



A Study on Lung Cancer in non Smokers and Smokers in a Tertiary Care Hospital of Eastern India

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Abstract

Background: Lung cancer contributes to the majority of all cancer diagnosis in the world. It has the most unfavourable prognosis and accounts for the maximum number of cancer related deaths worldwide. In our study we have compared epidemiology and clinic radiological profile of lung cancer among smokers and non smokers

Methods: 44 lung cancer patients were enrolled. They were subjected to diagnostic procedures like transthoracic FNAC/biopsy, bronchoscopy, closed pleural biopsy, lymph node FNAC/biopsy, besides routine blood and sputum examinations and CECT thorax. Data was analysed after 6 months.

Results: Age of most patients was between 46 and 60 years. Lung cancer among smokers was significantly high in males. 59% of lung cancer patients were residents of rural areas. 63.7 % of study population were illiterate and 63.7% were Hindu. 93% of non smokers and 23 % smokers had cough and wheeze at presentation respectively. 21.4 % of non smokers and 16.6% of smokers with lung cancer had pericardial effusion. The commonest radiological presentation of smokers with lung mass was mass lesion and mediastinal lymph nodes. 57.3% of non smokers with lung cancer presented with pleural effusion. Smokers mainly presented with mass in right upper lobe and non smokers presented with mass in left lower lobe. 23.3 % of smokers with lung cancer had COPD whereas 7.3% of nonsmokers were hypertensive and diabetic. 63.8 % of smokers and 43% of non smokers had squamous cell carcinoma. Smokers with pack years >30 suffered from squamous cell carcinoma and those with <5 pack years suffered from adenocarcinoma. 50 % and 35.8 % of squamous cell carcinoma presented with central mass in smokers and non smokers respectively. 35.7% of smokers and 3.3 % of non smokers were addicted to non smoking form of tobacco.

Conclusion: Squamous cell carcinoma is predominantly present in smokers however 43% of non smokers also suffered from same. COPD, hypertension and diabetes was not significantly correlated with bronchogenic carcinoma.

Introduction

Bronchogenic carcinoma was considered to be a rare disease at the start of the 20 th century¹ but

has now reached epidemic proportion .It is the leading cause of cancer related death and its incidence is rising at alarming rate in developing

country. According to first population based cancer registry from eastern part of India published in 2002, the highest number of lung cancer cases among male has been documented in Kolkata. Cigarette smoking is by far the leading cause of lung cancer, accounting for approximately 90% of lung cancer cases in the United States and other countries where cigarette smoking is common.² Compared to never smokers, smokers have about a 20-fold increase in lung cancer risk at present. About 30–40% of patients with lung cancer are never-smokers among the Asian countries.³ Many epidemiological studies have found that the characteristics of lung cancer among never-smokers are significantly different from those among smokers.^{1,3,4} In this study we have shared our experience with 44 cases of primary lung cancer diagnosed in a tertiary care hospital in Kolkata. We have compared the demographic and clinic radio pathological difference between lung cancer in smokers and non smokers.

Materials and Methods

This study is a retrospective analysis of all diagnosed cases of lung cancer, admitted during period of 6 month (1st. Dec '13 to 31st May'14) in the Chest medicine department of a tertiary hospital of Eastern India. Data regarding Demographic and Clinical informations were collected from the patients, their relatives, case record files and entered in a predesigned and pretested schedule. Demographic parameters such as age, sex, occupation, religion, literacy status, residence were recorded for all patients. Patients were interviewed regarding their history of

smoking and smoking pattern. The definition of non smoker are those who smoked <100 cigarettes in their lifetime and those who smoked more than just occasional smoking are termed as smokers⁵. Detailed clinical examination was done with emphasis on clubbing, pallor, nutritional status, lymphadenopathy, signs of superior vena cava obstruction. Routine blood examinations and sputum for acid fast bacilli was performed in all patients. Radiological assessment was done with help of chest radiographs, CT Scan of thorax, abdomen and brain. Parameters like distribution of mass, presence or absence of collapse, pleural effusion, mediastinal lymphadenopathy, metastasis in ipsilateral or contralateral lung ,rib metastasis, distal metastasis was noted. Diagnosis of primary bronchogenic carcinoma was established using CT guided fine needle aspiration and biopsy from lung mass, fibre optic bronchoscopy, fine needle aspiration cytology and biopsy from peripheral palpable lymph node. Pleural fluid for malignant cells was sent in cases of lung mass with pleural effusion for prognostication. All data was entered in excel sheets and statistical analysis was performed using Epi Info software. P value was calculated to determine the level of significance.

Results

Of the 44 diagnosed cases of lung cancer 68% were smoker and rest non-smoker. Mean age for smokers with lung cancer was 59 ± 17.72 which was significantly higher than the mean age for non-smokers i.e. 54.21 ± 27.64 as shown in Table 1.

