

An Observational Study Assessing the Correlation between Clinico-Radiological Profiles with Histopathological Patterns of Lung Cancer

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Abstract

Aim: The aim of the present study was to find out the correlation between clinico-radiological profiles with histopathological patterns of lung cancer.

Methods: This was a cross-sectional observational study conducted at over a duration of 1 year patients with histopathologically confirmed lung cancer. A total of 200 histopathologically confirmed diagnosed patients with lung cancer were included in the study.

Results: There were 36% and 35% of patients who belonged to age between 51-60 year and 60-70 year respectively. Out of 200 patients, 170 patients were smokers, 90 patients had a prior history of COPD, and lymphadenopathy was present in 20 patients. The ECOG performance status 37% of patients remained on scale 2, followed by 35% on scale 3. Among the clinical symptoms, cough was present in (85%), breathlessness (60%), chest pain (56%) followed by hemoptysis, sputum production, voice change, and superior vena cava obstruction. Radiological examination showed mass lesion as the most common finding (80%) followed by collapse (9%) and pleural effusion (5%). Correlation of histopathological types with radiological findings showed that mass lesion was the major finding in both adenocarcinoma and squamous cell carcinoma. Pleural effusion was present in about more than half of the patients with adenocarcinoma. Lymphadenopathy was only present in adenocarcinoma.

Conclusion: This study showed that smoking is a principal risk factor in causation of lung carcinoma. It was seen to present more frequently in elderly age groups. Patients commonly present with chief complaints of smoking and breathlessness. Further investigations should be carried out in such circumstances to confirm the diagnosis.

Keywords: Lung Cancer, Clinico-Radiological Profile, Histo-Pathological Pattern.

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Introduction

Lung cancer is the most common cancer worldwide since 1985, both in terms of incidence and mortality. Globally, lung cancer is the largest contributor to new cancer diagnoses (1,350,000 new cases and 12.4% of total new cancer cases) and to death from cancer (1,180,000 deaths and 17.6% of total cancer deaths. [1] In India, lung cancer constitutes 6.9 percent of all new cancer cases and 9.3 percent of all cancer-related deaths in both sexes. It is the commonest cancer and cause of cancer-related mortality in men. [2] 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). [3] Smoking is the cause for

more than 85% of the bronchogenic carcinoma cases. [4]

Squamous cell carcinomas and small cell carcinomas shows significant association with smoking. [5] Occupational exposures and air pollution approximately accounts for 2% to 9% of lung cancers. Approximately 85% patients with lung cancer are symptomatic at presentation. In remaining patients, lung cancer is diagnosed by various radiological methods initiated for an unrelated health problem and histopathological examination. [6] The clinical features of carcinoma lung result from the local growth and regional growth of the tumor as well as lymphatic invasion, haematogenous distant metastatic spread and

remote para-neoplastic effects from tumour products or immune cross- reaction with tumour antigens. [7] More interest has been developed in the histological characterisation of lung cancer in recent years in view of newer histology guided therapeutic modalities and genomic classification of lung carcinoma. [8,9]

Targeted therapy or immunotherapy is mainly based on subtype analysis for mutation. Another changing trend has been observed in the morphological variety, with adenocarcinoma becoming equal to or even overtaking squamous cell carcinoma sometimes in some Asian and most Western countries. [10] About one-third of patients present with symptoms resulting from loco-regional growth of the tumor as well as hematogenous and lymphatic spread and para-neoplastic manifestations. In others, bronchial carcinoma is diagnosed by radiology done for unrelated health problems followed by histopathology.

The aim of the present study was to find out the correlation between clinico-radiological profiles with histopathological patterns of lung cancer.

Materials and Methods

This was a cross-sectional observational study conducted at Katihar Medical College and Hospital, Katihar, Bihar, India and Arc Hospital, Bhagalpur for one year in which patients with histopathologically confirmed lung cancer were included. A total of 200 histopathologically confirmed diagnosed patients with lung cancer were included in the study. Patients who had lung metastasis from a non-pulmonary primary tumor, lymphoproliferative disorder, and the patient already received treatment for lung cancer was excluded from this study. Prior approval was taken from Institutional Review Board.

Complete sociodemographic characteristics, smoking status, previous history of COPD, radiological, and histopathological characteristics of the tumor were recorded in the study. The performance status of patients was documented using the Eastern Cooperative Oncology Group scale (ECOG). CT scan of the chest was done in the majority of the patient. CT-guided or fibre-optic bronchoscopic guided tissue sampling from lung lesions followed by histopathological examination was done to diagnose the appropriate tumor type.

Results

Table 1: Demographic and baseline characteristics of the study subjects

Gender	N%
Male	160 (80)
Female	40 (20)
Age in years	
<40	10 (5)
41-50	30 (15)
51-60	72 (36)
61-70	70 (35)
>70	18 (9)
Smoking status	
Yes	170 (85)
No	30 (15)
COPD	
Yes	90 (45)
No	110 (55)
Lymphadenopathy	
Yes	20 (10)
No	180 (90)
ECOG	
1	10 (5)
2	74 (37)
3	70 (35)
4	30 (15)
5	16 (8)

There were 36% and 35% of patients who belonged to age between 51-60 year and 60-70 year respectively. Out of 200 patients, 170 patients were smokers, 90 patients had a prior history of COPD, and lymphadenopathy was present in 20 patients. The ECOG performance status 37% of patients remained on scale 2, followed by 35% on scale 3.

