EVALUATION OF THE EPIDEMIOLOGICAL PROFILE OF LUNG CANCER PATIENTS TREATED AT A HOSPITAL IN THE INTERIOR OF ESPÍRITO SANTO STATE

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ABSTRACT

Lung cancer is the leading cause of cancer death in the world, accounting for 14.1 million new cancer cases and 8.2 million deaths a year. Smoking is the main risk factor for developing lung cancer (LC). However, the risk of developing the disease varies according to certain factors, such as age, number of packs per day, duration of the habit, environmental exposure and genetic factors. Although there have been advances in diagnostic and therapeutic methods, the fact that most PCs are discovered at an advanced stage and that only 15% of cases are discovered in the early stages may be responsible for the disease's dismal prognosis, with a low 5-year survival rate. Cancer therapy must be individualized. Knowing the epidemiological profile of patients diagnosed with the disease is important for outlining medical approaches. Therefore, the aim of this study was to describe the profile of patients diagnosed with PC referred to the Oncology and Oncological Surgery service over the last 7 years at a referral hospital in the interior of Espírito Santo. Sixty-seven lung cancer patients were analyzed: 25 smokers, 27 former smokers and 6 non-smokers. The prevalence among non-smokers was higher among females and the triggering factors were diverse. Most of the cases analyzed were at an advanced stage of the disease. In summary, the results highlight the complexity of lung cancer, reinforcing the importance of prevention and investment in screening and early detection and the development of more effective therapies.

Keywords: *oncology, stage, prognosis, smoking.*

1 INTRODUCTION

Lung cancer (LC) is the most common and deadly type of malignant tumor worldwide (Mao et al., 2016; Nasim et al., 2019). In 2018, there were an estimated 2.1

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million new diagnoses of PC, corresponding to 12% of all cancer cases worldwide (Schabath; Cote, 2019). In Brazil, lung cancer is the third most common type of cancer and is the leading cause of cancer-related death in men. In women, it is the fourth most common type of cancer and the second leading cause of death (INCA, 2023).

PC is classically divided into two major histological categories: non-small cell lung carcinoma (NSCLC) and small cell lung carcinoma (SCLC). NSCLC represents the majority of lung cancers, of which around 40% are adenocarcinomas, 25-30% are squamous cell carcinomas and 10-15% are large cell carcinomas. Among adenocarcinomas, the constituents of the subgroup include adenocarcinoma *in situ*, minimally invasive adenocarcinoma and invasive adenocarcinoma of the lung.

Other less common histological subtypes include adenosquamous carcinoma, pleomorphic sarcomatoid carcinoma, large cell neuroendocrine carcinoma and carcinoid tumor (Schabath and Cote, 2019). The variety of histopathological diagnoses reflects the heterogeneity of the tumor, which can be elucidated by different cells of origin or tumor differentiation pathway during carcinogenesis (Sousa and Carvalho, 2018).

Lung cancer cases were rare before the popularization and mass production of cigarettes (Grzywa-Celińska et al., 2019). Although the number of smokers has fallen over the last century, smoking is still considered the main risk factor for developing PC, followed by genetic factors, occupational exposure and air pollution (Malhotra et al., 2016). The risk of lung carcinogenesis in smokers varies from 10 to 30 times, with the variation depending on the number of cigarettes smoked daily and pack-years smoked. Smoking cigars and pipes is also associated with higher chances of developing PC, as is passive smoking (Barta et al., 2019). The reduction in cigarette consumption following the introduction of the anti-smoking law has considerably reduced the incidence of PC in Brazil.

However, the number of cases of the disease among non-smoking (NS) patients has increased (Smolle and Pichler, 2019). It is estimated that more than 50% of women with PC are non-smokers, which demonstrates the tendency for the female sex to be more affected in situations of PC in NC individuals, especially the non-small cell subtype (Dubin and Griffin, 2020). Although the etiology is still undefined, passive smoking, exposure to carcinogenic agents, oncogenic viruses and the genetic factor itself are factors that may be involved in the pathogenesis of cancer in NF (Suda et al., 2011).

