

## Changing Trends in the Histological Types of Lung Carcinoma

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### ABSTRACT

**Introduction:** Lung cancer is a major cause of cancer-related mortality and morbidity in males and females. Although smoking is the major cause of lung cancer, only 10 % of heavy smokers develop lung cancer suggesting that other factors may also act independently or synergistically with smoking. Recent studies have suggested that there are changes in histological type in recent years.

**Objectives:** This study was to determine incidence of various histological types of lung carcinoma and analyse their changing trends.

**Material and Methods:** This is a prospective study. A total of 184 cases of lung carcinoma were undertaken to analyse from 2011 to 2014 in a tertiary care centre.

**Results:** Overall adenocarcinoma was found to be most common with 73 (39.67%) cases followed by squamous cell carcinoma with 68 (36.96%) cases. However, in males squamous cell carcinoma still remains predominant with 59 (43%) cases followed by adenocarcinoma with 49 (35.7%) cases. Male to female ratio was 2.9:1. In females, adenocarcinoma was the most common type.

**Conclusion:** Overall adenocarcinoma was the most predominant variant of lung carcinoma in our region closely followed by squamous cell carcinoma. However, in males squamous cell carcinoma was most common histological type. Incidence of lung tumor also shows increase in females thereby decreasing the male to female ratio to 2.9.

**Keywords:** Lung Cancer, Smoking, Histological Pattern.


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### INTRODUCTION

Lung cancer still ranks as the leading cause of tumour-related death in the world.<sup>1</sup> Epidemiological changes in smoking habits are affecting the pattern of lung cancer patients, with perhaps an increasing number of non-smokers, women involved and variation in the occurrence of adenocarcinoma.<sup>1-3</sup> Some important epidemiological factors are age, gender, and histology, and these have markedly changed in the past few years.<sup>4</sup> Reasons could be non-smoking policies, population aging, women now smoking, improvement in histological and imaging diagnosis etc.<sup>2-6</sup>

The dominant risk factor is cigarette smoking. Although exposure to factors such as radon, second hand smoke (SHS), asbestos, arsenic, and various other chemicals, diet, genetic predisposition, hormonal factors, and infections and inflammatory processes also contribute to risk, about 95% of lung cancers among men and 90% among women in the United States are attributable to smoking.<sup>7-10</sup>

### MATERIALS AND METHODS

It was a prospective study, conducted in department of pathology, JLN Medical College, Ajmer, consisting of 184 cases of lung carcinoma from 2011 to 2014. Patients were interviewed regarding their history of smoking, smoking pattern and use of smokeless tobacco. Following the interview, all patients underwent the routine work-up for lung cancer, including imaging (computed tomography (CT) scan of the thorax and upper abdomen) and pathologic confirmation of the diagnosis. All the patients with lung carcinomas were included whereas patients with others diagnosis like inflammatory conditions, infections, benign tumors were excluded.

### RESULTS

A total of 184 cases of lung carcinoma were analysed consisting of 137 males and 47 females. The age range of patients were

from 15 – 90 years. A male to female ratio of 2.9 was observed in this study. The average age of presentation with lung cancer was found out to be 59 yrs in males and 55 yrs in females. The peak incidence of lung tumors was seen in 5-6<sup>th</sup> decade. Majority of cases were seen in 4-7<sup>th</sup> decade.

In this study, most prevalent was adenocarcinoma (including bronchioloalveolar carcinoma) consisting of 73 cases followed by squamous cell carcinoma in 67 cases, small cell carcinoma in 15 cases, large cell anaplastic carcinoma in 8 cases, undifferentiated

carcinoma in 5 cases, mesothelioma and adenosquamous carcinoma in 3 cases each, 2 cases of carcinoid, 1 case each of NHL and spindle cell neoplasm and 6 metastatic cases from Ewing's sarcoma, ductal carcinoma breast, metastatic adenocarcinoma, metastatic sarcoma and metastatic squamous cell carcinoma.(table 1)

History of smoking was given by 85.4% of males and 35% females thereby strongly supporting role of smoking as a major causative agent of lung carcinoma.

**Table 1: Histological types of lung carcinoma in our study**

Diagnosis	Male	Female	Total	Percentage
<b>Primary lung tumors</b>				
Adenocarcinoma	49	24	73	39.67
Squamous cell carcinoma	59	9	68	36.96
Adenosquamous carcinoma	1	2	3	1.63
Small cell anaplastic carcinoma	13	2	15	8.15
Large cell anaplastic carcinoma	6	2	8	4.35
Undifferentiated large cell carcinoma	4	1	5	2.72
Non-Hodgkin's lymphoma	0	1	1	0.54
Carcinoid	2	0	2	1.09
Malignant Mesothelioma	1	2	3	1.63
<b>Total</b>	<b>135</b>	<b>43</b>	<b>178</b>	<b>96.75</b>
<b>Secondary lung tumors</b>				
Metastatic Ewing's sarcoma	0	1	1	0.54
Metastatic Ductal carcinoma Breast	0	1	1	0.54
Metastatic Adenocarcinoma	0	2	2	1.09
Metastatic Sarcoma	1	0	1	0.54
Metastatic Squamous Cell Carcinoma	1	0	1	0.54
<b>Total</b>	<b>2</b>	<b>4</b>	<b>6</b>	<b>3.25</b>

## DISCUSSION

Lung cancer is the most malignant disease worldwide and is a major cause of death from cancer particularly amongst males. It was a rare disease until the beginning of 20<sup>th</sup> century and since then the occurrence of lung cancer has increased rapidly. Lung cancer has shown astonishing 15 fold increase in males and 9 fold increase in females. The global incidence of lung cancer is increasing at the rate of 0.5% per year.

