

DEMOGRAPHIC AND CLINICOPATHOLOGICAL PARAMETERS IN LUNG CANCER IN A CHEST HOSPITAL, LAHORE – PAKISTAN

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ABSTRACT

Background: We are presenting the clinical and pathological characteristics of lung cancer among patients reporting to Gulab Devi Chest Hospital Lahore, the largest and the oldest health care facility for chest diseases including lung cancer in Pakistan.

Methods: It was a cross – sectional, descriptive study conducted at the department of histopathology, Gulab Devi Hospital Lahore between March 2011 and February 2012. A sample of 293 patients of primary lung cancer was taken. The demographic and clinical details i.e. age, sex, history of smoking and presenting symptoms were collected after the informed consent. Histopathological diagnosis and tumour grades were added in respective columns. Data was analysed with the help of S.P.S.S. version 17.0.

Results: Mean age was 53.19 ± 0.92 years for male and 47.36 ± 1.92 years for females. Male to female ratio was 3:1. History of tobacco smoking was present in 2/3rd of the patients. Smoking was strongly associated with squamous and small cell carcinoma of lung. Most common histological diagnoses were squamous cell, small cell and adenocarcinoma respectively. Majority of squamous cell carcinoma were poorly differentiated as compared to adenocarcinoma in which well and moderately differentiated tumours constituted 25% and 45% respectively. Most of patients presented at inoperable stage.

Conclusion: Smoking is most strongly associated with the two most common histological entities of lung cancer viz. squamous cell carcinoma and small cell carcinoma. Bronchial biopsy was the commonest diagnostic procedure in practice and surgical resection is offered to only a few cases.

Key Words: lung cancer, squamous cell carcinoma, small cell carcinoma, pulmonary adenocarcinoma, large cell carcinoma, non-small cell carcinoma, tobacco smoking.

INTRODUCTION

Lung cancer is the 2nd most common cancer and carries highest mortality among all human cancers.¹ It accounts for 1/3rd of total cancer – related deaths in USA.² The disease was more prevalent (2/3rd cases) in developed world before 1980 and now it has become equally widespread in the developing countries especially those in Asia.^{3,4} These variations in the incidence and prevalence are in parallel with the habit of tobacco smoking.⁵

In developing countries including Pakistan, the habit of smoking is disquietingly high. Annual per capita cigarette consumption is an important parameter to assess the severity of smoking habits in a population which is 129 for India, 245 for Bangladesh, 374 for Sri Lanka and 564 for Pakistan.³

Lung cancer is much more prevalent among Pakistani men with a male to female ratio of 4.4 – 7.6:1.^{6,7} The disease shows a peak between the ages of 51 and 70 years.^{7,8} The common presenting symptoms include cough, shortness of breath, chest pain,

haemoptysis, fever, weight loss and anorexia.⁶ Histologically, carcinoma of lung is classified mainly into squamous cell carcinoma, small cell carcinoma, adenocarcinoma, large cell carcinoma and other less common types.⁹

Gulab Devi Chest Hospital Lahore is the largest and the oldest health care facility for chest diseases in Pakistan and it caters for all social classes but more commonly the lower class. The hospital attracts patients of chest diseases including lung cancer mainly from the province of Punjab and other parts of the country. Usually, the patients present with advance stage disease because of the prevailing socio-cultural reasons e.g. many patients initially go to spiritual healers, hakeems and quacks and then, after many referrals reach Gulab Devi Chest Hospital.

We report clinicopathological analysis patients of lung cancer along with a brief account of demographic features of the disease.

PATIENTS AND METHODS

It was a cross – sectional, descriptive study conducted at department of histopathology, Gulab Devi Hospital Lahore between March 2011 and February 2012. A sample of 293 patients of primary lung cancer, of any age and either sex was included. The patients with a metastatic tumour in lungs were excluded. The demographic and clinical details i.e. age, sex, history of smoking, presenting symptoms, radiological features, type of biopsy procedure done etc. were collected in a preformed questionnaire after the informed consent. Biopsy specimens were processed and stained with Eosin and Haematoxylin. Microscopical assessment for histological diagnosis and tumour grade was performed by two pathologists independently. Inadequate samples, metastatic disease and the cases where pathologists' opinion disagreed were excluded.

The data was analysed with the help of P.A.S.W version 18. Means \pm S.E (Standard error of mean) were calculated for the quantitative variables (age, pack years) with their 95% confidence intervals (CI). ANOVA was used to calculate p-value for difference of the quantitative variables among groups (based on histological type of cancer and type of biopsy procedure done). The frequency, ratio and percentages were given for the qualitative variables (sex, presenting symptoms, side, site and zone of lung involved and type of biopsy procedure done). Chi-square was applied to measure the statistical difference in case of qualitative variables. A p-value of <0.05 was regarded as statistically significant.

