

Original Research Article

Histology of lung cancer: experience from a tertiary care centre in South India

Veni Krishna S., Balachandran J.*

Department of Pulmonary Medicine, Travancore Medical College Hospital, Kollam, Kerala, India

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***Correspondence:**

Dr. Balachandran J.,

E-mail: doctorbalachandran@gmail.com

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ABSTRACT

Background: Lung cancer is a leading cause of mortality worldwide and is increasing at an alarming rate in developing countries. In spite of advances in treatment, prognosis of lung cancer is extremely poor. It is because of delayed presentation and difficulty in obtaining histological diagnosis. Histological confirmation is difficult in all cases due to the limited biopsy specimen obtained via bronchoscopy / transthoracic biopsy. Primary objective was to study the histology of lung cancer at a tertiary care centre in South India. Secondary objective was to study association between smoking habit and histological type of lung cancer

Methods: Cross sectional study conducted at Tertiary teaching hospital, South India in 100 patients with suspected lung cancer. Data on symptoms, smoking status, histological diagnosis were recorded using a structured questionnaire. Statistical analysis was done on the data collected. Chi square test was used to assess the statistical significance.

Results: Total 100 lung cancer patients with histopathological diagnosis were included in the study. In the present study, histopathologically 90% of the patients had non-small cell lung cancer and 10% had small cell type of cancer. In male patients squamous cell carcinoma was the most common diagnosis, and majority were smokers. In female most common type was adenocarcinoma (40%).

Conclusions: Adenocarcinoma (41.9%) was the commonest histological type in our study and this was the commonest histological type seen in females and nonsmokers.

Keywords: Histology, Lung cancer, Molecular pathology

INTRODUCTION

Lung cancer is a major health problem and causes increased mortality worldwide.¹ Prognosis of lung cancer mainly depends on histological type and stage of disease at presentation. Histologically lung cancer is divided into 2 main subtypes; small cell lung carcinoma and non-small cell lung carcinoma. There are differences observed in histological type affecting males and females. It varies with smoking status also. Previously lung cancer was reported more in males due to smoking habits. Now it is

increasing at a high rate in females. It is the adenocarcinoma variant which is commonly seen in females.² Adenocarcinoma is less associated with smoking than the other types of lung cancer. Small cell carcinomas are most closely linked to smoking, followed by squamous cell carcinoma, and large cell carcinoma. It has been suggested that an increase in adenocarcinoma in smokers may be due to increased use of low tar cigarettes.³ These may be associated with deeper inhalation, allowing carcinogens to reach the peripheral parts of the lungs, where adenocarcinoma tend to occur.⁴

⁶ Histological classifications forms the basis of treatment and prognosis in all malignancies. Hence it is of utmost importance to get diagnosis in all cases. However, it is technically difficult to obtain histological type in all lung cancer cases due to limited tissue samples obtained via bronchoscopy/ transthoracic biopsy. Also, with small biopsy or cytology specimens, classification of tumours can be difficult, and tissue might be too scanty for processes such as immunohistochemical stains.⁷ This study was aimed to understand the common histological subtypes of lung malignancy in a tertiary care teaching hospital in Kerala.

METHODS

This is a cross-sectional study carried out on patients with a definite histopathological diagnosis of bronchogenic carcinoma in the form of bronchoscopic or transthoracic biopsy /cytology. Study period extended from November 2012 to October 2014 and was carried at tertiary care teaching hospital in South India

All patients with suspected lung cancer; referred to the Department of Pulmonary Medicine for confirmation will be included. For histopathological confirmation of lung cancer either bronchoscopic biopsy, percutaneous USG/CT guided fine needle aspiration or biopsy, thoracoscopy will be done. Pleural fluid analysis, cytological examination of regional lymph nodes and metastatic deposits will be done in appropriate cases. A standardized questionnaire will be prepared for collecting data of included patients. Details including age, sex, smoking habits, histopathological diagnosis will be entered in the proforma. Statistical analysis was done on the data collected. Comparison of qualitative variables were analysed by chi-square test. P value of less than 0.05 was considered as level of significance.

Inclusion criteria

Patients with a definite histopathological diagnosis of bronchogenic carcinoma in the form of bronchoscopic or transthoracic biopsy.

Exclusion criteria

Patients with definite histological evidence of active extra-pulmonary malignancy were excluded from the study.

