

Original Research Article

Clinico-epidemiological and pathological profile of lung cancer: a hospital based observational study in Western part of Rajasthan, India

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ABSTRACT

Background: Lung cancer is the most common cancer causing deaths in men and women world-wide, responsible for over 1 million deaths annually. Although, advances in surgical techniques and combined therapies lung cancer remains a disease with a poor prognosis. Aim of the study was to evaluate the clinico-epidemiological and pathological profile in diagnosed case of lung cancer patients, presenting in the K N Chest hospital.

Methods: Initial evaluation after obtaining informed consent, demography, history, clinicoradiological findings of patients and relevant investigations was recorded. Histopathological reports reviewed.

Results: Our study included 108 patients with confirmed cases of lung cancer. The mean age of the patients was 57.50 years. The male: female ratio was 5.8:1. Cough was the most common presenting symptom (77.78%) followed by chest pain (62.33%). Clubbing was most commonly associated with squamous cell carcinoma. Most common radiological presentation was consolidation (42.59%) followed by mass lesion (30.55%). Most common histopathological type of lung cancer found in this study was squamous cell carcinoma 47(43.52%) followed by adenocarcinoma 42 (38.89%). Small cell carcinoma was present in 15 (13.89%) and large cell carcinoma was present in 4 (3.70%) study group. The most common pathological cell type in silica dust exposed patient in this study was squamous cell carcinoma followed by adenocarcinoma with occupational history of > 10 years of silica dust exposure in stone mines.

Conclusions: Squamous cell carcinoma still remains the commonest histological subtype followed by adenocarcinoma.

Keywords: Histopathology type, Lung cancer, Smoking, Silica, Squamous cell carcinoma

INTRODUCTION

Lung cancer is the most common cancer causing deaths in men and women worldwide, responsible for over 1 million deaths annually.¹ Each year, more people die of lung cancer than of the next three leading causes of cancer related deaths combined: breast, colon, and prostate cancer. Although, advances in surgical techniques and combined therapies lung cancer remains a disease with a poor prognosis. Although 1-year survival

has improved over the past few decades, over all 5-year survival has remained relatively unchanged at 12% to 16% over the past 30 years.²

Lung cancer has been the most common cancer in the world for several decades. There are estimated to be 1.8 million new cases (12.9% of the total), of which 58% occur in developing countries. Lung cancer remains as the most common cancer in men worldwide (1.2 million, 16.7% of the total). In women, the incidence rates are

generally lower, and the geographical pattern is a little different primarily reflecting different past exposure to tobacco smoking. Therefore the highest estimated rates are in Northern America (33.8%) and Northern Europe (23.7%) with a relatively high rate in Eastern Asia (19.2%) and the lowest rates again in Western and Middle Africa (1.1 and 0.8%, respectively).³

There is an estimated 70,000 new cases (54,000 in men and 17,000 in women) and estimated mortality of 64,000 (49,000 in men and 15,000 in women) in India.

In India, lung cancer constitutes 6.9% of all new cancer cases and 9.3% of all cancer related deaths in both sexes.⁴

The incidence and profile of lung cancer differ as per geographic region and ethnicity and largely reflect the prevalence and pattern of smoking. The overall 5-year survival rate of lung cancer is very low with approximately 15% in developed countries and 5% in developing countries.⁵

Risk factor for lung cancer

- Tobacco smoking
- Genetic susceptibility
- Atmospheric pollution-
- Occupational factors- Asbestos exposure in mining, processing, Silica dust exposure in mining and Arsenic in insecticide.
- Pulmonary scarring- Old tubercular fibrocavitary lesions and Secondary to the lung fibrosis of asbestosis

Lung cancer appears to arise in the bronchi in response to repetitive carcinogenic stimuli, inflammation, and irritation.

The vast majority (85%) of cases of lung cancer are due to long-term exposure to tobacco smoke. About 10-15% of the cases occur in people who have never smoked. These cases are often caused by a combination of genetic factors and exposure to radon gas, asbestos, silica dust or other forms of air pollutants, including second-hand smoke.

