

PREVALENCE OF COPD IN PATIENTS WITH LUNG CANCER

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Abstract. Introduction: Chronic obstructive pulmonary disease (COPD) is a leading cause of morbidity, mortality, and healthcare costs worldwide. Lung cancer is the second most common cancer and is the leading cause of cancer mortality, accounting for almost 25% of all cancer deaths. This study aims to investigate the prevalence of COPD in patients with lung cancer (LC). **Materials and Methods:** This is a cross-sectional observational study. Consecutive patients with suspected LC in a respiratory clinic were studied. The method of verification of the lung abnormalities (fibrobronchoscopy and/or transthoracic biopsy) was performed. Postbronchodilator spirometry was performed. An FEV1/FVC ratio < 0.7 was diagnostic for the presence of COPD. The association between the presence of COPD and LC with other routine tests (laboratory tests, blood gas analysis, CT) was also analyzed. **Results:** A total of 65 patients with verified LC were included. 48.4% of the LC patients in this study had COPD. There was no significant difference in the prevalence of COPD in the different subgroups of non-small cell cancer: unspecified non-small cell cancer – 62.5%, squamous cell cancer – 50%, adenocarcinoma – 45.8% ($p = 0.33$). Patients with COPD and LC had lower FEV1 (56.9 vs. 70.5%, $p = 0.01$) but not FVC (71.6 vs. 74.6%, $p = 0.67$). The presence of COPD in LC patients was associated with lower leukocytes (8.8 vs. 11.3 $\times 10^9$, $p = 0.018$). Squamous cell cancer was associated with a higher number of leukocytes compared to adenocarcinoma (11.0 vs. 8.4 $\times 10^9$, $p = 0.026$), although smoking showed no clear association with histology. **Conclusion:** Nearly half (48.4%) of the patients with LC also had COPD.

Key words: COPD, lung cancer, prevalence, spirometry, histology

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INTRODUCTION

Chronic obstructive pulmonary disease (COPD) is a leading cause of morbidity, mortality, and healthcare costs worldwide [1].

Lung cancer (small cell and non-small cell lung cancer) is the second most common cancer and is the leading cause of cancer mortality, accounting for al-

most 25% of all cancer deaths [2]. More people die each year from lung cancer than from colon, breast, and prostate cancers combined.

About 10-15% of smokers develop lung cancer [3]. Age, smoking, family history, and impaired lung function have been identified as key risk factors [4]. At the same time, these are also risk factors for the development of COPD.

This study aims to investigate the prevalence of COPD in patients with lung cancer (LC).

MATERIALS AND METHODS

This is a cross-sectional observational study. Consecutive patients with suspected LC in a respiratory clinic of MHATPD “Sv. Sofia”, Sofia were studied. The method of verification of the lung abnormalities (fibrobronchoscopy and/or transthoracic biopsy) was performed.

Postbronchodilator spirometry was performed. An FEV1/FVC ratio < 0.7 was diagnostic for the presence of COPD. Routine blood tests (ESR, complete blood count) and arterial blood gas analysis were performed. In the presence of CT data, the cancer was staged according to the eighth revision of the TNM classification [5].

Data were analyzed using RStudio v1.4.1743.

RESULTS

Population characteristics

A total of 65 patients with verified LC were included. Patients with secondary malignancy were excluded (n = 5). The mean age was 65.4 (standard deviation [SD]: 7.8) years, mean FEV1 was 64.1% (SD: 21.1%). Table 1 summarizes the characteristics of the included patients.

COPD prevalence and correlations

In this study 48.4% of patients with LC had COPD. In the subgroup with non-small cell carcinoma (unspecified non-small cell, squamous cell, and adenocarcinoma), the prevalence of COPD was 50%. There were no patients with small cell cancer and COPD, but it should be noted that this subgroup consisted of only 4 patients. There was no significant difference in the prevalence of COPD in the different subgroups of non-small cell carcinoma – unspecified non-small cell (62.5%), squamous cell (50%), and adenocarcinoma (45.8%) (p = 0.33). In the vast majority of cases, lung cancer was diagnosed at an advanced stage – 50.8% at stage IV, followed by 32.8% at stage III.

