

Epidemiological Trends of Lung Tumours on Endobronchial Biopsy in Patients Presenting to Tertiary Care Hospital

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ABSTRACT

Objective: To determine the epidemiological trends of lung tumours on endobronchial biopsy in patients presenting to our hospital.

Study Design: Prospective longitudinal study.

Place and Duration of Study: Department of Pulmonology, Pak Emirates Military Hospital, Rawalpindi Pakistan, from Nov 2021 to Jun 2022.

Methodology: Two hundred eighty-seven patients who exhibited clinical and/or radiological signs of a lung mass were enrolled in this study. Bronchoscopy was done to identify endobronchial lesions, followed by endobronchial biopsies submitted for histopathology and immunohistochemistry to diagnose the exact type of tumour. Patients who underwent bronchoscopy for some other indication but were found to have an endobronchial mass incidentally were also included in the study.

Results: Squamous cell carcinoma was the most common 107(37.3%), followed by small cell carcinoma 76(26.5%). Adenocarcinoma was diagnosed in 75 patients (26.1%). Diagnosis of carcinoid tumour was made in 6 patients (2.09%). There were 5 cases (1.7%) of poorly differentiated carcinoma and metastatic adenocarcinoma each. Large cell carcinoma was present only in 2 cases (0.7%). Strangely, two patients (0.7%) had small and Squamous cells simultaneously, and one had adenosquamous carcinoma. Other tumours, including mantle cell lymphoma, Rhabdomyosarcoma, mucoepidermoid carcinoma, neuroendocrine tumours, spindle cell carcinoma and sarcomatoid carcinoma, were found in 8 cases (2.8%).

Conclusion: Squamous cell carcinoma is the most common centrally arising tumour in our population in both genders, followed by small cell carcinoma and adenocarcinoma.

Keywords: Epidemiology, Endobronchial mass, Lung cancer, Squamous cell carcinoma.

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INTRODUCTION

Lung cancer is the most frequently diagnosed malignancy in males and the second most common malignancy in females after breast carcinoma worldwide.¹⁻³ Statistics have shown an exponential increase in incidence and mortality caused by lung cancer, particularly in developing countries.⁴ As per the American Cancer Society, lung carcinoma was the leading cause of cancer-related death in both genders in 2017.⁵ In the United States, every fourth death is caused by lung cancer, which is higher than cumulative deaths caused by prostate, breast, and colon cancer. According to cautious estimates, 1.8 million new lung cancer cases occurred in 2012, with 1.68 million deaths making up 19% of cancer-related deaths. In our country, we do not have a reliable central cancer record to give us a true reflection of the disease burden.⁶ As per GLOBOCON 2012, in Pakistan, lung carcinoma is the third leading cause of death in males

and the 10th leading cause in females. Lung cancers are broadly classified into two types: small cell lung carcinoma (SCLC) and non-small cell lung carcinoma (NSCLC) based on histology.⁷ Non-small cell carcinoma is subdivided into adenocarcinoma, squamous, and large cell carcinoma. Other tumour types include bronchial carcinoids and sarcoma.⁸ Certain types, like squamous and small cell carcinoma, are usually centrally located in large bronchi, while others have a more peripheral predilection.⁹ Clinical features result from local growth, distant hematogenous or lymphatic invasion, or paraneoplastic effects of the tumour's products.¹⁰ In this study, we will determine the distribution of histopathological types of lung cancer in a tracheobronchial tree for age and gender presenting to our setup. It will help us understand the relationship between lung tumours and these variables in a better way.

METHODOLOGY

The prospective longitudinal study was carried out at the Department of Pulmonology, Pak Emirates Military Hospital Rawalpindi Pakistan, from January

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2021 to August 2022 after approval by Ethical Review Committee (Certificate No. A/28/196/EC/459/2022).

Inclusion Criteria: Patients of either gender, aged 19-80 years presenting through Outpatient Department or Emergency who were suspected of lung mass clinically and confirmed with subsequent chest radiography or those who were found to have suspicious radiological features as an incidental finding on chest radiography done for some other indication, were included in the study.

Exclusion Criteria: Patients who were either unfit for bronchoscopy and biopsy owing to co-morbidities like recent MI, high oxygen dependency, bleeding diathesis or unwilling for it were excluded from this study. Similarly, patients with already diagnosed pulmonary or extrapulmonary tumours were also excluded.

After informed consent, 287 patients were enrolled using a consecutive, non-probability sampling technique. These patients were then assessed for fitness for flexible bronchoscopy and biopsy. Subsequently, suppose any endobronchial lesion was visible on flexible bronchoscopy, i.e., any ulcer, plaque, sessile nodule or pedunculated mass in the tracheobronchial tree. In that case, they have included in the study Clinically suggestive symptoms, including significant unintentional weight loss in a chronic or ex-smoker, persistent cough, blood in sputum, persistent pleuritic chest pain, gradually progressive shortness of breath, supraclavicular or cervical lymphadenopathy. Radiologically suspicious features included parenchymal mass or nodules, bronchial narrowing, mediastinal lymphadenopathy, thick-walled cavity, persistent infiltrates, segmental collapse or non-resolving pneumonia.

In selected patients, multiple bronchoscopy-guided biopsies were taken with crocodile forceps and sent to the Armed Forces Institute of Pathology Rawalpindi for histopathology and immunohistochemistry, where they were analyzed and reported by two consultant histopathologists. Two hundred eighty-seven patients were followed up.

The complete data of these patients were analysed in the Statistical Package for Social Sciences version 22. Results were projected using descriptive statistics, e.g. mean with standard deviation in continuous variables like age and percentages in categorical variables like gender and type of carcinoma. Pearson chi-square test was applied for inferential statistics and the p -value of ≤ 0.05 was taken as significant.