A tobacco component causes lung carcinogenesis through the accumulation of mutations in key genes in the growth regulatory pathways, leading to uncontrolled cellular proliferation and tumorigenesis. Although tobacco use is the oldest and the most well-established risk factor for lung cancer, lung cancer can also occur in patients who have no history of smoking. A “never smoker” is usually defined as an individual who has smoked not more than 100 cigarettes over his or her lifetime.⁶ The World Health Organization estimates that 25% of lung cancer globally occurs in never smokers, but in Western countries this percentage is nearly 10% to 15%.⁶⁻¹⁰

Histological, the most frequent type of lung cancer in never smokers is adenocarcinoma.⁶ In all series of never smokers, lung cancer is much more frequent in women than in men, and generally occurs at an earlier age.^{6,8,11-13} Although lung cancer in never smokers occurs global, geographic and ethnic variation is striking, with 30% to 40% of Asian patients with lung cancer having never smoked, compared with 10% to 20% of Caucasians.^{6,14}

Aims and objectives was to evaluate the clinico-epidemiological and pathological profile of patients with Diagnosis of lung cancer presenting in the K N Chest hospital and to determine the proportion of any form of Silica dust exposure in lung cancer patients.

METHODS

An observational study “clinico-epidemiological and pathological profile of lung cancer in western Rajasthan” was conducted in Department of Pulmonary Medicine, K.N. Chest Hospital, after approval from Dr. S. N. Medical College, ethical committee Jodhpur. The study was completed in one year duration which includes time for data collection and analysis.

Inclusion criteria

All the patients with histo-pathological proven lung cancer (diagnosed previously), of either genders, above 18 years age attending OPD or admitted in TB and Chest Hospital.

Exclusion criteria

Patients, whose detail clinical profile or Histopathological reports were not available.

After obtaining informed consent, demography, history, radiological findings of patients and relevant investigations was recorded. The complaints which was evaluated in detail includes cough, sputum, chest pain, dyspnea, fever, weight loss, hoarseness of voice, dysphagia. History of smoking was asked in terms of number of bidies or cigarettes smoked per day and years of smoking. Occupational history was enquired as nature of work, exposure to silica and duration of exposure.

All patients was subjected to baseline blood investigations (CBC, LFT, RFT, HIV, HBsAg, Serum electrolyte) sputum microscopy for AFB, chest x ray PA and lateral view. Those patients were positive sputum microscopy for AFB, excluded from our study.

Computerized Tomography of chest was done, where ever feasible to characterize the lesion further and help to arrive at tissue diagnosis. Bronchoscopy / thoracoscopy were done in same patients to detect and aid in getting at histopathological diagnosis.

Following investigations help in the histopathological confirmation of the diagnosis.

- Biopsy was taken with Fiberoptic bronchoscopy/thoracoscopy.
- Computerized Tomography and Ultrasound guided needle biopsy (where ever feasible).

RESULTS

In our study the mean age was (57.50±9.45) years, the maximum number of patients in this study was 40-70 years. Most of study group is male, with male: female ratio was 5.8:1. Most common lung cancer among male was squamous cell carcinoma 41 (87.19%) followed by adenocarcinoma 34 (80.95%). In females most common lung cancer was adenocarcinoma 8 (19.05%). The pulmonary symptoms most commonly presented were cough was present in 84 patients (77.78%) followed by chest pain in 68 patients (62.33%) and dyspnea in 59 patients (54.63%), Haemoptysis in 40 patients (37.04%), Clubbing in 59 patients (54.63%) and lymphadenopathy (cervical lymphnode) in 14 (12.96%) (Figure 1). The most common cell types among smokers were squamous

cell carcinoma 24 patients were nonsmokers. Among nonsmoking patients the most common pathological diagnosis was adeno carcinoma 17 (70.83%), followed by squamous cell carcinoma 4 patients (16.67%) (Table 1).

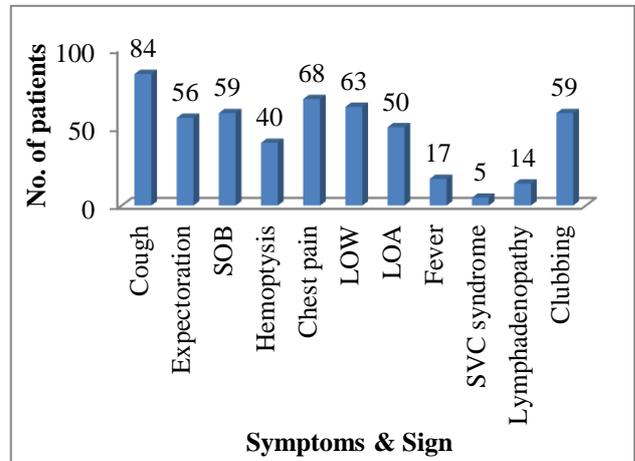


Figure 1: Distribution of patients based on clinical features.

Table 1: Level of smoking in pack-years with histopathological type of lung carcinoma.