RESULTS

A total of 293 biopsy proven cases of primary lung cancer were analysed. Mean age was 53.19 ± 0.92 (95% CI: 51.37 – 55.01) years for male and 47.36 ± 1.92 (95% CI: 43.52 – 51.19) years for females. The difference was statistically significant ($p = 0.001$). Male to female ratio was 3:1. History of tobacco smoking was present in majority ($n = 195$, 66.55%) of the patients. However, frequency of smokers was much higher in cases of squamous cell carcinoma and small cell carcinoma (83.33% and 89.23% respectively) as compared to other histological types of lung cancer as shown in Figure 1.

The commonest presenting symptoms were cough (70.2%), dyspnea (64.0%), chest pain (52.1%), fever (50.3%), haemoptysis (39.0%) and loss of weight (29.1%). In 151 (51.5%) cases right lung and in 126 (43.0%) cases left lung were involved. There

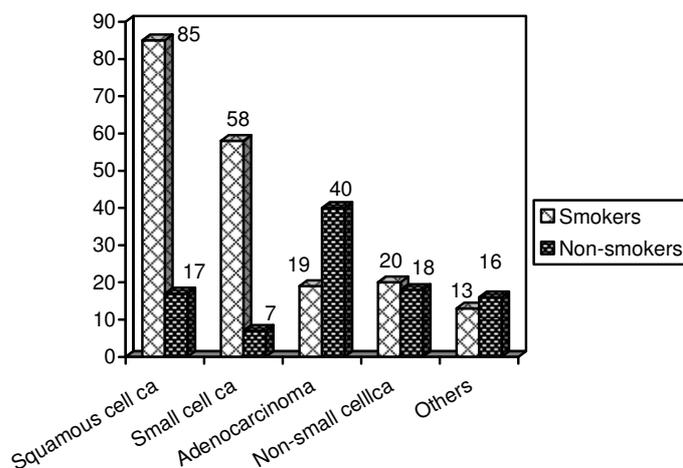


Figure 1: Association of smoking with histological diagnosis of lung cancer.

were some cases with bilateral lung involvement by the time of diagnosis. Out of a total of 30.7% tumours were located in the main bronchi, 24.9% were found in the peripheral part of lung parenchyma or under the visceral pleura and 1.0% were present in trachea. In a large proportion of cases (37.9%), the disease had spread to all parts of lung at presentation and in 5.4% cases site of the lesion could not be ascertained.

The most common procedure to ascertain the histological diagnosis was flexible fibre-optic endoscopically obtained bronchial biopsy (115, 39.2%) followed by lymph node excision biopsy (29.7%), CT – guided needle core biopsy (12.6%) and pleural biopsy (12.3%). Open lung biopsy performed during video – assisted thoracoscopic surgery or otherwise accounted for 8 cases (2.7%). In 4 cases, chest wall biopsy was taken. Lobectomies and pneumonectomies were done in a minute number of cases (2 cases each).

Histopathological assessment revealed that squamous cell carcinoma was the most frequent type of lung cancer ($n = 102$, 34.81%) among the study population, followed by small cell carcinoma and adenocarcinoma (22.18% and 20.14%) respectively. Majority (69.6%) of squamous cell carcinoma were found to be high grade – poorly differentiated. However, large proportion of adenocarcinoma cases (45.8%) were moderately differentiated. Another 1/4th of cases of the adenocarcinoma were well – differentiated. Relative frequencies of various histological diagnoses and tumour grades of each type of lung cancer have been summarized in Table 1. Photomicrographs of some tumours are shown in Figure 2 to 5.

Table 1: *Histological diagnosis and tumour grades of lung cancer*

<i>Histological Diagnosis</i>	<i>No. of Cases</i>	<i>Percentage (%)</i>	<i>Histological Grades</i>		
			<i>Well Differentiated</i>	<i>Moderately Differentiated</i>	<i>Poorly Differentiated</i>
Adenocarcinoma	59	20.14	15 (25.4%)	27 (45.8%)	17 (28.8%)
Squamous cell carcinoma	102	34.81	12 (11.8%)	19 (18.6%)	71 (69.6%)
Small cell carcinoma	65	22.18	-	-	65 (100%)
Non-small cell carcinoma	38	12.97	-	-	38 (100%)
Large cell carcinoma	03	1.02	-	-	03 (100%)
Adenoid cystic carcinoma	02	0.68	-	02 (100%)	-
Bronchial carcinoid	02	0.68	01 (50%)	-	01 (50%)
Others	22	7.51	-	-	22 (100%)