The patients with COPD and LC had lower FEV1 values (56.9 vs. 70.5%, p = 0.01) but not FVC (71.6 vs. 74.6%, p = 0.67). The presence of COPD in LC patients was associated with lower leukocytes (8.8 vs. 11.3 x10⁹, p = 0.018).

The presence of COPD had no effect on the blood gas parameters – pO₂ (73.0 vs. 72.1 mm Hg, p = 0.75), pCO₂ (34.2 vs. 33.6 mm Hg, p = 0.77) and SatO₂ (94.8 vs. 94.9%, p = 0.78).

Squamous cell cancer was associated with a higher number of leukocytes compared to adenocarcinoma (11.0 vs. 8.4 x10⁹, p = 0.026), although smoking showed no clear association with histology.

Table 1. Patient characteristics (n = 65)

Characteristic	Value
Age, years (± SD)	65.4 ± 7.8
Male, n (%)	57 (87.7%)
Smoking status:	
– Non-smoker	9 (13.8%)
– Former smoker	19 (29.2%)
– Current smoker	37 (56.9%)
Smoking packyears (± SD)	34.9 ± 18.9
Histology:	
– Non-small cell, unspecified	8 (12.3%)
– Squamous cell	27 (41.5%)
– Adenocarcinoma	25 (38.5%)
– Pleomorphic	1 (1.5%)
– Small cell	4 (6.2%)
Spirometry (± SD):	
– FVC, L	2.80 ± 0.9
– FVC, %	73.2 ± 21.3
– FEV1, L	1.92 ± 0.7
– FEV1, %	64.1 ± 21.1
Lab tests (± SD):	
– ESR, mm/h	40.5 ± 22.7
– Leucocytes, x10 ⁹	10.1 ± 4.3
– Erythrocytes, x10 ¹²	4.6 ± 0.7
– Hemoglobin, g/l	132.3 ± 23.2
– Hematocrit	0.39 ± 0.1
– Platelets, x10 ⁹	340.0 ± 136.1
– Lymphocytes, %	23.0 ± 9.6
– Monocytes, %	5.5 ± 2.4
– Neutrophils, %	71.4 ± 11.0
Arterial blood gas analysis (± SD):	
– pCO ₂ , mm Hg	33.9 ± 4.6
– pO ₂ , mm Hg	73.0 ± 10.0
– SatO ₂ , %	94.9 ± 2.0
CT stage at diagnosis:	
– stage I	4 (6.5%)
– stage II	6 (9.8%)
– stage III	20 (32.8%)
– stage IV	31 (50.8%)
– No CT data	4 (6.6%)

DISCUSSION

This study shows that nearly half (48.4%) of the patients with LC also have COPD.

According to the literature, the prevalence of COPD is 40-70% in patients diagnosed with lung cancer [4, 6], although it is highly dependent on diagnostic criteria, age, gender, and smoking exposure [7]. The prevalence of COPD was 50% in 301 patients with

lung cancer, whereas in a control group of smokers without LC it was 8%, a more than sixfold difference, and this was not a result of overdiagnosis [8]. COPD is independently and closely associated with LC [9], and the two diseases share common major risk factors [10, 11]. However, the risk in non-smokers is also elevated, indicating that the association between COPD and LC is not due to smoking alone. In a large cohort study, non-smokers with COPD had a more than 2.6-fold higher incidence of LC compared with non-smokers without COPD. In addition, the risk of lung cancer in non-smokers with COPD is similar compared with smokers without COPD [12].

The presence of COPD worsens the prognosis in LC. Radical surgical treatment is considered the best alternative and most effective approach for the limited stages of non-small cell LC [13]. The presence of COPD reduces the likelihood of surgical treatment or chemotherapy administration [14]. At the same time, patients with COPD are at higher risk of complications after lung resection due to LC [15]. Three-year survival in patients with lung cancer and COPD is almost halved compared to patients without COPD (15% versus 26%; $p < 0.01$) [16].

CONCLUSION

Nearly half of the patients with lung cancer also had COPD in this study, with the vast majority of lung cancer cases diagnosed at an advanced stage – 50.8% at stage IV, followed by 32.8% at stage III. All of these factors predict unsatisfactory treatment outcomes and high mortality in LC patients.

Disclosure Summary: *The authors have nothing to disclose.*

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