RESULTS

There were 100 cases of pathologically proven bronchogenic carcinoma admitted during the study period. From the clinical and pathological data received during the study, various aspects of the disease like the age, duration, smoking habits, histology of lung cancer. They are given below in the form of tables for easy appraisal. Out of 100 patients with lung carcinoma, 90

were diagnosed as non small cell lung carcinomas and 10 were small cell lung cancers (Table 1).

Table 1: Histological subtypes of carcinoma lungs (n=100).

| Histology | Number |
|-------------------------------|--------|
| Small cell carcinoma | 10 |
| Non-small cell lung carcinoma | 90 |

Table 2: Distribution of non small cell lung carcinoma (n=90).

| Types | Number | Percentage |
|--|--------|------------|
| Adenocarcinoma | 52 | 57.77 |
| Squamous cell | 30 | 33.33 |
| Adenosquamous | 1 | 01.11 |
| In situ pulmonary adenocarcinoma (AIS) | 3 | 03.33 |
| Salivary | 1 | 01.11 |
| Carcinoid | 2 | 02.22 |
| Poorly differentiated | 1 | 01.11 |
| Total | 90 | 100.00 |

Mean duration of symptoms in patients with small cell lung carcinoma was 82.90 with (SD of 102.41), while for adenocarcinoma it was 67.49 (SD 63.618) and for squamous cell carcinoma it was 66.33 with SD (75.37). There was no statistically significant difference based on histological subtypes and duration of symptoms (Table 3).

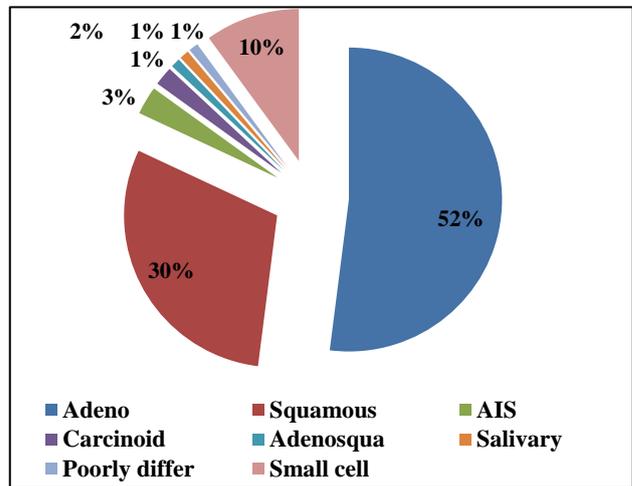


Figure 1: Histological classification of lung cancer cases.

Within NSCLC, the most common histology was adenocarcinoma (52%) followed by squamous-cell carcinoma (30%) and others in (8%) (Table 2). Small-cell and squamous histology were more commonly found among the smokers than non-smokers (Table 3 and 4). Statistically significant difference existed between small

cell lung carcinoma and NSCLC cases among smokers and nonsmokers (p value 0.005).

Table 3: Duration of symptoms based on major histological types.

| Type | No. | Mean ±SD | Median \min – max | P value |
|----------------|-----|----------------|-------------------|---------|
| Adenocarcinoma | 52 | 67.49 (63.618) | 60.00 (0-300) | 0.869 |
| Squamous cell | 30 | 66.33 (75.375) | 60.00 (14-365) | |
| Small cell | 10 | 82.90 (102.41) | 60.00 (14- 365) | |

Table 4: Smoking status in small cell lung carcinoma.

| Histological type | Percentage of smokers |
|-----------------------------|-----------------------|
| Small cell carcinoma (n=10) | 100.00 |

Table 5: Smoking status in non small cell carcinoma.

| Types | Smoker (n= 60) % | Non smokers (n= 40) % | P value |
|----------------|------------------|-----------------------|---------|
| Adenocarcinoma | 24 40.00 | 28 70.00 | 0.016 |
| Squamous | 23 38.33 | 7 17.05 | |
| Others | 3 06.00 | 5 12.50 | |
| Total | 50 83.33 | 40 100 | |

Table 7: Histology of lung cancer in various studies.

| Histology | Jatav et al ¹² | Jindal et al ¹³ | Gupta et al ¹⁴ | Rawat et al ¹⁰ | Westpal et al ¹⁵ | Present study (2014) |
|----------------------|---------------------------|----------------------------|---------------------------|---------------------------|-----------------------------|----------------------|
| Small cell carcinoma | 25.00 | 34.03 | 14.00 | 16.07 | 09.01 | 10.00 |
| Squamous | 37.05 | 27.06 | 42.00 | 44.83 | 62.08 | 30.00 |
| Adeno | 32.05 | 25.09 | 20.00 | 19.78 | 24.07 | 52.00 |
| AIS | - | - | - | - | - | 03.00 |
| Carcinod | 02.05 | - | - | - | - | 02.00 |
| Undifferentiated | - | - | 18.00 | 10.03 | - | 01.00 |
| Large | 02.05 | - | 06.00 | 08.37 | 03.04 | 00.00 |