CPNPC was the subtype most commonly identified among patients with CP NF, especially in females. This subtype is less aggressive than NSCLC in smokers, and its development in NF may be related to a higher incidence of the EML4 - ALK gene in these patients than in smokers (Yano et al., 2011). Despite the improvement in the survival of patients with PC compared to previous years, it still remains low, with an estimated average of 5 years from the initial diagnosis. The difficulties in improving survival are mainly due to the late diagnosis of the disease, since most patients are diagnosed in advanced stages of PC, with restricted therapeutic and cure possibilities (Schabath and Cote, 2019).

Therapeutic options for patients with PC vary according to the type of cancer, the stage of the disease and the patient's clinical and functional status. Treatments can include surgical resection, chemotherapy, radiotherapy, targeted therapy and immunotherapy. In addition, behavioral approaches have been indicated as adjuncts to CP therapy, such as dietary plans and physical activity (Judd and Borghaei, 2020; Su et al., 2020; Nigro et al., 2021). It is important to emphasize that each patient must be assessed individually, knowing their epidemiological profile and lifestyle, and it is extremely important to know which group they fall into - non-smokers or smokers. Contributing to the analysis of the therapeutic regimen of best choice for the needs of each case. Therefore, the aim of this study was to describe the profile of patients diagnosed with PC referred to the Oncology and Oncological Surgery service over the last seven years at a referral hospital in the interior of Espírito Santo.

2 MATERIAL AND METHOD

A descriptive, retrospective, cross-sectional and qualitative study was carried out, based on the analysis of medical records of patients with diagnosed PC, registered in the Clinical Oncology and Oncological Surgery services at a hospital in the interior of Espírito Santo, from 2017 to 2023. The work was only started after it was approved by the Research Ethics Committee of Centro Universitário do Espírito Santo UNESC, under the CAAE number: 63378322.0.0000.5062.

The inclusion criteria for the study were patients referred to the Oncology or Oncological Surgery service of a hospital in the interior of Espírito Santo in the last 7 years, aged 18 or over and with a primary diagnosis of PC. Patients who had previously undergone curative, neoadjuvant or adjuvant surgery, radiotherapy or chemotherapy

for PC were also included, provided that the primary site of the disease was pulmonary. Medical records of patients under 18 years of age, with pulmonary metastasis from an extrapulmonary primary site or cases in which the diagnosis is uncertain were excluded. Despite the inclusion of a group of smoking patients in the project, its focus was on non-smoking patients diagnosed with PC. It was decided to include those who have the habit in order to compare the data.

The following variables were taken into account when analyzing the medical records: gender, age at diagnosis, method used for diagnosis (imaging tests, histopathology, anatomopathology, tumor markers, for example), type of PC, stage of the disease (TNM staging classification), main signs and symptoms, associated comorbidities, established treatment, the patient's lifestyle (smoking and drinking), family history and vital status. The data used was extracted from the systems: Soul-mv hospital management, data tabulation using Microsoft ® Excel 2007.

3 RESULTS AND DISCUSSION

The survey found that of the 67 patients analyzed, 28 (41.79%) were female and 39 (58.21%) male. The age at diagnosis ranged from 24 to 91 years, with an average of 64 years. Of the cases studied, 25 were smokers, 27 former smokers, 5 non-smokers (all female) and 10 did not have this information in their medical records. Most of the population had non-small cell lung cancer (NSCLC) (Table 1).

Although smoking is widely recognized as the main risk factor, lung cancer also has significant relevance in individuals with no history of smoking. PC in non-smokers demonstrates epidemiological and biological characteristics that are distinct enough to be considered a separate entity. In an analysis of patient data from five large cohort studies in the United States, it is estimated that 19% of women with lung cancer have never smoked, compared to around 9% of men with the disease. In this group of patients, NSCLC is the most prevalent, with adenocarcinoma standing out (Wakelee, 2023).

