ORIGINAL ARTICLES

Association between performance status and Quality of life in advance stages non-small cell lung cancer patients

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ABSTRACT

Objective: The relation between performance status and quality of life (QoL) among advanced non-small cell lung cancer (NSCLC) patients remains uncertain. This study aimed to assess the correlation between performance ability (indicated by the Eastern Cooperative Oncology Group performance score - ECOG) to QoL among individuals diagnosed with advanced NSCLC, utilizing the EORTC QLQ-LC13 tool.

Methods: A total of 170 patients diagnosed with NSCLC (TxNxM1) with periodically chemotherapy treatment at Hanoi Oncology hospital were invited to the study. The ECOG score and EORTC QLQ-LC13 were assessed by a dietitian.

Results: The highest proportion (64.1%) of subjects with ECOG score = 1. The most frequent symptoms in EORTC QLQ-LC13 categories were mild coughing, shortness of breath, and chest pain and hair loss was the most unwanted side effect of treatment. Poor performance status related with decrease in QoL (p< 0.05).

Conclusions: Performance status correlated significantly with QoL categories, suggests that improving aspects of quality of life sufficiently can enhance the performance abilities of patients with advanced stage NSCLC.

Keywords: lung cancer, malnutrition, quality of life, PG-SGA, QLQ-C13.

INTRODUCTION

Most of non-small cell lung cancer (NSCLC) had short survival (1) because patients were often diagnosed late (2), so the patient's quality of life needs to pay attention. Disease advancement, symptom severity, and treatment-related side effects notably decrease the quality of life for those living with lung cancer. The quality of life (QoL) for patients with lung cancer tends to be inferior compared to other cancer types due to the impact of various symptoms, including fatigue, dyspnea, cough, pain, and hemoptysis, which are hallmark features of lung tumor patients.

The relationship between performance status and quality of life is a critical aspect in healthcare, particularly in the context of managing cancer. Performance status refers to an assessment of a patient's overall functional ability and daily activities. Performance status is described as an assessment of the patients' actual function and their capability of self-care (3). Among a number of metrics

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which have been developed to quantify performance status, the Eastern Cooperative Oncology Group performance score (ECOG) was commonly used in routine practice and cancer researches (3). Higher ECOG scores (indicating poorer health) tend to be associated with lower quality of life. Previous study has shown that a patient's ECOG score is correlated with health related quality of life score in patients diagnosed with LC for the first time, according to the International Classification Diseases, 10th revision code, ICD-10: C34.0 (4).

The QLQ-LC13 quality of life questionnaire is tailored specifically for assessing the quality of life in lung cancer patients. It builds upon the foundation of the QLQ-C30 questionnaire, which is designed for evaluating quality of life in cancer patients more broadly. By accounting for the distinct characteristics and challenges of lung cancer, the QLQ-LC13 questionnaire provides a targeted approach to assessing quality of life in this patient population (5). The objective of this study is to assess the relationship between performance status (indicated by the Eastern Cooperative Oncology Group (ECOG) Performance Status) to QoL among individuals diagnosed with advanced NSCLC, utilizing the EORTC QLQ-LC13 tool.

METHODS

Study design: Cross-sectional study.

Research subjects

Inclusion Criteria: Patients diagnosed with LC stage IV lung cancer receiving chemotherapy soly, age 20–60, both genders, from Department of Internal Medicine 1 and Department of General Internal Medicine services at Hanoi Oncology Hospital were invited to this study. All of them had a completed medical records including administrative information, medical history, previous history, clinical examinations, imaging diagnosis, and confirmed histopathological diagnosis.

Exclusion Criteria were those in emergency situations or with unstable hemodynamics; unable to stand on the weighing scale or who do not met the technical standards for anthropometric measurements; sychiatric disorders or whose family members are unable to cooperate.

Study site and time: From May 2023 to May 2024 at Hanoi Oncology Hospital: Department of Internal Medicine 1 and Department of General Internal Medicine services

Sample size and sampling method

Sample size: Applying the formula for estimating sample size for a proportion:

$$n = Z^2_{(1 - \alpha/2)} \frac{p(1-p)}{d^2}$$

In which:

- n: Required sample size

- α: Significance level, with α=0.05

- =1.96 (for α=0.05, 95% confidence level)

- p: Proportion of stage IV lung cancer patients with malnutrition, as found in the study by Nguyễn Thị Hồng Thái et al., is 80.2% (p=0.802, so (1−p)=0.198

- dd: Margin of error, set at d=0.06

- The calculated sample size, rounded, is: 170 patients.

Sampling method: A convenience sampling technique was employed until the desired sample size was achieved.

Data collection: Firstly, patients were informed about the study's objective.

