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Original Article

Neutrophil-to-lymphocyte Ratio as a Predictor of Prognosis in Patients with Small Cell Lung Cancer: A Retrospective Study

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ABSTRACT

Objective: Neutrophil-to-lymphocyte Ratio (NLR) is an easily measurable parameter with prognostic value for various types of cancer. The role of NLR in terms of prognosis in small cell lung cancer (SCLC) is controversial. The aim of this study was to investigate the relationship between NLR, platelet-to-lymphocyte ratio (PLR), other potential factors and prognosis in patients with SCLC.

Methods: A retrospective cohort study enrolled 396 patients diagnosed with SCLC between January 1, 2008, and December 31, 2012 in the department of chest diseases of a tertiary hospital. Patients were grouped according to their NLR levels at the time of diagnosis; low-NLR (<4) (Group 1) and high-NLR (≥4) (Group 2). These groups were compared with the recorded data and predictors of mortality and the results were analyzed.

Results: Patients with low-NLR (<4) (Group 1) had worse performance status, extensive stage, and lower response rate compared to patients with high-NLR (≥4) (Group 2). Median overall survival (OS) was worse in the high-NLR group than in the low-NLR group (Group 1). In contrast, elevated PLR was not associated with OS. Multivariate analysis showed that elevated NLR and lactate dehydrogenase, stage, smoking history, presence of malign pleural effusion were independent prognostic factors for OS.

Conclusion: Elevated NLR is easily measurable can be used as a prognostic marker that reflects poor prognosis, while PLR is not associated with survival for patients with SCLC.

INTRODUCTION

Small cell lung cancer (SCLC) is an aggressive type of lung tumor that comprises 20–25% of all lung cancer cases.[1] The survival rate is poor with a 5-year survival rate is only 5–10%, and the median survival is about 2–4 months in patients not receiving treatment.[2,3] However, despite a significant advantage that has been achieved in survival by the introduction of various chemotherapy methods into treatment planning, the prognosis still remains poor. Therefore, effective and easily measurable prognostic markers are needed to take an active role in planning appropriate treatment and patient management at the time of diagnosis.

Among the various parameters for SCLC, stage, baseline lactate dehydrogenase (LDH), C-reactive protein (CRP), treatment modalities, performance status (PS), age, gender, weight loss and smoking have been implicated as prognostic factors by previous evidence.[4,5] In addition, reassigned laboratory biomarkers such as carcinoembryonic antigen, cytokeratin-19 fragments, progastrin-releasing peptide, and tumor M2-pyruvate kinase are also not easily accessible and costly.[6]

Emerging evidence has indicated that the inflammatory response is associated with poor prognosis in various types of solid tumors. NLR is a systemic inflammatory marker that has been proven to be a prognostic factor in many cancer types such as colorectal, pancreas, hepatocellular and non-small cell lung cancer.[7,8] Recently, tumor-associated neutrophils have been shown to play a critical role in tumor biology, including tumor angiogenesis, progression, invasion and metastasis.[9,10] Similarly, platelets are activated by proinflammatory cytokines and participate in neutrophil recruitment.[11] Therefore PLR has also been evaluated as a tumor-related inflammation marker, however, the prognostic value of PLR in cancer is controversial. High PLR has been reported to be a risk factor for poor prognosis in pancreatic, colorectal, non-small cell lung cancer (NSCLC), head and neck cancer.[12–14] On the other

hand, there are reports indicating that for lung cancer is not associated with survival.[15,16] Among these inflammatory markers, there is also evidence that NLR is a better prognostic marker than PLR.[17] Due to their aggressive and rapid progression, it is advantageous to use such prognostic markers, which are easily accessible and practical, in the diagnosis of SCLC. However, the evidence for these markers in patients with SCLC is limited and their role in predicting prognosis is unclear. The aim of this study was to investigate the prognostic value of NLR and PLR in patients with SCLC.

MATERIALS AND METHODS

This retrospective cohort study was conducted in the chest diseases department of a tertiary teaching hospital.

The study was approved by the local ethics committee (03.06.2014-89513307/1009/302). Ethical approval was in accordance with the Declaration of Helsinki.

Patients

A total of 396 patients were diagnosed with SCLC histopathologically using various diagnostic methods in the study period. All patients received standard treatment. Patients with no data, concomitant active infection and extrapulmonary primer cancer were excluded from the study. A flowchart of the study design is summarized in Figure 1.

