause of cancer-related death in the United States and worldwide. The GLOBOCAN project estimated 1.61 million new cases (13% of all newly diagnosed cancers) and 1.38 million deaths (18% of all deaths) from lung cancer occurred in 2008 (Bray, Ren, Masuyer, & Ferlay, 2012). In the United States, more than 220,000 new cases of lung cancer were projected to occur in 2012 (American Cancer Society, 2012). Non-small cell lung cancer (NSCLC) accounts for about 80%–85% of all cases of lung cancer, and the majority of patients with NSCLC present with advanced-stage disease at diagnosis (Jemal et al., 2009). Chemotherapy confers a modest survival improvement for patients with advanced disease at diagnosis when compared with supportive care alone, yet the overall prognosis remains poor, with a median survival time of 4–15 months (Hotta et al., 2007). A meta-analysis supported that the benefit of adjuvant chemotherapy is 4%–5% at five years (Besse & Le Chevalier, 2012). Therefore, knowledge of the factors that predict clinical outcomes in patients with NSCLC is critical for determining disease prognosis and guiding treatment. In addition, nurses' ability to recognize patients at high risk for poor survival might be enhanced by identifying predictors seen in everyday hospital charting of patients, potentially leading to earlier intervention.

Background

Determining survival prognosis in patients with lung cancer is challenging, as the majority of patients are diagnosed at a later cancer stage (Jemal et al., 2009). Although survival prognosis in NSCLC has been investigated, most studies were conducted for specific treatment protocols or changed certain patient characteristics. Factors generally predictive of survival outcomes remain controversial and inconclusive and vary by disease severity and age.

Accepted prognostic factors in patients with NSCLC include tumor stage, performance status, and possibly weight loss (Buccheri & Ferrigno, 2001; Grivaux et al.,

Purpose/Objectives: To examine how routine laboratory biomarkers and clinical parameters available within medical records related to overall survival in patients with non-small cell lung cancer (NSCLC).

Design: Retrospective chart review.

Setting: University-based cancer center in rural West Virginia.

Sample: 110 patients from the U.S. Appalachian region with a primary diagnosis of NSCLC at initial hospitalization.

Methods: Electronic medical records were reviewed for one year after discharge or until death. The Kaplan-Meier method was used to compare survival curves for each prognostic factor. Cox proportional hazards model was used for multivariate analyses.

Main Research Variables: Total white blood cell, neutrophil, lymphocyte, and platelet counts; hemoglobin level; body mass index (BMI); performance status; and cancer stage.

Findings: Low BMI (lower than 18.5 lb/in^2), advanced cancer stage (IIIB or IV), and elevated neutrophil (higher than 8 x 10^3/mcl) and platelet (300–826 x 10^{12}/L) counts were significant, independent prognostic factors for shorter survival time in NSCLC. BMI (hazard ratio [HR] = 2.15, 95% confidence interval [CI] [0.94, 4.9]) and neutrophil (HR = 2.93, 95% CI [1.53, 5.59]) and platelet (HR = 2.65, 95% CI [1.25, 5.62]) counts were overall prognostic predictors for patients with advanced NSCLC and remained in the multivariate survival model.

Conclusions: This study detected two known clinical parameters, cancer stage and nutritional status (i.e., BMI and neutrophil and platelet counts), as having independent prognostic significance for shorter survival in NSCLC. Research on survival in patients with NSCLC should include those identified laboratory biomarkers and clinical parameters for screening patients at risk for shorter survival time following hospitalization. Investigation of whether treatments tailored to address neutrophil and platelet counts and BMI can improve survival outcomes also is warranted.

Implications for Nursing: Attention to common biomarkers recorded in patient charts (e.g., neutrophil and platelet counts) as well as BMI could allow nurses to identify patients at risk for low survival. Interventions should be identified and initiated. Longitudinal studies in clinical settings that follow the survival of patients with NSCLC are essential.