Anthropometric measurements (weight, height, arm circumference, and calf circumference) were then gathered following standard procedures. Nutritional status was evaluated using the PG-SGA tool, while quality of life was measured with the EORTC QLQ–LC13 toolkit. Performance status was also assessed using the ECOG tool. Administrative details including name, address, medical record number, admission date, age, gender, occupation, and educational level, along with subclinical information, were extracted from medical records. A unique identification number was also recorded on the data collection form for tracking and processing.

Data analysis: Data cleaned and entered using Epi Data 3.1 software, extracted to Microsoft excel for management and converted to SPSS 20.0 for windows for analysis. Differences are considered statistically significant when the p value < 0.05. The results were presented in tables and charts using Microsoft Excel and Microsoft Word.

Processing and analyzing data: Epidata (Version 3.1) software was used to develop datasets. All input data were statistically analyzed using the Statistical Package for the Social Sciences (IBM SPSS Statistics version 20.0 for Windows). Continuous variables were presented as the mean ± standard deviation (SD); whereas categorical variables were presented as the number and percentage values (n; %). Inter-group differences were assessed by Kruskal-Wallis's test and were significant at $p < 0.05$.

Ethics approval: All patients were informed about the purpose and content of this study with explained that they could withdraw at any time. The study has been approved by the Ethics Committee of Hanoi Oncology hospital, number 1041/QĐ-BVUB on 27th April 2023. The study protocol was carried out in accordance with the tenets of the Declaration of Helsinki and Good clinical practice guidelines.

RESULTS

Patients' characteristics

The patients' mean age in this study was 59.1 ± 7.8 years, nearly three fouth was male (75.9%) and 68.8% smoke. All of them lived with their family. The prevalence of hypertension and diabetes was 10.6% and 12.9%, respectively; hypertension combined with diabetes orcured in 7.6% patients (Table 1).

Table 1. Patients' characteristics

Parameters		All (n = 170)
Age	mean ± SD (min; max)	59.1 ± 7.8 (20;78)
Sex		
Male	n (%)	129 (75.9)
Female	n (%)	41 (24.1)
Live with family	n (%)	170 (100)
Smoking	n (%)	117 (68.8)
Hypertension	n (%)	18 (10.6)
Diabetes	n (%)	22 (12.9)
Diabetes and hypertension	n (%)	13 (7.6)

The ECOG performance score

The mean ECOG performance score was 1.21 ± 0.73, median was 1. Subjects with ECOG score = 1 accounted for the highest proportion of 64.1%, the lowest was ECOG score = 3 (Figure 1).
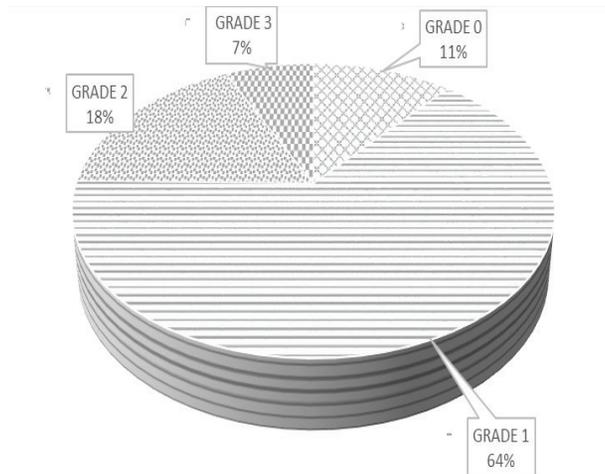

Figure 1. Patient's Quality of Life Questionnaire Lung Cancer-13 (QLQ-LC13) score
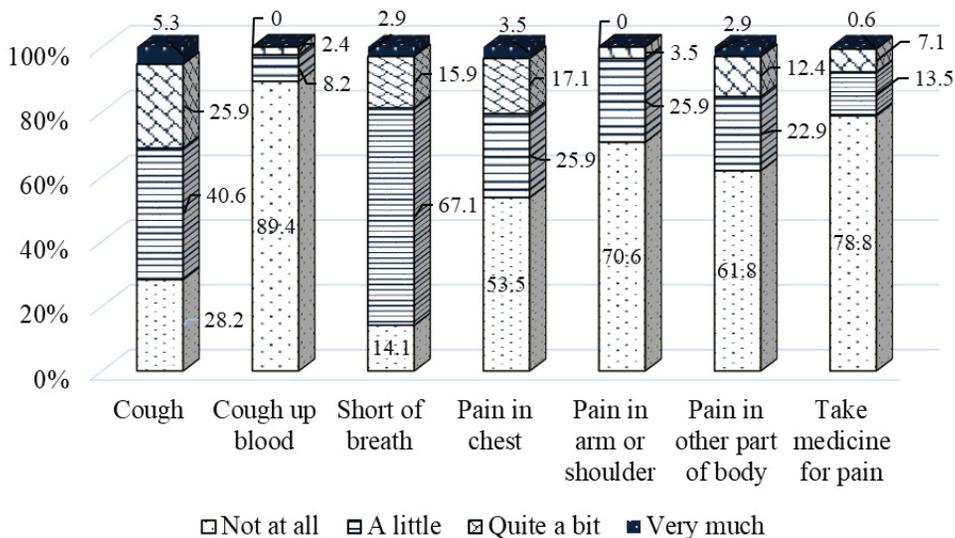