RESULTS

A total of 287 patients with a mean age of 62.52 ± 12.67 years were included in this study. About 242(83.97%) persons were males, and 45(16.02%) were females. One hundred seven individuals (37.28%) had squamous cell carcinoma, while 76(26.48%) were diagnosed with small cell carcinoma. Adenocarcinoma was found in 75(26.13%) patients, while carcinoid tumours were seen in 6(2.09%) patients. Large cell carcinoma was present in 2(0.7%) patients (Table).

Table: Descriptive Statistics of sample Population (n=287)

Characteristics		n(%)
Gender Distribution	Male	242(83.97%)
	Female	45(16.03%)
Age Distribution	15-30 years	8(2.8%)
	31-50 years	41(14.3%)
	51-70 years	162(56.6%)
	>70 years	76(26.48%)
Distribution Of Types Of Lung Tumours	Squamous Cell CA	107(37.28%)
	Adenocarcinoma	75(26.13%)
	Small cell Carcinoma	76(26.48%)
	Carcinoid tumours	6(2.09%)
	Large cell CA	2(0.7%)
	Metastatic Tumours	5(1.74%)
	Poorly Differentiated CA	5(1.74%)
	Combination Of Squamous Cell CA with Adeno or SCC	3(1.04%)
	Others	8(2.78%)

Five patients (1.74%) with metastatic carcinoma, and five patients (1.74%) with poorly differentiated tumours. Another strange finding was 3(1.04%) patients with two histological lung tumours simultaneously. Large cell carcinoma was equally distributed in both genders, with 1 case (0.34%) in each gender. Metastatic tumours were more common in females, with 3 cases (1.04%), as compared to males, with 2 cases (0.69%). Other tumours also showed a predilection for females in 5 cases (1.74%) shown in Figure.

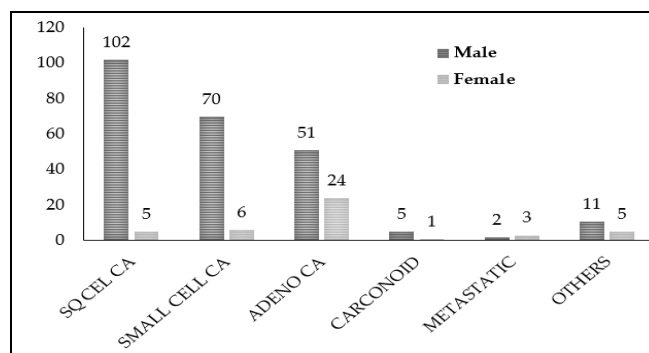


Figure: Gender Distribution of Lung Tumors in Study Sample (n=287)

DISCUSSION

Our study results demonstrated that squamous cell carcinoma is the most common originating central lung tumour in our study population. Around 38% of the individuals in our study sample were diagnosed with squamous cell carcinoma, which strongly correlates with smoking.

Active and passive smoking play a role, which was demonstrated by this tumour's occurrence in females with no history of active smoking.¹¹ Exposure to smoke can be calculated in terms of pack years, whose effect is directly proportional to the incidence of Squamous cell carcinoma.¹² One study showed the highest percentage was squamous cell carcinoma, about (58.4%), with adenocarcinoma at (16.9%) on the second and small cell carcinoma on the third at (15.7%).¹³ Another study showed that Squamous Cell carcinoma was the most frequent type in both males and females; in contrast, many other studies have shown Adenocarcinoma to be the most frequent type in females.¹⁴ In our study, Small cell carcinoma was the second most common centrally arising tumour occurring in (26.48%) of the study sample, followed by a slight margin by adenocarcinoma at (26.13%), consistent with local studies. The prevalence of adenocarcinoma showed a significant relative preponderance for females compared to the rest of the tumours, making it the most common tumour in females. However, female representation in our sample was not proportionate with male representation. In studies conducted different parts of the world similar results were seen.^{15,16}

The incidence of lung tumours in the younger population is quite alarming. Eight patients were below the age of 30 years and mostly had carcinoid or supporting tissue tumours of the lung, like sarcomatoid or spindle cell tumours.¹⁷ Adenocarcinoma was most prevalent in patients in their fourth or fifth decade of life (5.92%) compared to squamous cell carcinoma (3.48%), reflecting a change in our epidemiological trends from other countries and old studies. However, in patients above 50 years of age, squamous cell carcinoma remained the most common tumour. An essential but infrequent finding was the concurrence of two types of tumours in the same patient. There were three such cases in total.¹⁸ patients had adenosquamous carcinoma, and one had small cell carcinoma with squamous cell carcinoma.

CONCLUSION

Our study concludes that squamous cell carcinoma is our population's most prevalent centrally occurring tumour,

consistent with medical literature and international studies. However, there is a rising trend of adenocarcinoma, particularly in females. Squamous cell carcinoma is caused by active and passive smoking and air pollution. These results can be used to consolidate preventive strategies by our authorities in reducing tobacco usage and smoke exposure in our country and measures to shift to clean and recyclable energy to reduce air pollution. Moreover, a national screening program must be devised to screen the population above 50 years, particularly with a smoking history, by yearly chest radiography.

Conflict of Interest: None.

Authors' Contribution

Following authors have made substantial contributions to the manuscript as under:

NA & MZHM: Conception, study design, drafting the manuscript, approval of the final version to be published.

SAS & SA: Data acquisition, data analysis, data interpretation, critical review, approval of the final version to be published.

HR & ZMM: Critical review, data acquisition, drafting the manuscript, approval of the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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