Data collection

The data were collected from the hospital database and patient files. Demographics and characteristics of the patients including smoking history and status, comorbidities, Eastern Cooperative Oncology Group-Performance Status (ECOG) performance status, stage, diagnostic and therapeutic methods were obtained. Laboratory examination at the time of diagnosis including complete blood cell (CBC) counts, albumin (g/L), LDH (U/L), CRP (mg/dL) were recorded. The thorax was evaluated using thorax computed tomography (CT) scan reports evaluated by a radiologist who was blind to the clinical presentations and laboratory of the patients as in normal clinical practice. Histopathologically diagnostic data were collected from the pathology reports of the various tissue materials obtained. All patients' mortality data were recorded from the electronic death notification system of the state from the website http://obs.gov.tr website.

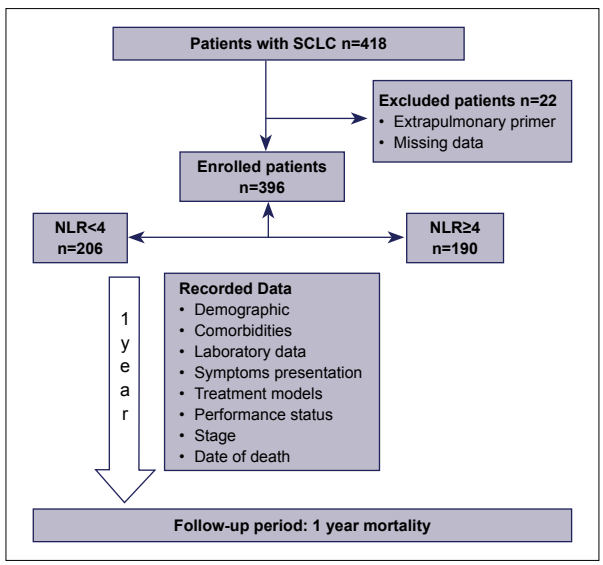

Figure 1. Flow chart of the study.

Definitions

Smoking for more than one year was considered as smoker. Limited disease (LD) was defined as disease confined to the ipsilateral chest within a single radiation field, while extensive disease (ED) was defined as disease beyond the ipsilateral hemithorax including malignant pleural, pericardial effusion, or hematogenous metastasis.[18] If pleural effusion was detected on thorax CT, it was classified as ipsilateral or contralateral to the the tumor. The malign pleural effusion was detected by the pathology department after detecting malignant cells in pleural fluid cytology and/or pleural biopsy.

The NLR was defined as the absolute neutrophil count divided by the absolute lymphocyte count. PLR was also defined as the absolute platelet count divided by the absolute lymphocyte count. NLR was grouped by a cut-off point (<4, Group 1 and ≥4, Group 2), and PLR was grouped by cut-off points (<180 and ≥180). Normal total leukocyte count was between 4.8x10^{9}L to 10x10^{9}L and values less than 4.8x10^{9}L were considered as an indication of leukopenia and values higher than 10x10^{9}L were accepted as leukocytosis. Normal platelet count was taken between 130x10^9 to 400x10^9/mm^3, and values lower than 130x10^{9}L were accepted as thrombocytopenia and values higher than 400x10^{9}L were considered as thrombocytosis.

Except for those who received chemotherapy and/or radiotherapy, the treatment of patients who did not receive both treatments and who received only symptomatic treatment was defined as palliative treatment.

Statistical analysis

The estimated optimal cut-off values for NLR and PLR were determined using time-dependent receiver operating curve (ROC) analysis. In the study, normal and homogeneously distributed data were presented as mean ± standard deviation, and data that did not show normal distribution and homogeneous distribution were given as median (min-max) values, as well as number and percentage values. The distribution of the variables was checked with the Kolmogorov Smirnov test, and its homogeneity was checked with One-way ANOVA. In the study, t-test was used for parametric data analysis, and Mann-Whitney U test for non-parametric data, and the Chi-Square test was used for categorical data analysis were used. The Kaplan-Meier method was used for the survival curve of the patients and log-rank test was used to calculate the survival differences between the groups. Cox Regression

analysis was used for multivariate survival analysis. The results were evaluated within the 95% confidence interval and the significance level was p<0.05. While evaluating the findings obtained in the study, SPSS (Statistical Package for Social Sciences) for Windows 22.0 program was used for statistical analysis.