In present study histological diagnosis was obtained in all cases. As shown in other studies, the most common cause for lung cancers is smoking. Histological types like small cell and squamous cell carcinomas are almost exclusively due to smoking, while others like adenocarcinomas are less dependent on smoking. Histological subtypes vary due to smoking dose-relationships, and the latency times between exposure and outcome. With the reduction of smoking habits, lung cancer histology distribution has changed with adenocarcinomas overtaking squamous cell

Table 6: Gender wise histology of carcinoma lung.

| Histopathology report | Males | Females | Total |
|-----------------------|------------|------------|-------|
| | No (%) | No (%) | No. |
| Squamous cell | 28 (36.84) | 2 (08.33) | 30 |
| Adenocarcinoma | 33 (43.42) | 19 (79.16) | 52 |
| Small cell | 10 (13.15) | 0 (00.00) | 10 |
| Carcinoid | 2 (02.63) | 0 (00.00) | 2 |
| AIS | 0 (00.00) | 3 (12.50) | 3 |
| Adenosquamous | 1 (01.31) | 0 (00.00) | 1 |
| P. differentiated | 1 (01.31) | 0 (00.00) | 1 |
| Salivary | 1 (01.31) | 0 (00.00) | 1 |
| Total | 76 | 24 | 100 |

Adenocarcinoma was the commonest histological subtype encountered. There were 52% of cases with adenocarcinoma while squamous cell carcinoma was 30% (Table 6). Small cell carcinoma was seen in 10% of cases. Adenocarcinoma was the commonest malignancy in females where it accounted for 19, out of 24 cases.

DISCUSSION

Lung cancer remains one of the leading causes of cancer mortality worldwide. Early detection of the malignancy is the key to better prognosis. Obtaining histological diagnosis in all suspected cases of malignancy is difficult due to the small biopsy specimen obtained from bronchoscopic / trans thoracic biopsy.

carcinomas as the most common type. Santos-Martinez concluded that male sex and smoking are associated with SCC and female sex is associated with adenocarcinoma.⁸

In the present study, histopathologically 90% of the patients had non-small cell lung cancer compared to 10% of small cell type of cancer (Table 1). It is consistent with the findings of other investigators (Table 7). Among the non-small cell type, squamous cell carcinoma, adenocarcinoma constituted 30% respectively (Table 2).

This was similar to other Indian authors who reported a rapid increase in adenocarcinoma. This is again in concordance with pattern of lung cancer reported in West. The pattern of lung carcinoma is being increasingly diagnosed in women; adeno carcinoma has taken squamous cell carcinoma as the most common histological cell type.⁹ In other Indian studies by Rawat et al, reported Squamous cell carcinoma in 91 (44.83%), cases.¹⁰ Jindal et al, in their study reported incidence of squamous cell carcinoma in 34.3% and adenocarcinoma 25.9% (Table 7).¹¹ There is a variation in histological diagnosis in these previous studies, however squamous cell cancer has been the most common histological type of lung cancer in India as shown by these studies. In present study the most histological diagnosis came out to be adenocarcinoma (Table 5). In male patients squamous cell carcinoma was the most common diagnosis, and majority were smokers. In female most common type was adenocarcinoma (40%) (Table 6). Also, statistically significant difference existed between small cell lung carcinoma and NSCLC cases among smokers and nonsmokers (p value 0.005) (Table 5). Major limitation of present study is that it was entirely conducted at a single tertiary care facility, with the inherent referral bias. These results may not be representative of the general population. This is especially true for our hospital, which is one of the apex referral centres, drawing referrals from all over South India. Ideally, this study should be expanded to a multicentre analysis and should include data from the general population and cancer registry data. Another limitation of the study was the lower number of female cases involved, which makes the generalization very difficult. Similarly, no definite measures were used to quantify passive smoking. This study reveals that smoking can be treated as the single most important factor contributing for lung cancer.

CONCLUSION

In conclusion, this study demonstrated that adenocarcinoma is the commonest histological subtype in this part of the world also, provided a careful independent pathology review is done. Population based screening for early detection of cancer, and primary and secondary preventive strategies for reducing the prevalence of tobacco consumption are high priorities to reduce the lung cancer burden.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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