The histological types analyzed and used to classify the patients were: small cell carcinoma 4.48% (3 cases), non-small cell carcinoma 65.67% (44 cases) and 29.85% (20 patients) who did not have their histology reported in their medical records. The data analyzed showed that patients who do not smoke are the ones who present NSCLC in the majority of cases, mainly adenocarcinoma, which accounts for 60% of

cases, the rest being squamous cell cancer. Passive smoking is an important risk factor for lung cancer among those who have never smoked. However, the extent of this problem is unclear. Although the sample of non-smokers in this study was small, it was made up only of women, most of whom had NSCLC, as described in the literature (Table 1).

The risk factors associated with lung cancer in patients who have never smoked are not well understood. Studies suggest that exposure to passive smoking is the main risk factor in this group, with a prevalence of 15-35% of cases. In addition, radon, environmental exposures, oncogenic viruses, genetic factors and oestrogens are also considered significant risk variables. (Wakelee, 2023). From the data found in the medical records of patients who had never smoked, there was a possible genetic cause, with 1 patient reporting CP in a grandfather (4th degree relative), 1 patient reporting a case of breast cancer in a sister (2nd degree relative) and an environmental cause, with 3 patients reporting a history of using a wood-burning stove, 1 patient contact with pesticides and 1 patient contact with plaster during work. In addition, 1 patient had asthmatic bronchitis as an associated disease. Several benign lung diseases have been associated with an increased risk of lung cancer, which appears to be mediated by chronic inflammation (Mannino, 2023).

The main associated comorbidities described in the medical records were hypertension 55.22% (37 patients) and diabetes 14.93% (10 patients) and others 29.85% (20 patients). However, among the non-smokers, only one patient claimed to have diabetes (Table 2).

It is known that smoking, the use of electronic cigarettes (e-cigarettes) and the use of shisha (hookah, hookah, shisha) can increase blood pressure and accelerate atherothrombotic processes through a variety of potential mechanisms, including deleterious effects on endothelial function, inflammation, lipids and thrombosis. The acute effects of smoking are related to hyperactivity of the sympathetic nervous system, which leads to an increase in blood pressure, heart rate, myocardial contractility and myocardial oxygen consumption (Apeel, 2022), which may be the cause of the high incidence of this comorbidity in the medical records analyzed.

According to the total data analyzed, 97.01% of these were at an advanced stage (metastatic), including the majority of non-smoking patients. Among the reasons for this finding is the fact that the diagnosis of PC is still a major challenge, with most patients finding out when they have systemic symptoms that indicate a greater severity

of the disease. The associated symptoms in non-smokers were: dyspnea 4.48%, dry cough 4.48%, productive cough 1.49%, abdominal/thoracic pain 1.49% and hyporexia 1.49% (Table 2). It is worth noting that 1 specific case was detected at the beginning of disease activity by X-ray examination, showing that symptoms are difficult to associate with malignancy.

As for the specific systemic treatment for cancer, the therapies used were: chemotherapy alone (18 patients), surgery alone (13 patients), radiotherapy alone (2 patients), chemotherapy and radiotherapy (8 patients), chemotherapy, radiotherapy and surgery (5 patients) and palliative care (7 patients), the treatment of 1 patient was not included in the medical records and 3 did not undergo treatment. Among non-smokers, the most common treatment was chemotherapy alone and surgery alone (Table 3).

The scale used to assess vital status was the ZUBROD (ECOG), which has scores from 0 to 4, where 0 represents a patient with normal, completely active activity and 4 classifies the patient as totally incapacitated and confined to bed. Of the patients studied, 6 were classified as PS-0, 3 as PS-1, 11 as PS-2, 14 as PS-3 and 9 as PS-4. The classification of 24 patients was not reported in the medical records, and the non-smoking patients did not have this information (Table 3).