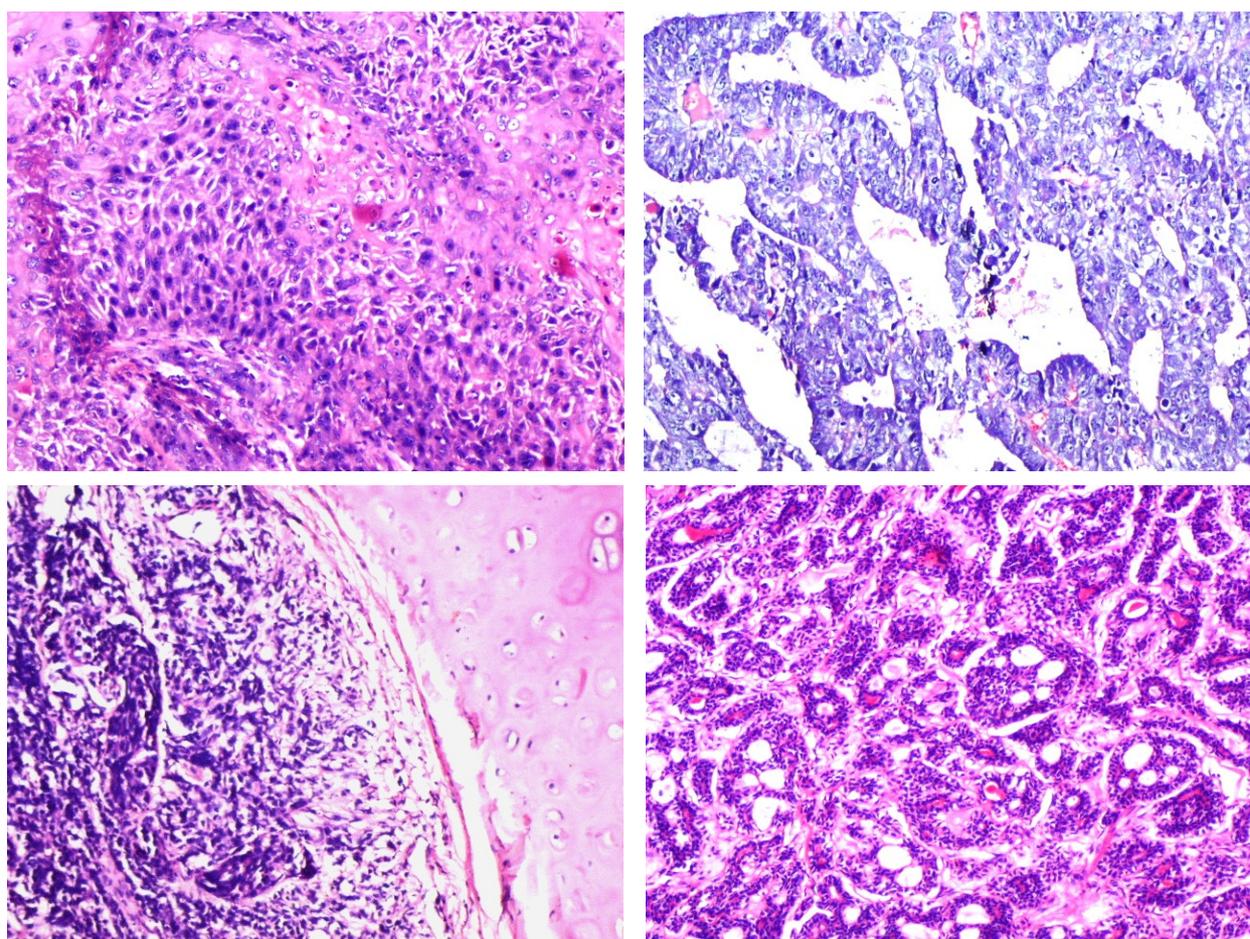


Figure 2: *Photomicrographs showing well differentiated squamous cell carcinoma (left upper), moderately differentiated adenocarcinoma (right upper), small cell carcinoma (left lower) and adenoid cystic carcinoma (right lower).*

DISCUSSION

In the current study, various clinicopathological parameters were observed in cases of primary carcinoma of lung. The mean age at diagnosis was found to be 51.80 ± 0.85 (53.19 ± 0.92 for males and 47.36 ± 1.92 for females) years. While a recent study from Pakistan¹⁰ reported the mean age to be 60.1 years for males and 57.5 years for female patients. Another study⁶ showed that most of the patients included (82/142) were of the age group 41 – 60 years of age.

Habit of tobacco smoking (active smoking was assessed) was found in 70.6% male and 33.3% female patients. This finding is consistent with other reports from within the country.^{11,12} The squamous cell carcinoma and small cell carcinoma showed strongest association with smoking (83.33% and 89.23% respectively) which was in accordance with the previous studies.⁸ The commonest presenting symptoms in our study were cough, dyspnea, chest pain, fever, haemoptysis and loss of weight and studies by other investigators¹¹⁻¹³ had reported cough, dyspnea, chest pain and haemoptysis as chief presenting complaints.