In the present study out of 184 cases diagnosed as lung tumors, 133 (72.28 %) gave history of smoking. In males 117 cases (85.4 %) out of 137 gave history of smoking. It correlates well with other studies where 80-90 % cases had history of smoking.<sup>11-15</sup>

In the present study, 137 males and 47 female patients were diagnosed as malignant lung tumors with a male to female ratio of 2.9 suggesting that the disease is still slightly more frequent in males.

Less than 7 % of the patients in the present study were below the age of 40 years at the time of diagnosis. The cause for this early onset of the disease may be due to heavy smoking, environmental exposure to carcinogens and perhaps due to genetic predisposition. Smoking has been associated in 85.4 % males and 34.4 % females in the present study. The risk of bidi smoking is almost identical or even more than cigarette smoking.<sup>11</sup>

In the present study Squamous cell carcinoma was the predominant type of carcinoma amongst heavy smokers. Adenocarcinoma occurred predominantly in moderate to light smokers and in non-smokers. These findings are similar to as that of Mohamed Sadek Sabour et al in their study of 509 cases of lung cancer.<sup>16</sup> In the present study major symptoms were cough with expectoration (52.71%), chest pain (44%), dyspnoea (37.5%), loss of weight (34%), fever (21%) and weight loss (21 %). Most of other studies also had such type of clinical presentation as shown in table 2.<sup>15-19</sup>

In 184 cases, most prevalent was adenocarcinoma(including Bronchioloalveolar Carcinoma) with 73 cases (39.67%), squamous cell carcinoma in 68 cases (36.96%), small cell anaplastic carcinoma in 15 cases (8.15%), large cell anaplastic carcinoma in 8 cases (4.35%), undifferentiated large cell carcinoma in 5 cases (2.72%) whereas 3 cases each of mesothelioma and adenosquamous carcinoma (1.63%). 2 cases of carcinoid (1.09%), 1 case of NHL (0.54) and 6 cases of metastasis (3.25%) one each from Ewing's sarcoma, ductal carcinoma breast, metastatic adenocarcinoma, metastatic sarcoma and two metastatic squamous cell carcinoma were observed.<sup>20-28</sup> These results were in agreement with other similar studies as shown by table 3.

Table 2: Common clinical presentation of lung carcinoma

Symptoms	Cohen et al <sup>[14]</sup>	Shetty CM <sup>[15]</sup>	Strug et al <sup>[17]</sup>	William Francis et al <sup>[18]</sup>	Jindal et al <sup>[19]</sup>	PRESENT STUDY
Chest Pain	46	33	38	50	52	44
Cough	78	55	68	71	88	52
Dyspnoea	22	43	48	23		37
Hemoptysis	37	36	35	63	69	21
Loss of weight	40	60	23	39	90	34

Table 3: Comparison of results of various studies with our study

Author	Squamous Cell Carcinoma	Adeno-carcinoma	Small Cell Carcinoma	Large Cell Carcinoma	Others
Tuladhar and Pant <sup>[20]</sup>	51	11	19	4	15
Schenk and Bryan <sup>[21]</sup>	41	35	12	4	8
Madan and Bann <sup>[22]</sup>	53	38	4	1	4
Pyrozinski et al <sup>[23]</sup>	43	26	20	4	7
Tatar et al <sup>[24]</sup>	33	40	7	7	13
Rawat and Sindhwani <sup>[25]</sup>	44	25.5	16	4.5	10
Roohi and Haque <sup>[26]</sup>	56	19	16	4	5
Patricia and Mehta <sup>[27]</sup>	35	41	14	5	5
Mukherjee et al <sup>[28]</sup>	40	38	9	4	9
PRESENT STUDY	36	40	8	4	12

## CONCLUSION

The distribution of histological patterns and male to female ratio shown by our study was in agreement with many similar studies performed worldwide. Overall adenocarcinoma was the most frequent type but in males, squamous cell carcinoma was found to be most predominant. Females, in concordance to many other studies have shown Adenocarcinoma to be the most frequent type. Therefore, in concordance to a number of studies, an increase in incidence of Adenocarcinoma and a decrease in incidence of Squamous cell carcinoma was observed. A strong association of lung carcinoma with smoking was observed. So, a prompt intervention and health education for a healthy lifestyle and smoking cessation is required to reduce the incidence of lung carcinoma.

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