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Original Research Article

Histopathological subtypes of lung cancer presented at a tertiary care cancer hospital in Kerala: a cross sectional study

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ABSTRACT

Background: Lung cancer is one of the commonest cancers causes high rate of mortality worldwide. An increasing incidence of lung cancer and the pathological profile varies among gender and geographical regions. The present study was aimed to assess the pattern of histological subtypes of lung cancer and their distribution with age and gender.
Methods: Histologically proven primary lung cancers were selected from the cancer registry. Distribution of subtypes of lung cancer in various age and gender was collected. The major clinical presentation among the non-small cell lung carcinoma (NSCLC) and small cell lung carcinoma (SCLC) were also analysed. The data were statistically analysed.
Results: A total of 155 cases of lung cancers were analysed. Adenocarcinoma of lung was the most common subtype followed by squamous cell carcinoma and SCLC. Majority were males with age of presentation from 23 to 93 years. Age of presentation in the female group was 23-75 years. Significant difference was found between cancer numbers in male and female patients (p=0.0001). Statistically significant difference was found among the distribution of smokers and non-smokers in the NSCLC and SCLC patients (p=0.046). Most of the NSCLC and SCLC patients were presented with dyspnea and coughing.
Conclusions: Lung cancers were commonly seen in males and smokers. The most common histological subtype in males and females was adenocarcinoma. The diagnosis of histological subtype at the onset of clinical presentation of suspected cases of lung cancer is required to start the therapeutic regimen at the earliest to increase the longevity of patients.

Keywords: Adenocarcinoma, Lung cancers, Squamous cell carcinoma, Small cell lung carcinoma

INTRODUCTION

Lung cancer is one of the most common cancers and is one of the leading causes of cancer-related death worldwide. According to GLOBOCAN report 2018, lung cancer affected approximately 2.1 million people and caused 1.8 million deaths which comprised 18.4% of all cancer-related deaths. Lung cancer related deaths were approximately 63,475, comprising 8.1% of all cancer-related deaths.[1] In India, among the new 67,795 lung cancer cases reported in 2018 and 48,698 (8.5%) cases was found in males.[1] Prognosis of lung cancer depends largely on the histological type and stage of disease at presentation. According to World Health Organization (WHO) classification formulated in 1999, there are six major types of malignant epithelial non-small cell lung carcinoma (NSCLC) and small cell lung carcinoma (SCLC).[2] Tobacco smoking remains the major risk factor for the development of lung cancer.[3] Historically lung cancer was more prevalent in men than in women, but a recent trend of increasing incidence in women was observed in several regions of the world.[4] Most patients are diagnosed at an advanced stage of the disease.[5] The overall survival of lung cancer patients in advanced stages was

found to be very poor. The 5-year survival rate was found to be in the range of 5-15%.[6] This is mainly determined by the age of patients, stage at diagnosis and presence of metastasis.[7] In addition to the risk factors such as hereditary and exposure to chemicals, tobacco smoking has long been established as the risk factors for lung cancer. But prevalence of tobacco smoking among the gender was found to vary geographically.[8,9] Apart from chemotherapy, radiotherapy and surgical modalities, several new targeted therapeutic modalities are available.[10] This has led to a great interest in the histological characterization and genomic classification of lung carcinoma.[11] Furthermore, an increasing incidence of lung cancer and the pathological profile varies among gender and geographical regions. The age wise distribution and pathological profile of lung cancer in our region is scant. Hence, this study was aimed to assess the pattern of histopathological subtypes, age and gender wise distribution of lung cancer.

METHODS

Study design and population

A cross-sectional study was designed among patients with pathologically proven malignant primary tumours of lung presented at the Department of Medical Oncology, Amala Institute of Medical Sciences, Amala Nagar, Thrissur, Kerala, India during one year period (between January 2017 and December 2017). All the cases with details of histological subtypes available in the medical records were selected. Patients with secondary malignancy in lung, malignant pleural effusion, lymphoproliferative diseases with an unknown primary or medical register with no details of histological subtypes were excluded from the study. The study was conducted after getting clearance from Institutional Research Committee and Institutional Ethics Committee. Using the 5% significance level (α), 43% prevalence (p) of NSCLC (from the preliminary data of this study) and relative precision (d) of 20% of p, the sample size was calculated as 132 using the equation.