Importantly, some studies show that improved treatment has accelerated progress against lung cancer and led to a record drop in overall cancer mortality, despite slowing the momentum for other common cancers (Siegel *et al*, 2021). Surgical resection offers the best chance of long-term survival and cure in patients with resectable NSCLC. The appropriateness of surgical resection for candidates with known or suspected NSCLC includes preoperative staging and assessment of performance status with concomitant comorbidities and lung function to allow prediction of postoperative function.

A patient with lung cancer may be potentially “resectable” by virtue of having a surgically removable NSCLC, but may not be “operable” due to poor lung function or comorbidity. CPPC is a disseminated disease in approximately two thirds of patients at presentation and is very responsive to initial chemotherapy. Systemic chemotherapy is therefore an integral part of the initial treatment. (Midthun, 2024.). The therapeutic responses obtained in this study were: death 31.34% (21 patients), under treatment 7.46% (5 patients), palliative 38.81% (26 patients), no information 22.39% (15 patients) (Table 3). However, the treatment for lung cancer is directly related to the stage at

which the cancer was discovered, and the prognosis of admitted patients not only depends on the histological type, but also on the stage the patient is at. It is known that in advanced and terminal stages, life expectancy is reduced or almost nil. One case in particular, discovered at an early stage, was successfully cured by surgical removal alone.

Table 1. Characteristics of the sample of lung cancer patients

Variable	Smoker n= 25	Former smoker n= 27	Non-smoker n= 6	No information on smoking n= 9
Age at diagnosis (n= 67)				
< 50 years (7) 10.45%	(1) 1,49%	(1) 1,49%	(1) 1,49%	(4) 5,97%
> 50 years (60) 89.55%	(24) 35,82%	(26) 38,81%	(5) 7,46%	(5) 7,46%
Sex (n= 67)				
Female (28) 41.79%	(7) 10,45%	(10) 14,93%	(5) 7,46%	(6) 8,96%
Male (39) 58.21%	(18) 26,87%	(17) 25,37%	-	(4) 5,97%
Tumor (n= 67)				
Non-small cell carcinoma (44) 65.67%	(16) 23,88%	(18) 26,87%	(3) 4,48%	(7) 10,45%
Small cell carcinoma (3) 4.48%	(2) 2,99%	(1) 1,49%	-	-
Other/Low-grade fibromyxoid sarcoma (1) 1.49%	-	-	(1) 1,49%	-
No information (19) 28.36%	(7) 10,45%	(9) 13,43%	(1) 1,49%	(2) 2,99%

Source: Authors (2024).

Table 2. Characteristics of the sample of lung cancer patients

Variable	Smoker n= 25	Former smoker n= 27	Non-smoker n= 6	No information on smoking n= 9
Disease stage (n= 67)				
Advanced and metastasized (65) 97.01%	(25) 37,31%	(26) 38,81%	(5) 7,46%	(9) 13,43%
Initial (1) 1.49%	(1) 1,49%	-	-	-
Stable (1) 1.49%	-	(1) 1,49%	-	-
Signs and Symptoms (n= 67)				
Dyspnea (40) 59.70%	(16) 23,88%	(16) 23,88%	(3) 4,48%	(5) 7,46%
Dry cough (25) 37.31%	(8) 11,94%	(8) 11,94%	(3) 4,48%	(6) 8,96%
Secretive cough (17) 25.37%	(7) 10,45%	(8) 11,94%	(1) 1,49%	(1) 1,49%
Hemoptysis (5) 7.46%	(1) 1,49%	(4) 5,97%	-	-
Abdominal/thoracic pain (26) 38.81%	(9) 13,43%	(12) 17,91%	(1) 1,49%	(4) 5,97%
Nausea/vomiting (8) 11.94%	(3) 4,48%	(3) 4,48%	-	(2) 2,99%
Hyporexia (10) 14.93%	(4) 5,97%	(3) 4,48%	(1) 1,49%	(2) 2,99%
Myalgia or asthenia (18) 26.87%	(5) 7,46%	(9) 13,43%	-	(4) 5,97%
Weight loss (11) 16.42%	(3) 4,48%	(6) 8,96%	-	(2) 2,99%
Other signs and symptoms (17) 25.37%	(6) 8,96%	(7) 10,45%	-	(4) 5,97%
NO SYMPTOMS (4) 5.97%	(2) 2,99%	(2) 2,99%	-	-
Comorbidities (n= 67)				
Hypertension (37) 55.22%	(15) 22,39%	(12) 17,91%	-	(10) 14,93%
Diabetes mellitus (10) 14.93%	(3) 4,48%	(3) 4,48%	(1) 1,49%	(3) 4,48%
Other/ denies comorbidities (20) 29.85%	(6) 8,96%	(7) 10,45%	-	(7) 10,45%