RESULTS

Patient characteristics

Of 396 patients, 358 (90.4%) were male and 38 (9.6%) were female. The median age was 59 (37–87 years old), and 130 (32.2%) patients were aged 65 years and over and 266 (67.2%) were under 65 years of age. The median age and over 65 years of age were higher in Group 2 (p=0.007 and p=0.039, respectively) than Group 1. Patients had poor PS and extensive stage were significantly higher in Group 2. Other demographic characteristics were similar in both groups. In laboratory examination, those with albumin ≥3 g/L, PLR ≥180 and mean platelet counts were found to be significantly higher in Group 2 (p<0.001, each). Other labs were similar. Weight loss and fatigue were found to be significantly different between groups (p=0.02, p=0.002, respectively), however, other symptoms were similar. Patients with liver metastasis and pleural effusion were significantly higher in Group 2 than Group1 (p=0.048, p=0.011, respectively). On the other hand, no statistically significant difference was found between the two patient groups with bone metastasis, brain metastasis, malignant pulmonary effusion, and malignant pleural effusion on the opposite side of the tumor (p=0.228, p=0.096, p=0.302, p=0.256, respectively). There was no difference between the two groups in terms of treatment modalities (p=0.206). Demographics, clinical and laboratory characteristics of the groups are shown in Table 1.

The patients were diagnosed with SCLC using fiberoptic bronchoscopy (78.3%), peripheral lymphadenopathy biopsy (8.8%), mediastinoscopy (5.3%), transthoracic needle aspiration biopsy (3.8%), wedge resection (1.3%), lobectomy (1%), thoracentesis (1%), pneumonectomy (0.5%).

The median survival of 396 patients was 8.53 months (95% CI: 7.55–9.51) and the one-year survival rate was 33.8%. The OS rate of Group 2 was significantly worse than Group 1 shown in the Kaplan–Meier cumulative survival curves (p=0.001) (Fig. 2).

The effects of demographic and clinical characteristics on survival are shown in Table 2 and Table 3 (Group 1, NLR <4 vs Group 2, NLR ≥4). In univariate analyses performed, gender (p=0.004), age (p=<0.001) and dyspnea (p=0.04), cough (p=0.04), weight loss (p=0.038), loss of appetite (p=0.021) and chest pain (p=0.015) were determined as prognostic factors associated with survival. However,the presence of comorbidity (p=0.052), smoking status (p=0.110), cigarette pack/years (p=0.060), hemoptysis (p=0.354) and fatigue (p= 0.622) were not associated with survival (Table 2). Additionally, extrapulmonary metastasis, extensive stage, malignant pleural effusion, poor PS, and receiving palliative treatment were associated with worse survival (p<0.001, each) (Table 3). The factors associated with poor survival in the laboratory values at diagnosis were high CRP (p<0.001), LDH (p<0.001) and NLR (p=0.015), while low albumin (p=0.001) levels and platelet (p<0.001) count. However, PLR (p=0.56) and leucocytes (p=0.50) count were not associated with OS (Table 4). Kaplan–Meier curves of survival for PLR are shown in Figure 3.

Factors affecting survival in multivariate analysis were investigated using Cox regression model, smoking (HR=1.35, 95% CI 1.073–1.708; p=0.01), extensive stage (HR=1.9, 95% CI 0.571–6.701; p<0.001), malign pleural effusion