Smoking in pack years	Adenocarcinoma	Large cell carcinoma	Small cell carcinoma	Squamous cell carcinoma
11-20	6	0	3	10
21-30	13	2	5	23
31-40	6	1	5	10
Non smoker	17	1	2	4
Total	42	4	15	47

In this study most of patients were farmer 48 (44.44%) followed by stone work 32 (29.63%) in mines (Table 2).

Table 2: Distribution of patients according to their occupation in this study.

Occupation	No. of patients	Percentage
House wife	13	12.04
Stone Work	32	29.63
Farmer	48	44.44
Labour	6	5.56
Other	9	8.33
Total	108	100.00

Radio-logically, (chest x ray) consolidation was the commonest presentation 46 (42.59%) followed by mass lesion 33 (30.55%), collapse consolidation 25 (23.14%) and pleural effusion 16 (14.81%) (Figure 2). Radio-logically mostly mid zone and hilum was involved (37.04%) followed by upper zone (35.18%) and lower zone (27.78%). Squamous cell carcinoma was involved

upper zone and adenocarcinoma mostly involved lower zone (peripheral). Right side was most commonly involved site in this study population.

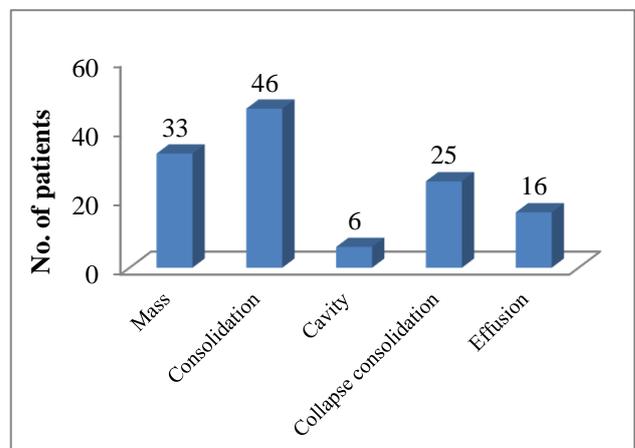


Figure 2: Distribution of patients based on chest x-ray findings.

Most common histopathological type of lung cancer found in this study was squamous cell carcinoma 47 (43.52%) followed by adenocarcinoma 42 (38.89%). Small cell carcinoma was present in 15 (13.89%) and large cell carcinoma was present in 4 (3.70%) study group (Table 3).

Table 3: Histopathological distribution of patients of lung cancer.

HPE	No. of patients	Percentage
Squamous cell carcinoma	47	43.52%
Adenocarcinoma	42	38.89%
Large cell carcinoma	4	3.70%
Small cell carcinoma	15	13.89%
Total	108	100.00%

DISCUSSION

Lung cancer is becoming the most common cause of cancer death for both men and women and it is a growing worldwide problem, especially, in developing countries like India. In the recent past there have been many advances in the early detection, staging, prevention and treatment of lung cancer. The histopathologic appearance of lung carcinoma remains an important guide to prognosis and treatment.

In this study of 108 patients, the mean age (57.50 ± 9.45) years, the maximum number of patients in this study was between 40-70 years. This is consistent with the studies conducted in India and abroad.¹⁵⁻¹⁸

Of the total 108 patients, 92 patients were males and 16 patients were females, with male: female ratio was 5.8:1. In a study conducted by Dey A et al male: female ratio of 4.14:1.¹⁸ The picture is not the same in certain countries. The most common Histopathological type among males was squamous cell carcinoma and the most common type among female was adenocarcinoma. The similar results found in other studies conducted in India.¹⁷⁻¹⁹ Tobacco smoking causes approximately 85%-90% of bronchogenic carcinoma.²⁰ Majority of the patients in this study population were from rural area. Smoking habit is significantly high among rural population.

Of the total 108 patients, 77.78 % (84/108) were smoker, 22.2% (24/108) were non-smoker. Smoking status has been found to have a strong correlation with primary lung cancer. In our study, the incidence of adenocarcinoma and squamous cell carcinoma among non smokers were 17 (70.83%) and 4 (16.67%) respectively. A study, conducted in India in 2012 by Dey et al, was found that the incidence of adenocarcinoma and squamous cell carcinoma among non smokers were 38.6% and 34.9%, respectively.¹⁸

There exists a dose-response relationship between smoking and lung cancer which emphasises the importance of duration and intensity of smoking as well as number of cigarettes smoked.¹³ Compared to never-smokers, smokers have 20-fold increased risk of lung cancer at present.²⁰ The risk of lung cancer among smokers increase with duration of smoking and number of cigarettes per day.²⁰ The risk for lung cancer in former smoker remains high than never-smoker even after >40 years of abstinence.²⁰ Incidences of lung cancer as reported from different parts of India had been nicely compiled by Behera and Balamugsh and few other studies which showed mostly Squamous cell carcinoma predominance in Indian subcontinent.¹⁵⁻¹⁸ The overall increased proportion of adenocarcinoma over Squamous cell carcinoma in the western world may be due to use of low-tar or filter cigarettes and decrease in number of smokers.