$Z_{1-\alpha/2}\, pq/d^2$

Study procedure

All patients with pathologically proven malignant primary tumours of lung available in the medical records were selected. Details of demographic details such as age, gender and history of tobacco smoking were collected using a questionnaire. The details of clinical presentations such as dyspnea, coughing, sore mouth and tongue, hemoptysis, dysphagia and peripheral neuropathy were taken. The histological subtypes belonging to NSCLC and SCLC were also recorded. The data were subjected to analysis.

Statistical analysis

The data was entered in Microsoft excel worksheet. Analysis was performed using SPSS software. Data was presented as percentage and Fischer's exact test was done. $p<0.05$ was considered significant.

RESULTS

A total of 155 cases of pathologically proven lung malignancies were included in the study during the study period. Distribution of cancer among male and female is given in figure 1. Majority of the cases were males (81.3%). The male to female ratio was found to be 4.3:1. The age at presentation was 17-93 years among males and 23-78 years among females. Among patients with NSCLC, most common histology was adenocarcinoma (69/155, 44.5%), followed by squamous cell carcinoma (30/155, 19.3%). Small cell carcinomas compromised of 14 cases (9%) only. Majority of the cases were males (81.3%) among whom adenocarcinoma was the most common subtype. Females also showed adenocarcinoma as the most common histologic type. Only one adenosquamous type was observed in male patient. Number of NSCLC was found to be 141/155 and number of SCLC patients was 14/155. Significant difference was found between cancer numbers in male and female patients (Fischer's exact test=22.6, p=0.0001).

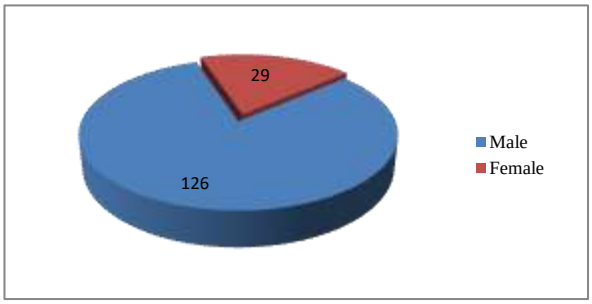

Figure 1: Distribution of malignancies among gender.

Table 1: Gender wise distribution of histologic subtypes of lung cancer.

Histologic subtype	Males (n=126)	Females (n=29)	Total (%) (n=155)
Adenocarcinoma	44	24	69 (44.5)
Non small cell carcinoma	31	1	32 (20.6)
Squamous cell carcinoma	30	1	31 (19.3)
Small cell carcinoma	13	1	14 (9.0)
Carcinoma	3	2	5 (3.2)
Neuroendocrine	2	0	2 (1.3)
Carcinoid tumor	2	0	2 (1.3)
Adenosquamous	1	0	1 (0.6)

Fischer's exact test=22.6, p=0.0001. Significant difference was found between cancer numbers in male and female patients.

Adenocarcinoma was found in the age group of ranges 93 to 23 years (mean 58 years). Squamous cell carcinoma and small cell carcinoma were observed in the age group of

range 84 to 42 years (mean 63 years) and 76 to 53 years (mean 64.5 years), respectively. The clinical presentations of patients are given in table 2. Most of the NSCLC patients were presented with dyspnea and coughing. Dysphagia was the least presenting symptom among the NSCLC and SCLC patients. In the SCLC patients, dyspnea and cough were the common presentations. No pain in the chest, arm, or other sites or peripheral neuropathy was observed in any of the SCLC patients. History of tobacco smoking was given in figure 2. Most of the patients in NSCLC were smokers (110/141) remaining were non-smokers (31/141). In the SCLC cases, all the patients were smokers (14/14). Statistically significant difference was found among the distribution of smokers and non-smokers in the NSCLC and SCLC patients (Fischer's exact test=3.97, p=0.046).

Table 2: Distribution of clinical presentations of NSCLC and SCLC.