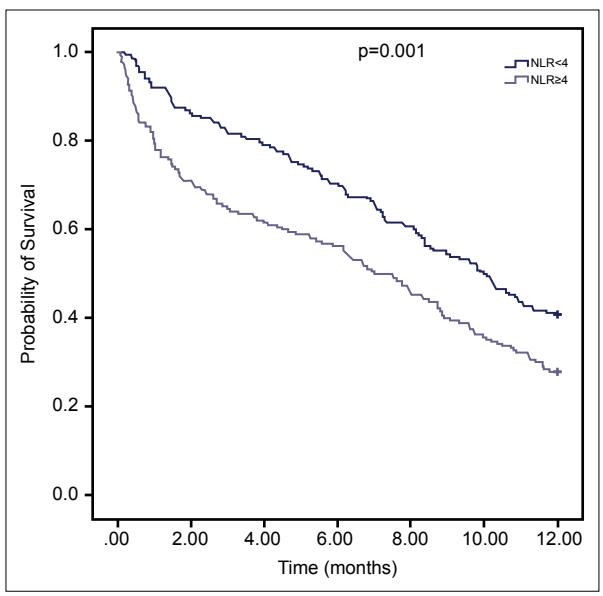

Figure 2. Kaplan–Meier curves of survival for NLR is shown in Figure 2

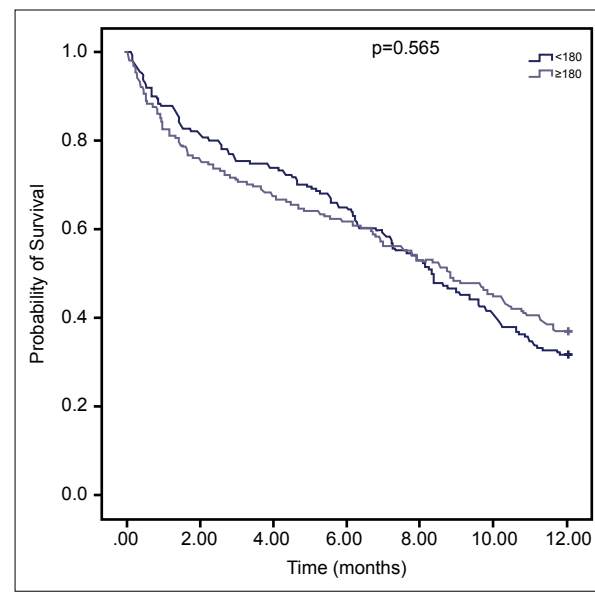

Figure 3. Kaplan–Meier curves of survival for PLR is shown in Figure 3.

Table 1. Patient characteristics in the study groups

	Total number of patients n (%)	Group 1 (NLR <4) n (%)	Group 2 (NLR ≥4) n (%)	p-value
Number of patients	396	206	190	
Median age	59 (37–87)	58 (37–84)	61 (38–87)	0.007*
Age				
≥65 years	130 (32.8)	58 (44.6)	72 (55.4)	0.039
<65 years	266 (67.2)	148 (55.6)	11 (44.4)	
Gender				
Male	358 (90.4)	186 (52)	172 (48)	0.937
Female	38 (9.6)	20 (52.6)	18 (47.4)	
Smoking status				0.141
Current smoker	125 (31.6)	61 (48.8)	64 (51.2)	
Non-smoker	255 (64.4)	133 (52.2)	122 (47.8)	
Ex-smoker	16 (4.0)	12 (75)	4 (25)	
Smoking (packs/years)				
<50	186 (47)	96 (51.6)	90 (48.4)	0.879
≥50	210 (53)	110 (52.4)	100 (47.6)	
ECOG PS at diagnosis				
0–2	262 (66.2)	146 (55.7)	116 (44.3)	0.039
3–4	134 (33.8)	60 (44.8)	74 (55.2)	
Stage				
Limited	121 (30.6)	72 (59.5)	49 (40.5)	0.048
Extensive	275 (69.4)	134 (48.7)	141 (51.3)	
Platelet $\times 10^9$/l, mean±SD	324±131.1	291 (24–729)	319 (62–1097)	<0.001
PLR at diagnosis, mean±SD				
<180	193 (48.7)	154 (79.8)	39 (20.2)	<0.001
≥180	203 (51.3)	52 (25.6)	151 (74.4)	
Albumin, g/L				
<3	103 (26)	24 (23.3)	79 (76.7)	<0.001
≥3	293 (74)	182 (88.3)	111 (58.4)	
LDH at diagnosis U/L				
<200	105 (26.5)	62 (59)	43 (41)	0.093
≥200	291 (73.5)	144 (69.9)	147 (77.4)	
CRP at diagnosis mg/dl				
<5	51 (12.9)	33 (64.7)	18 (35.3)	0.071
≥5	345 (87.1)	173 (50.1)	172 (49.9)	
Comorbidities				
Yes	192 (48.5)	91 (47.4)	101 (52.6)	0.074
No	204 (51.5)	115 (56.4)	89 (43.6)	
Presenting symptoms				
Shortness of breath	221 (55.8)	113 (51.1)	108 (48.9)	0.691
Cough	240 (60.6)	122 (50.8)	118 (49.2)	0.558
Chest pain	65 (16.4)	35 (53.8)	30 (46.2)	0.747
Fatigue	94 (23.7)	36 (38.3)	58 (61.7)	0.002
Weight loss	98 (24.7)	41 (41.8)	57 (58.2)	0.020
Hemoptysis	77 (19.4)	39 (50.6)	38 (49.4)	0.788
Extrapulmonary metastasis				
Bone	130 (32.8)	62 (47.7)	68 (52.3)	0.228
Brain	78 (19.7)	34 (43.6)	44 (56.4)	0.096
Liver	99 (25)	43 (43.4)	56 (56.6)	0.048
Pleural effusion	104 (26.3)	43 (41.3)	61 (58.7)	0.011
Malign pleural effusion	71 (17.9)	33 (16)	38 (20)	0.302
Malign pleural effusion at opposite lung	35 (8.8)	15 (42.9)	20 (57.1)	0.256
Treatment methods				
Chemo±radiotherapy	267 (67.4)	133 (49.8)	134 (134)	0.206
Only palliative treatment	129 (32.6)	73 (56.6)	56 (43.4)	

