UNDERSTANDING PROGNOSIS AND SURVIVAL OUTCOMES IN A REAL-LIFE LONG-TERM COHORT OF PATIENTS WITH EARLY STAGE NON-SMALL-CELL LUNG CANCER

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INTRODUCTION: Lung cancer represents a significant global health problem, accounting for more than 1.7 million deaths worldwide in 2021(1). Despite advances in cancer treatment over the last decade, the 5-year survival rate is still around 50% for surgically resected non-small cell lung cancer (NSCLC). Even for stage I patients, 20% showed recurrence within 5 years (2). Treatment modality, mostly dictated by stage and patient's performance status (PS), directly determines disease survival. Adjuvant radiotherapy is no longer recommended after surgery and several recent large trials have confirmed the benefit in overall survival (OS) with adjuvant chemotherapy (3,4). Thus, the identification of patients with poor prognoses after surgery is of considerable clinical relevance. We report the results of a study population survival analysis from patients diagnosed with early-stage NSCLC at Puerta de Hierro-Majadahonda University Hospital, a tertiary hospital in Madrid, Spain. Our objective was to determine their clinicopathological characteristics at diagnosis, analyze survival, and develop a stratification model to identify poor prognosis factors.

METHODS: A total of 560 patients with histological confirmation of NSCLC in early stages (I–II) were included. Statistical analysis was performed using R Software, version 4.0.5. Univariate survival analysis was performed using Kaplan-Meier curves and survival functions were compared using a log-rank test to check for differences. Statistical significance was set at $p < 0.05$. To investigate the contribution of each characteristic in the survival time, Cox Multivariate regression model was adjusted.

RESULTS AND DISCUSSION: Overall, there was a significantly greater number of men (77.5%) compared to women (22.5%). The median age at diagnosis was 60.6 years. Regarding smoking habits, 56% of the diagnosed patients were former smokers and 31% current smokers, with only 10.5% of never smokers; and 35% patients relapsed. The univariate analysis identified statistically significant differences ($p < 0.001$) according to sex, with greater survival in women; age, with greater survival to youngest; smoking habits with greater survival in non-smokers (Figure 1). As for treatment, survival is strongly improved by surgery and surgery with adjuvant chemotherapy, compared to radiotherapy. PS also stands as a statistically significant factor that impacts prognosis, along with relapse. Median survival in our cohort was 63.7 months (95% CI, 56.7-64.4), with a subgroup of long survivors who were alive more than 150 months since diagnosis (Figure 2A). Multivariable analysis showed that age, surgery, adjuvant chemotherapy, PS, and relapse were the most significant variables, while gender, stage, comorbidities, smoking habit, and radiotherapy were not statistically significant ($p > 0.05$). Accordingly, we identified and integrated significant prognostic factors for survival in the patient cohort to build a model that could stratify patients by risk. The prognostic model identified a high-risk profile defined by males over 70 years old, former smokers, received RT, had a PS of 2, and had relapsed. The identified features for the low-risk profile were being a woman, 20-50 years old, non-smoker, who underwent surgery and adjuvant chemotherapy, PS 0, and no relapse (Figure 2B).

CONCLUSIONS: The identification of high-risk clinicopathological features and significant prognostic factors for survival should be considered simultaneously when evaluating patients with early-stage NSCLC for improving prognosis and increase OS.

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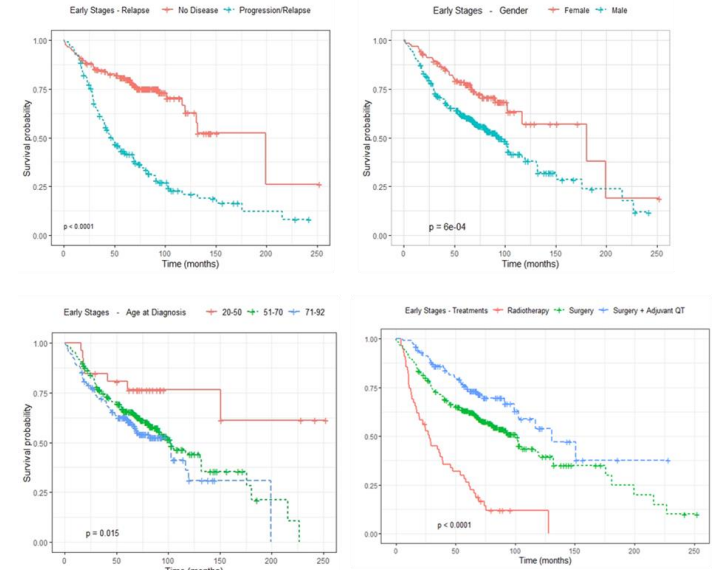
Figure 1. Survival analysis in stages I and II according to gender, age at diagnosis, treatment and relapse.
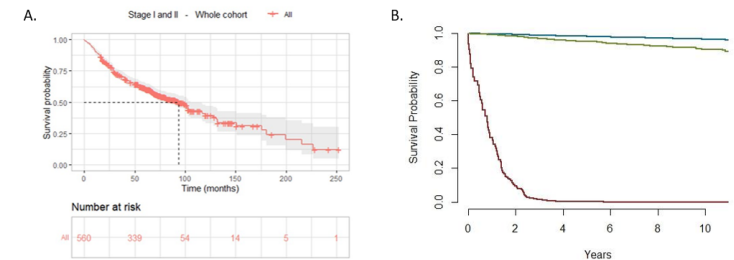

Figure 2. (A) Overall survival curve for the 560 early stage patients estimated using the Kaplan-Meier method. (B) Survival probabilities for High-(red) and Low-(blue) risk profiles and reference category (green).