Lung cancer-specific symptoms	NSCLC (n=141)	SCLC (n=14)
Dyspnea	54	14
Coughing	98	12
Sore mouth and tongue	2	0
Hemoptysis	11	2
Dysphagia	1	1
Peripheral neuropathy	2	0
Pain in the chest, arm, or other sites	48	0

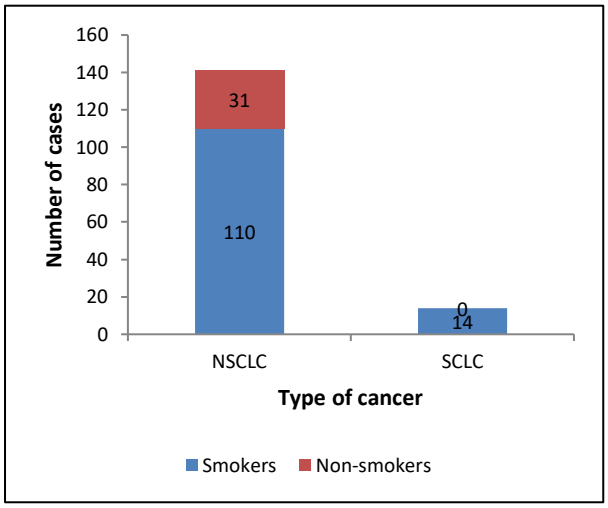

Figure 2: Distribution of smoking history among NSCLC and SCLC patients.

Fischer's exact test=3.97, p=0.046.

DISCUSSION

Lung cancer still remains one of the leading causes of cancer mortality worldwide. Early detection of malignancy is the key to better prognosis. To the best of our knowledge, this is the 1st study conducted in central South India to evaluate the spectrum of histopathology types of lung cancer in India, and their variations according to age and sex. An increase in the incidence of adenocarcinoma lung and a decrease in the incidence of squamous cell carcinoma was observed in both genders worldwide.[12,13] Lung cancer is commonly a disease of elderly patients, with a peak incidence at around 70-80 years of age.[14] In this study, a total of 155 cases were studied, which included 126 males and 29 females. The mean age at presentation among males was 65.88 and among females was 58.65 years. The youngest age at presentation among males was 17 years with histologic subtype osteoblastic osteosarcoma, and among females was 23 years with histologic subtype lymphoma. Majority of the histology subtypes demonstrated NSCLC and SCLC. Other subtypes included adenosquamous, lymphoma, carcinoid tumors, neuroendocrine carcinomas, osteoblastic osteosarcoma, and thymic carcinoma. In a similar study done in tertiary care hospital in Kashmir for a total of 783 cases over a 10 years period showed 685 males and 98 females with a mean age at presentation of 57.8 years. The most common histological type of tumour in both sexes was squamous cell carcinoma (71.3 per cent), followed by small cell carcinoma (20.8%), adenocarcinoma (2.6%), bronchioalveolar carcinoma (1.8%) while other tumours constituted 3.6%.[15] A 3 year clinico-pathological study done in AIIMS, a total of 434 pathologically confirmed lung cancer were analysed. Results revealed a median age being 55 years with a male: female ratio of 4.6:1. There were 85.3% NSCLC and 14.7% SCLC cases. Among NSCLCs, Adenocarcinoma was the commonest histological subtype.[16] In a descriptive study histologic lung cancer incidence rates and trends done in the U.S., adenocarcinoma and squamous cell carcinoma were the two most common histologic subtypes. Adenocarcinoma rates continued to increase in men and women, and squamous cell rates increased in women only.[17]

Many patients remain asymptomatic for a very long time owing to slow and silent growth of lung cancer or non-specific natures of lung cancer symptoms and present in advanced stages.[18,19] Relatively ineffective methods for early detection and lack of curative treatment for locally advanced disease ascribe to this. Majority of lung cancer is diagnosed on small biopsies or cytology specimens. In recent years, there has been a great interest in the histological characterization of lung carcinoma due to availability of several new targeted therapeutic modalities.[20] Subtype analysis for mutations such as epidermal growth factor receptor (EGFR), anaplastic lymphoma kinase (ALK) rearrangements, ROS-1 translocation, or expression of programmed death receptor-1 (PD-1)/PD ligand-1 now forms the basis of immunotherapy for lung cancer.[21] Molecular testing of NSCLC is widely recommended to provide personalized treatment and better outcomes.[22]

Major limitation of present study is that it was entirely conducted at a single tertiary care facility. These results may not be representative of the general population. Another limitation of the study was the lower number of female cases involved, which makes the generalization difficult.

CONCLUSION

This study demonstrated that adenocarcinoma is the commonest histological subtype. Majority of the cases were males with adenocarcinoma histology being more common in both males as well as females; with mean age at presentation among males 65.88 and among females 58.65 years. The diagnosis of histological subtype at the onset of clinical presentation of suspected cases of lung cancer is required to start the therapeutic regimen at the earliest to increase the longevity of patients.

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