ECOG PS: Eastern Cooperative Oncology Group-Performance Status; NLR: Neutrophil-Lymphocyte ratio; Group 1: NLR <4, Group 2: NLR ≥4; LDH: Lactate dehydrogenase; PLR: Platelet-Lymphocyte Ratio. *Mann-Whitney U Test.

Table 2. Effects of demographic characteristics and symptoms on survival*

	Median survival (months)	95% CI	p-value
Gender			
Male	7.28	6.82–7.74	0.004
Female	9.40	8.15–10.66	
Age			
<65 years	9.73	8.77–10.6	<0.001
≥65 years	8.53	7.54–9.51	
Smoking status			
Non-smoker	8.97	4.91–13.02	0.110
Ex-smoker	9.33	8.36–10.29	
Current smoker	7.23	5.67–8.78	
Smoking (packs/years)			
<50	9.33	7.94–10.71	0.060
≥50	7.83	6.32–9.33	
Comorbidities			
Yes	9.07	7.79–10.34	0.052
No	7.77	6.14–9.51	

CI: Confidence interval, *by log-rank test.

Table 3. Effects of stage, metastasis, performance score and treatments on survival*

	Median survival (months)	95% CI	p-value
Extrapulmonary metastasis			
Yes	7.50	6.67–8.32	<0.001
No	13.00	7.07–18.92	
Stage			
Limited	13.50	7.67–19.32	<0.001
Extensive	7.50	6.65–8.34	
Pleural effusion			
No	9.97	8.92–11.01	<0.001
Yes	2.40	0.91–3.89	
Malignant pleural effusion			
No	9.73	8.75–10.70	<0.001
Yes	1.70	0.62–2.77	
ECOG PS			
0-2	10.90	9.78–12.01	<0.001
3-4	2.03	0.84–3.22	
Chemo and/or radiotherapy	10.03	8.885–11.175	<0.001
Palliative treatment	2.8	0.000–5.651	

ECOG PS: Eastern Cooperative Oncology Group performance score; CI: Confidence interval, *by log-rank test.

(HR=1.73, 95% CI 1.086–2.782; p=0.021), elevated LDH (HR=1.51, 95% CI 1.108–2.061; p=0.009) and elevated NLR (HR=1.44, 95% CI 1.061–1.962; p=0.019) were independent factors associated with OS (Table 5).

Table 4. Relationship between laboratory results and survival*

	Median survival (months)	95% CI	p-value
C-reactive protein			
≤5 mg/dL	19.90	12.27–28.52	<0.001
>5 mg/dL	7.83	6.31–9.34	
Blood LDH			
<200 U/L	11.20	8.84–13.55	<0.001
≥200 U/L	7.90	6.76–9.03	
Blood albumin			
≥3.0 g/L	10.23	9.01–11.44	0.001
<3.0 g/L	7.23	6.11–8.35	
Platelets			
Thrombocytosis (>400,000)	8.73	7.75–9.70	<0.001
Thrombocytopenia (<130,000)	0.73	0.34–1.11	
Normal	8.50	7.34–9.65	
Leukocytes			
Leukocytosis	8.23	6.54–9.92	0.509
Leukopenia	3.50	0.01–17.14	
Normal leukocyte count	8.83	7.57–10.09	
Neutrophil lymphocyte ratio			
<4	9.96	8.53–11.39	0.015
≥4	7.00	5.55–8.44	
Platelet lymphocyte ratio			
<180	8.37	7.074–9.666	0.565
≥180	8.83	7.136–10.524	

LDH: Lactate dehydrogenase; CI: Confidence interval, *by log-rank test.