Figure 2. Common symptoms according to QLQ C-13 toolkit

According to the EORTC QLQ C13 assessment, 40.6% of patients experiencing mild coughing, 25.9% reported at moderate, and only 5.3% reported severe coughing. The majority of patients (89.4%) did not report coughing up blood.

Shortness of breath is a prevalent symptom among lung cancer patients, with 67.1% experiencing mild difficulty breathing and 2.9% experiencing severe difficulty breathing. Additionally, approximately half of the patients (46.5%) reported chest pain, while 38.2% reported pain in other areas, and 21.2% required medication for pain relief.

Table 2. Common unwanted side effects of treatment

Unwanted side effects	Not at all		A little		Quite a bit		Very much	
	n	%	n	%	n	%	n	%
Sore mouth and tongue	141	82.9	25	14.7	4	2.4	0	0.0
Difficult swallowing	122	71.8	37	21.8	10	5.9	1	0.6
Tingling hands and feet	119	70.0	44	25.9	7	4.1	0	0.0
Hair loss	62	36.5	80	47.1	24	14.1	4	2.4

Two third of patients (63.5%) experienced hair lost. Inflammation of the mouth and tongue occurs in 14.7% of patients, and dry mouth also appears in 28.2% of patients.

Correlation between performance status (ECOG) and quality of life (EORTC QLQ-C13)

Table 3 represented the correlation between performance status (ECOG) and quality of life (EORTC QLQ-C13). As the ECOG scores rose, the severity of symptoms or issues also escalated significantly ($p < 0.05$).

Table 3. Correlation between performance status (ECOG) and quality of life (EORTC QLQ-C13)

Symptoms or problems. \ ECOG	0	1	2	3	p^a
Cough	22.8 ± 22.4	30.9 ± 26.3	55.6 ± 28.1	55.6 ± 32.8	**0.000**
Cough up blood	1.8 ± 7.6	1.8 ± 8.9	12.2 ± 22.3	11.1 ± 16.4	**0.000**
Short of breath	11.7 ± 14.1	24.1 ± 18.9	44.4 ± 20.0	62.0 ± 25.7	**0.000**
Chest pain	14.0 ± 25.6	17.7 ± 24.7	44.4 ± 33.1	38.9 ± 34.3	**0.000**
Pain in arm or shoulders	7.0 ± 14.0	9.2 ± 16.3	18.9 ± 22.6	13.9 ± 22.9	0.084
Pain in other parts of body	7.0 ± 17.8	15.9 ± 24.7	30.0 ± 35.4	36.1 ± 26.4	**0.002**
Take medicine for pain	3.5 ± 10.5	4.6 ± 14.0	22.2 ± 29.5	36.1 ± 26.4	**0.000**
Sore mouth or tongue	3.5 ± 10.5	6.4 ± 15.4	6.7 ± 13.6	11.1 ± 21.7	0.705
Trouble swallowing	7.0 ± 14.0	8.3 ± 17.1	17.8 ± 22.7	36.1 ± 33.2	**0.000**
Tingling hands or feet	14.0 ± 20.2	11.0 ± 18.7	13.3 ± 18.8	5.6 ± 13.0	0.543
Hair loss	28.1 ± 25.5	26.6 ± 25.2	28.9 ± 27.3	30.6 ± 22.3	0.897

[a]: *Kruskal-Wallis Test*

DISCUSSION

In this study, the majority of patients have an ECOG = 1 (accounting for 64.1%), reflecting patients only limited self-care, only 7.1% patients required lying in bed or chair for more than 50% of waking hours (ECOG = 3). This result is similar to previous study Do Mai Linh in 62 NSCLC stage IV at Nghe An Oncology hospital (Vietnam) in 2019-2020, showed that ECOG ≥ 2 accounted for 24.2% and there were no patients with ECOG > 3 (7).