Source: Authors (2024).

Table 3. Characteristics of the sample of lung cancer patients

Variable	Smoker n= 25	Former smoker n= 27	Non-smoker n= 6	No information on smoking n= 9
Treatment (n= 67)				
QT (18) 26.87%	(7) 10,45%	(6) 8,96%	(2) 2,99%	(3) 4,48%
CX (13) 19.40%	(5) 7,46%	(4) 5,97%	(3) 4,48%	(1) 1,49%
RX (2) 2.99%	(1) 1,49%	-	-	(1) 1,49%
RTX +QT(10) 14.93%	(2) 2,99%	(5) 7,46%	-	(3) 4,48%
QT+RX (8) 11.94%	(5) 7,46%	(2) 2,99%	-	(1) 1,49%
QT+RX+CX (5) 7,46%	(3) 4,48%	(2) 2,99%	-	-
PALLIATIVE (7) 10.45%	(1) 1,49%	(6) 8,96%	-	-
NO INFORMATION (1) 1.49%	(1) 1,49%	-	-	-
NO TREATMENT (3) 4.48%	-	(3) 4,48%	-	-
Vital status (n= 67)				
PS-0 (6) 8.96%	(2) 2,99%	(2) 2,99%	-	(2) 2,99%
PS-1 (3) 4.48%	(1) 1,49%	(1) 1,49%	-	(1) 1,49%
PS-2 (11) 16.42%	(2) 2,99%	(4) 5,97%	-	(5) 7,46%
PS-3 (14) 20.90%	(8) 11,94%	(4) 5,97%	-	(2) 2,99%
PS-4 (9) 13.43%	(4) 5,97%	(3) 4,48%	-	(2) 2,99%
Not informed (24) 35.82%	(13) 19,40%	(1) 1,49%	(2) 2,99%	(8) 11,94%
Therapeutic response (n= 67)				
Death (21) 31.34%	(9) 13,43%	(4) 5,97%	-	(8) 11,94%
Under treatment (5) 7.46%	(4) 5,97%	(1) 1,49%	-	-
Palliative (26) 38.81%	(9) 13,43%	(9) 13,43%	-	(8) 11,94%
No information (15) 22.39%	(8) 11,94%	(1) 1,49%	(2) 2,99%	(4) 5,97%

Source: Authors (2024).

Caption: QT: chemotherapy, CX: surgery and RX: radiotherapy

4 CONCLUSION

In view of the data presented by the survey, it can be concluded that the total sample was predominantly made up of men, while the non-smoking population was exclusively made up of women aged over 50, most of whom had NSCLC and no comorbidities.

Despite the limitations of the study, such as the small sample size and the absence of some data in the medical records, a significant association was observed between smoking and lung cancer.

Another limitation was the higher prevalence of cases at an advanced stage of the disease (97.01%), reflecting the challenges in early diagnosis and the need for more effective detection strategies. In summary, the results highlight the complexity of lung cancer, reinforcing the importance of prevention, investment in screening and early detection and the development of more effective therapies to improve the prognosis and quality of life of patients affected by this disease.

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