DISCUSSION

The primary finding of this study is that high NLR (≥4) is an independent prognostic factor and is significantly associated with survival in patients with SCLC. The study also showed that; smoking, extensive stage, elevated LDH and malign pleural effusion are independent predictive factors for poor prognosis, whereas PLR is not associated with survival.

Many studies have demonstrated that NLR predicts prognosis in various solid tumors.[8] In the largest published meta-analysis of 18 studies involving 7219 lung cancer patients, most of whom had NSLC, it was reported that pretreatment NLR of ≥4 effectively predicted poor survival.[7] Recent studies have focused on the role of inflammatory factors, NLR and PLR on prognosis in patients with SCLC, but there are limited studies and data are still insufficient.

Table 5. Cox regression analysis for the multivariate factors effecting survival

	Multivariate analysis		
	p-value	**HR**	**(95% CI)**
Smoking	0.011	1.35	(1.073–1.708)
Stage			
Limited	<0.001	0.50	(0.368–0.682)
Extensive			
Malign pleural effusion	0.021	1.73	(1.086–2.782)
LDH			
<200	0.009	1.51	(1.108–2.061)
≥200			
Albumin			
<3	0.004	0.65	(0.486–0.872)
≥3			
NLR at diagnosis			
<4	0.019	1.44	(1.061–1.962)
≥4			
PLR at diagnosis			
<180	0.008	0.66	(0.495–0.901)
≥180			
Treatment	<0.001	0.387	(0.295–0.506)
Chemo and/or radiotherapy			

NLR: Neutrophil-lymphocyte ratio. Group 1: NLR <4, Group 2: NLR≥4. LDH: Lactate dehydrogenase; PLR: Platelet-lymphocyte ratio; HR: Hazar ratio; CI: Confidence interval.

In our results, patients with high NLR had shorter survival than patients with low NLR. In the multivariate analysis, high NLR was an independent prognostic factor with a hazard ratio of 1.44 (95% CI 1.061–1.962). We found that PLR was significantly higher in patients with high NLR, but high PLR was not associated with survival, similar to previous studies.[19,20] Recently, both Kang et al.[19] and Shao et al.[15] reported that high NLR at diagnosis predicted poor prognosis in SCLC patients, while PLR was not associated with survival. Their cut-off values of NLR (Kang et al., 4 and Shao et al., 4.15) were approximate to our provided comparable and optimal results. In another study, Liu et al.[21] found that NLR was an independent prognostic factor in SCLC patients, consistent with our primary result, but differently, they showed that PLR was associated with an overall poorer prognosis. However, they also explained that certain laboratory changes were observed in the group with high PLR and could cause bias. Also, in a study investigating prognostic markers according to the stage in 938 patients with SCLC, Xie et al.[22] found that NLR was an independent prognostic factor in extensive stage and PLR was also an independent prognostic factor in the limited stage. Based on this, the fact that PLR is not associated with prognosis in our study can be explained by the fact that the majority of the patients are in the extensive stage. On the other hand, in a meta-analyse Gu et al.[13] demonstrated that elevated PLR predicted poor survival, but according to results of subgroup analyses, the role of PLR in prognosis may vary depending on ethnicity. In the study of Lohinai et al.,[23] high NLR was significantly associated with short survival, consistent with our study; while PLR had no prognostic impact. Similar to our study, in a study conducted with extensive-stage patients with SCLC, the NLR cut-off value was taken as 4 and found to be a prognostic factor.[24] Eventually, although the role of PLR on prognosis is still controversial, the results of the reports are more stable for NLR. With our primary finding, we would like to draw attention that NLR at diagnosis is an easily measurable marker that can be used in clinical practice to evaluate the prognosis in SCLC patients.