Table 2: Distribution of the study subjects according to clinical findings

Symptoms	N%
Cough	170 (85)
Breathlessness	120 (60)
SVO	10 (5)
Voice change	30 (15)
Sputum	70 (35)
Hemoptysis	80 (40)
Chest pain	112 (56)
Radiological presentation	
Pleural effusion	10 (5)
Mass lesion	160 (80)
Collapse	24 (12)
Lymphadenopathy	6 (3)

A detailed analysis of clinical symptoms revealed cough in (85%), breathlessness (60%), chest pain (56%) followed by hemoptysis, sputum production, voice change, and superior vena cava obstruction. Radiological examination showed mass lesion was the most common finding (80%) followed by collapse (9%) and pleural effusion (5%).

Table 3: Histopathological diagnosis of the study subjects among smokers, non-smokers, COPD and Non-COPD

Histopathological type	Total (n=200) (%)	Smoker (170)	Non-smoker (30)	COPD (90)	Non-COPD (110)
Small cell carcinoma	30	26	4	16	14
Squamous cell carcinoma	70	62	8	40	30
Adenocarcinoma	95	80	15	25	70
Undifferentiated carcinoma	5	5	0	5	0

Adenocarcinoma was the most common histopathological type in non-COPD patients and squamous cell carcinoma in COPD patients.

Table 4: Association of histopathological diagnosis with CXR/CECT findings

Histopathological diagnosis	CXR/CECT findings			
	Effusion(n=10)	Mass(n=160)	Collapse(n=24)	LN(n=6)
Small cell carcinoma	4	12	0	0
Squamous cell carcinoma	1	65	10	0
Adenocarcinoma	5	80	14	6
Undifferentiated carcinoma	0	3	0	0

Correlation of histopathological types with radiological findings showed that mass lesion was the major finding in both adenocarcinoma and squamous cell carcinoma. Pleural effusion was present in about more than half of the patients with adenocarcinoma. Lymphadenopathy was only present in adenocarcinoma.

Discussion

Lung cancer has become one of the leading causes of preventable death worldwide. Increasing lifespan along with exposure to etiological agents have made this once a rare disease a very serious health problem. It is the leading cause of cancer death (18.0% of the total cancer deaths) and the second most commonly diagnosed cancer in both sexes worldwide. [11] Lung cancer is caused by mutations, causes abnormal proliferation of the mutated cells, and the formation of a tumor. Previously, lung cancer was broadly classified into non-small cell lung cancer (NSCLC) and small cell lung cancer (SCLC). The availability of newer

histology-guided targeted molecular therapies for lung cancer has made this classification inadequate. So, histopathological and genomic characterization of lung cancer has now become the topic of interest. [12]

There were 36% and 35% of patients who belonged to age between 51-60 year and 60-70 year respectively which was similar to other studies. [13] As life expectancy is increasing, it increases the risk of cancer with aging. [14] Similarly, the male predominance in our study was similar to observations done previously. [15,16] Out of 200 patients, 170 patients were smokers, 90 patients had a prior history of COPD, and lymphadenopathy was present in 20 patients. The risk for the development of lung cancer increased with the duration of smoking and the number of cigarettes smoked per day. Average smoking in males had an approximately 9- fold to 10-fold risk for lung cancer, whereas heavy smokers had at least a 20-fold risk. [17]

The ECOG performance status showed that 37% of patients remained on scale 2, followed by 35% on scale 3. When we looked for clinical symptoms, cough was present in (85%), breathlessness (60%), chest pain (56%) followed by hemoptysis, sputum production, voice change, and superior vena cava obstruction. Obstruction of the airway may cause post-obstructive pneumonia, which may have been associated with cough. [18] Mass lesion on radiological examination was the most common finding (80%) followed by collapse (9%) and pleural effusion (5%). Correlation of histopathological types with radiological findings showed that mass lesion was the major finding in both adenocarcinoma and squamous cell carcinoma. Pleural effusion was present in about more than half of the patients with adenocarcinoma. Lymphadenopathy was only present in adenocarcinoma. A similar observation regarding finding out of mass lesions was made by Aki et al [13] and Rawat et al. [19] Distribution of histopathological type according to radiological findings showed that pleural effusion was most commonly detected in adenocarcinoma, followed by small cell carcinoma. Sarfraz et al [20] also noted that adenocarcinoma was most commonly associated with pleural effusion.

Squamous cell carcinoma was seen to present more frequently as a central mass than a peripheral mass and adenocarcinoma was seen to present more frequently as a peripheral mass according to our study. The association of squamous cell carcinoma and central location of presentation along with association of adenocarcinoma and peripheral location of presentation were also proven to be statistically significant. Small cell carcinoma was also seen to present more frequently as central mass. Similar results were seen in study conducted by Sharma CP et al. [21] The study done by Bhadke B. on patients with lung carcinoma also denoted that squamous cell carcinoma commonly presents as central tumours, whereas adenocarcinoma as peripheral tumour. [22]

Conclusion

This study showed that smoking is a principal risk factor in causation of lung carcinoma. It was seen to present more frequently in elderly age groups. Patients commonly present with chief complaints of smoking and breathlessness. Further investigations should be carried out in such circumstances to confirm the diagnosis. Lung carcinoma should be suspected in a person presenting with cough and other symptoms such as malaise, weight loss, etc. Squamous cell carcinoma is still the most common histological type of lung carcinoma in India. Adenocarcinoma is also emerging as a dominant histological type due to changing trends in smoking habits.

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