Current study shows that right lung was involved more commonly than the left. Similar observation was documented by Khan and colleagues.¹³ As a majority of patients presented with advance disease i.e. in more than half of the cases the tumour had invaded two or more lung zones however, 1/4th of cases were confined to the middle zone. Naseem and colleagues⁶ showed that the upper lobes were most commonly involved by lung cancer.

Our study reports that bronchial biopsy was the most frequent (115, 39.2) procedure carried out to obtain the tissue diagnosis which is quite consistent with a previous report from Pakistan.¹² The second commonest diagnostic procedure was lymph node biopsy (88, 30%). Lymphadenopathy may be seen less frequently in the west as one of the physical findings at the time of diagnosis in lung cancer, but it is frequent among Pakistani patients.^{12,13} CT – scan is being widely used to assess the extent of disease and CT – guided core needle biopsy is becoming a popular diagnostic tool (36, 12.3%) in cases where the tumour is small in size and situated deep in the lung parenchyma and in it bronchial biopsy may not yield the representative tumour tissue. Only 12 (4.1%) patients were offered thoracotomy and out of these, in 8 (2.7%) patients it was found intra-operatively that the disease had been inoperable. Thus only a small fraction (4, 1.4%) of the patients could actually underwent surgical resection. Each half of them underwent pneumonectomy and lobectomy. Khan and colleagues¹³ analysed 773 lung cancer ca-

ses who presented at Agha Khan University Hospital in 10 years and found that only 38 (4.9%) were offered a surgical intervention of which 20 (2.6%) cases showed inoperable disease thus surgery was deferred. Only 18 (2.3%) patients underwent a surgical resection thus supporting our findings.

In view of our observation and by comparing these with literature, this report *concludes* that lung cancer is becoming as frequent in females as in males. Vast majority of patients presented at an inoperable stage of disease. Squamous cell carcinoma, small cell carcinoma and adenocarcinoma are the three most common histological diagnoses of lung cancer. First two of these are more strongly associated with history of smoking. Adenocarcinoma is more common among non-smokers.

REFERENCES

1. Jemal A, Siegel R, Xu J, Ward E. Cancer Statistics, 2010. *CA Cancer J Clin* 2010; 60: 277-300.
2. Jemal A, Siegel R, Ward E, Murray T, Xu J, Thun MJ. Cancer statistics. *CA Cancer J Clin* 2007; 57: 43-66.
3. Jha R, Weerakoon AP, Karki KB, Shrestha S, Gamage, PWK. Lung cancer and smoking in Asia. *SAARC J Tuber Lung Dis HIV/AIDS* 2008; 1: 1-6.
4. Parkin DM, Bray FI, Ferlay J, Pisani P. Global cancer statistics, 2002. *CA Cancer J Clin* 2005; 55: 74-108.
5. Helland A, Brustugun OT. Lung cancer in smokers and never-smokers. [Article in Norwegian] *Tidsskr Nor Laegeforen* 2009; 129 (18): 1859-62.
6. Naseem N, Sadiq S, Nagi AH, Ashraf M. A pattern of carcinoma of lung as seen in a tertiary care hospital. *Biomedica* 2008; 24: 118-23.
7. Iqbal ZH. Presentation of Lung Cancer in south of Punjab. *Biomedica* 1997; 13: 6-10.
8. Hussain AN. The Lung. In: Kumar V, Abbas AK, Fausto N, Aster JC. (Eds). *Robbins and Cotran Pathological Basis of Disease*. 8th ed. Pennsylvania, Elsevier 2010: 727-8.
9. Wahbah M, Boroumand N, Castro C, El-Zeky F, El-torky M. Changing trends in the distribution of the histological types of lung cancer: a review of 4,439 cases. *Ann Diag Pathol* 2007; 11: 89-96.
10. Badar F, Meerza F, Khokhar RA, Ali FA, Irfan N, Kamran S, et al. Characteristics of lung cancer patients--the Shaukat Khanum Memorial experience. *Asian Pac J Cancer Prev* 2006; 7 (2): 245-8.
11. Rana F, Rana H, Gill J, Saeed K. Epidemiology of Lung Cancer in Pakistani patients - Our Experience at Shaukat Khanum Memorial Cancer Hospital and Research Centre. *Ann King Edward Med Uni* 1998; 4 (2): 47-9.
12. Amanullah S, Zaidi SHM, Malik IA. Clinico-pathological features of lung cancer and incidence of familial malignancies a study of population in Karachi. *Pak J Chest Med* 2006; 12 (4): 23-32.
13. Khan M, Hasan S, Sami S. Non – small cell lung cancer: disease spectrum and management in a tertiary care hospital. *J Pak Med Assoc* 2000; 50 (10): 330-3.