According to quality of life assessment, common symptoms disturb QoL of NSCLC patients were cough, difficulty breathing and chest pain. The rate of symptoms was 71.8%; 85.9% and 46.5%. This result is quite similar to Tsai-Chung Li's report with 73.7%; 64.4% and 41.0% respectively (8). In terms of treatment unwanted effects, this study found the most was hair loss, a common symptom caused by chemotherapy, account highest with 27.5 ± 25.2 score, the next was difficult swallowing (11.8 ± 20.6), tingling hands or feet (11.4 ± 18.5) and the lowest was sore mouth or tongue (6.5 ± 15.1). To our knowledge, there is no agreement in the literature on which is the most common unwanted effects in lung cancer patients with chemotherapy treatment, these symptoms should be paid attention in order to improve patient's quality of life.

The association between performance status and quality of life in patients with advanced-stage non-small cell lung cancer (NSCLC) is a critical aspect of patient care and management. Our study reveals a significant correlation between these two variables, indicating that as performance status deteriorates, the overall quality of life declines. This finding aligns with previous research suggesting that patients with lower performance status scores, as measured by the ECOG tool, experience greater difficulties in daily activities and increased symptom burden, resulting in poorer quality of life.

Performance status serves as a valuable predictor of treatment outcomes and survival rates in NSCLC patients. By assessing performance status, healthcare providers can make more informed decisions regarding treatment plans, aiming to balance the efficacy and potential side effects of interventions. Considering the strong association we observed, interventions aimed at maintaining or improving performance status are likely to have a beneficial impact on patients' quality of life.

Furthermore, our study highlights the importance of a multidisciplinary approach to NSCLC management. Incorporating supportive care measures such as nutritional support, pain management, and psychosocial interventions could help optimize performance status and, consequently, enhance quality of life. Early palliative care, tailored to individual patient needs, can also play a crucial role in improving patients' overall well-being.

Limitations of this study include the relatively small sample size and the single-center design, which may affect the generalizability of the findings. Future research should focus on larger, multi-center studies to validate these results and explore additional factors influencing the relationship between performance status and quality of life. Moreover, longitudinal studies could provide insights into how changes in performance status over time impact quality of life, potentially guiding interventions at various stages of the disease.

In conclusion, our study underscores the significant association between performance status and quality of life in advanced-stage NSCLC patients. By prioritizing interventions that support performance status, healthcare providers can enhance the quality of life for this patient population, emphasizing the need for comprehensive and patient-centered care approaches in oncology practice.

CONCLUSION

In summary, we found that a link between performance status (defined by ECOG toolkit) and a decline in quality of life (using EORTC-QLQ-C13 questionnaire) in advance stage NSCLC patients. Second, QoL

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symptoms or problems had correlation with ECOG categories. This finding suggested that improving aspects of quality of life sufficiently can enhance the performance abilities of patients with advanced stage NSCLC.

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REFERENCES

1. He S, Li H, Cao M, Sun D, Yang F, Yan X, et al. Survival of 7,311 lung cancer patients by pathological stage and histological classification: a multicenter hospital-based study in China. Transl Lung Cancer Res. 2022;11(8):1591-605.

2. Tran HTT, Nguyen S, Nguyen KK, Pham DX, Nguyen UH, Le AT, et al. Lung Cancer in Vietnam. Journal of Thoracic Oncology. 2021;16(9):1443-8.

3. Sorensen JB, Klee M, Palshof T, Hansen HH. Performance status assessment in cancer patients. An inter-observer variability study. British journal of cancer. 1993;67(4):773-5.

4. Liao C-H, Yu S, Lin K-C, Wu Y-C, Wang T-J, Wang K-Y. The determinants of health-related quality of life among patients with newly diagnosed lung cancer in Taiwan: A cross-sectional study. Journal of the Chinese Medical Association. 2023;86(3):338-44.

5. Bergman B, Aaronson NK, Ahmedzai S, Kaasa S, Sullivan M. The EORTC QLQ-LC13: a modular supplement to the EORTC Core Quality of Life Questionnaire (QLQ-C30) for use in lung cancer clinical trials. EORTC Study Group on Quality of Life. Eur J Cancer. 1994;30a(5):635-42.

6. Oken MM, Creech RH, Tormey DC, Horton J, Davis TE, McFadden ET, et al. Toxicity and response criteria of the Eastern Cooperative Oncology Group. American journal of clinical oncology. 1982;5(6):649-55.

7. Đỗ Mai Linh THT, Nguyễn Văn Hiếu. Đánh giá kết quả thuốc Erlotinib trong điều trị bước một ung thư phổi không tế bào nhỏ có đột biến EGFR. Tạp chí Nghiên cứu y học. 2021;137(1):76-83.

8. Li TC, Li CI, Tseng CH, Lin KS, Yang SY, Chen CY, et al. Quality of life predicts survival in patients with non-small cell lung cancer. BMC Public Health. 2012;12:790.