Most of patients were farmer 48 (44.44%) followed by stone worker 32 (29.63%) in mines in this study. In our study, among stone workers most common lung carcinoma was squamous cell carcinoma 16/32 patient followed by adenocarcinoma 13/32 patient small cell carcinoma 3/34. A study, conducted in Canada by Vida S et al, was found that, the Squamous cell carcinoma 186/400, adenocarcinoma 84/400 and small cell carcinoma 73/400.²¹

In this study, respiratory symptoms most commonly presented were cough was present in 84 patients (77.78%) followed by chest pain in 68 patients (62.33%) and dyspnea in 59 patients (54.63%), haemoptysis in 40 patients (37.04%), Clubbing in 59 patients (54.63%) and lymphadenopathy (cervical lymphnode) in 14 (12.96%). (Figure 1) A study, conducted in India in 1998 by Gupta et al was found that, the respiratory symptoms was cough (68%), dyspnoea (59%), chest pain (22%), haemoptysis (20%) and dysphagia (6%).¹⁹

Radiologically, consolidation was the commonest presentation 46 (42.59%) followed by mass lesion 33 (30.55%), collapse consolidation 25 (23.14%) and pleural effusion 16 (14.81%). A study, conducted in India in 1998 by Gupta et al was found that, the, obstructive pneumonitis was the commonest presentation (59.5%) followed by mass lesion (31.8%).¹⁹ An another study, conducted in India by Mandal SK et al was found that, the most common radiological presentation was mass (70%) followed by combined presentation (20.3%), collapse-consolidation (6.7) and pleural effusion (3%).²²

Radiologically mostly mid zone and hilum was involved (37.04%) followed by upper zone (35.18%) and lower zone (27.78%). Squamous cell carcinoma was involved upper zone and mid zone, adenocarcinoma mostly involved lower zone (peripheral). Right side was most commonly involved site in this study population. A study, conducted in India by Mandal SK et al, was found that,

the most of the patients had primary lung cancer in the right lung (60.3%).²²

Histopathological analysis revealed that the commonest cell type in our study was squamous cell carcinoma 47 (43.52%) patients, followed by adenocarcinoma 42 (38.89%), small cell carcinoma 15 (13.89%), large cell carcinoma 4 (3.70%). Squamous cell carcinoma still remained the leading cause of lung cancer in this study. Adenocarcinoma remains the second most common histological subtype of lung cancer in this study. A study, conducted in India by Mohan A et al was found that, the Small cell carcinoma was diagnosed in 14.6% (58) of patients while 85.4% (339) had non-small cell lung carcinoma (NSCLC).¹⁷ Within NSCLC, the most common histology types were squamous cell carcinoma (30%), followed closely by adenocarcinoma (ADC) (28.3%) and large cell carcinoma (1.7%).

The clinico-pathological profile of lung cancer has undergone noticeable changes over the last four decades, especially in the increase in adenocarcinoma incidence and their frequent presence in smokers. Some studies showed adenocarcinoma was the predominant cell type which did not correlate with this Study. The studies in United States by Samet J M, and Beckett W S, on epidemiology of lung cancer had shown adenocarcinoma to be the commonest. The reasons cited by them mainly were raise in female smokers and change in smoking pattern.

CONCLUSION

The lung cancer is emerging as a big medical and social problem for our country especially with rampant use of tobacco despite legislation to control it. Our patients are presenting in advanced stages of the disease whereby only palliation can be planned. The government should establish more centers for the treatment as affordability is major issue especially in the rural area. The government should strictly implement the rules and regulations for decreasing tobacco consumption. There is a need for strengthening cancer registry system in our country so that exact burden of the disease can be assessed and measures can be taken for planning and management of the disease. There is a need for new research in the field of early diagnosis and management for improvement of survival of the lung cancer patients. So, while awaiting a breakthrough in early diagnosis and effective management it is imperative that doctors keep a high clinical suspicion for it especially in the high risk groups of smokers and COPD patients and evaluate them appropriately to avoid misdiagnosis and delayed diagnosis of lung cancer.

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