Many laboratory and clinical prognostic factors have been shown to predict the prognosis for SCLC. In the study conducted by Kang et al.,[19] LDH and extensive stage were independent predictors in patients with SCLC. In a multicenter prospective study by Bremnes et al.[4] 436 patients with SCLC were enrolled, demonstrating that gender, extensive stage, poor PS, weight loss, thrombocytopenia, and elevated LDH were independent prognostic factors. In the same study, male, extensive stage, poor PS, weight loss, pleural, bone, liver and brain metastases were associated with short survival. In addition, other studies have shown that high CRP and low albumin levels were associated with shorter survival in patients with lung and any type of cancer.[25,26] As shown in the present study, age, gender, poor PS, extensive stage, extrapulmonary metastasis, malignant pleural effusion, and palliative treatment were associated with short survival. Also, from laboratory examination, high CRP, high LDH, low albumin and thrombocytopenia were also associated with poor survival. Furthermore, we found that smoking, extensive stage, malignant pleural effusion and high LDH were independent prognostic factors. Our secondary findings support the previous studies and reinforce the prognastic value of the parameters we obtained.

There are conflicting results as to whether symptoms presentation is associated with survival in patients with lung cancer. Braun et al.[27] found that fatique, pain, dyspnea, and loss of appetite were significant predictors of survival in patients with NSLC. On the other hand, Gupta et al.[28] suggested that none of these symptoms was significantly predictive of survival in patients with advanced stage of NSCL. Our results emphasized the importance symptom presentation on prognosis in SCLC patients, where dyspnea, chest pain, loss of appetite, weight loss and cough were associated with survival.

One of the important limitations of the study is that it has a retrospective design, and the other is that the progression-free survival data were not available because of retrospective data collection.

CONCLUSION

A high NLR (≥4) at diagnosis is an easy measure reflecting the poor prognosis in patients with SCLC. NLR is an inde-

pendent prognostic factor that can be used to predict the prognosis in clinical practice.

Ethics Committee Approval

This study approved by the Istanbul Kartal Dr. Lutfi Kirdar Training and Research Hospital Ethics Committee (Date: 03.06.2014, Decision No: 89513307/1009/302).

Informed Consent

Retrospective study.

Peer-review

Internally peer-reviewed.

Authorship Contributions

Concept: P.A.G.; Design: I.I.; Supervision: P.A.G.; Materials: S.A.; Data: I.I.; Analysis: U.S.K.; Literature search: I.I.; Writing: P.A.G.; Critical revision: I.I.

Conflict of Interest

None declared.

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Küçük Hücreli Akciğer Kanseri Olan Hastalarda Prognoz Prediktörü Olarak Nötrofil-Lenfosit Oranı: Retrospektif Bir Çalışma

Amaç: Nötrofil-lenfosit oranı (NLO), çeşitli kanser türleri için prognostik değeri olan, kolayca ölçülebilir bir parametredir. Küçük hücreli akciğer kanserinde (KHAK) NLO'nun prognoz açısından rolü tartışmalıdır. Bu çalışmanın amacı; KHAK'li hastalarda NLO, TLO (trombosit-lenfosit oranı) gibi potansiyel faktörleri değerlendirmek ve bunların prognoz ile arasındaki ilişkiyi araştırmaktır.

Gereç ve Yöntem: Retrospektif kohort çalışması, 1 Ocak 2008 ile 31 Aralık 2012 tarihleri arasında KHAK tanısı konan 396 hastayı üçüncü basamak bir hastanenin göğüs hastalıkları bölümüne dahil etmiştir. Tanı sırasında NLO düzeylerine göre gruplandırılan hastalar; düşük NLO (<4) (Grup 1) ve yüksek NLO (≥4) (Grup 2) ayrıldı. Bu gruplar kaydedilen verilerle karşılaştırılmış ve mortalite ile ilgili prediktif değerler analiz edilmiştir.

Bulgular: Yüksek NLO'ya sahip hastalar düşük NLO'ya sahip hastalara kıyasla daha kötü performans durumu, geniş evre ve daha düşük yanıt oranına sahipti. Genel sağkalım (OS) yüksek NLR grubunda daha kötü idi. Aksine, yüksek TLO OS ile ilişkili değildi. Çok değişkenli analiz, yüksek NLO ve laktat dehidrojenaz, evre, sigara öyküsü, malign plevral efüzyon varlığının OS için bağımsız prognostik faktörler olduğunu göstermiştir.

Sonuç: Yüksek NLO kolayca ölçülebilir ve kötü prognozu yansıtan prognostik bir belirteç olarak kullanılabilirken, TLO KHAK'li hastalar için sağkalım ile ilişkili değildir.

Anahtar Sözcükler: Küçük hücreli akciğer kanseri; mortalite; nötrofil-lenfosit oranı; prognoz; survey.