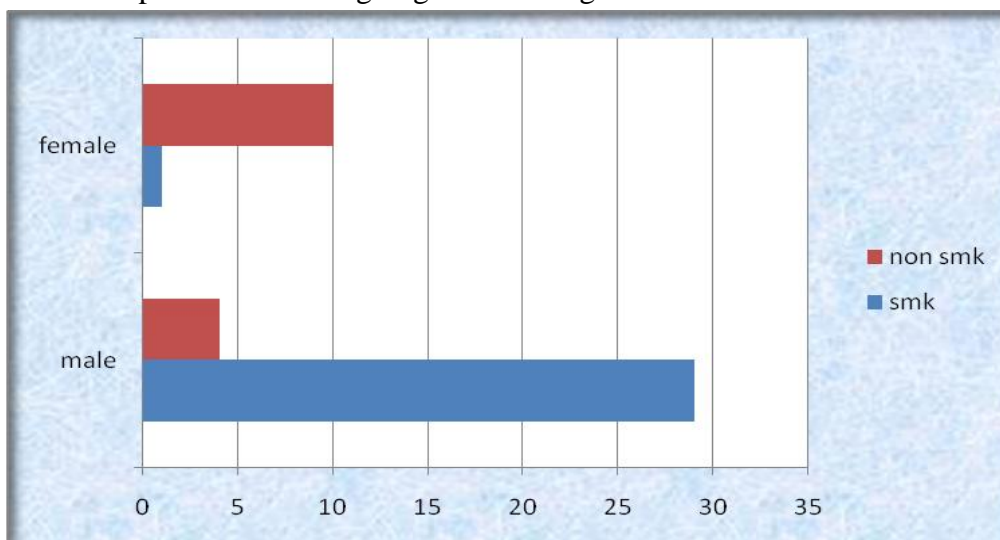
Table 1: Distribution of study population according to their age

Age group	Smoker (n ₁ =30)		Non smoker (n ₂ =14)		Total (n=44)	
		%		%		%
31-45	3	10	5	35.7	8	18.2
46-60	15	50	5	35.7	20	45.5
61-75	12	40	3	21.5	15	34
>75	0	0	1	7.1	1	2.3
Mean age	59		54.21		57.47	
Standard Deviation	8.86		13.82		10.76	
		Z = 4.03			p<.05	

Lung carcinoma among smokers were significantly high in male where as among non smokers lung cancer was more common in

females. Male: female ratio was 3:1 as shown in Figure 1.

Figure 1: Distribution of patients according to gender among smokers and non smokers

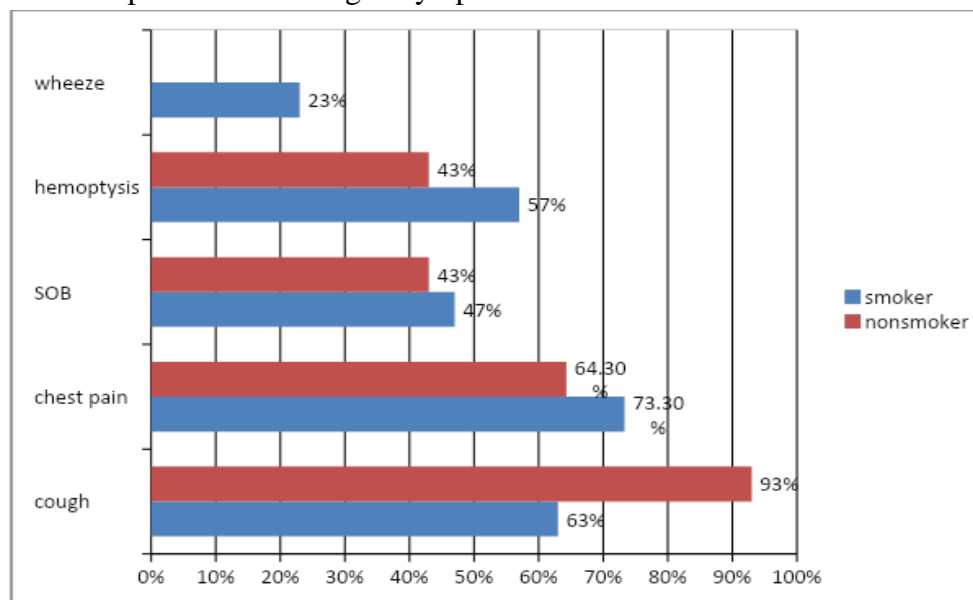


Majority (59%) of Carcinoma Lung patients were resident of ‘rural’ area. 63.7% of study population were illiterate and hindu by religion.

Most (93%) of the non-smokers had cough at presentation which is significantly higher than that

of smoker group. 23% of smokers had wheeze at presentation compared to none among non-smoker group (significant). It is shown in Figure 2.

Figure 2: Distribution of patients according to symptoms.



Pericardial effusion was present in 16.6% of smokers with lung cancer whereas 21.4% of non smokers had pericardial effusion.53.3% of smokers had mediastinal lymphnodes. The commonest radiological presentation of smokers

with lung cancer was mass leision and mediastinal lymph nodes. Whereas 57.3% of non smokers with lung cancer commonly presented with pleura effusion as shown in Table 2.

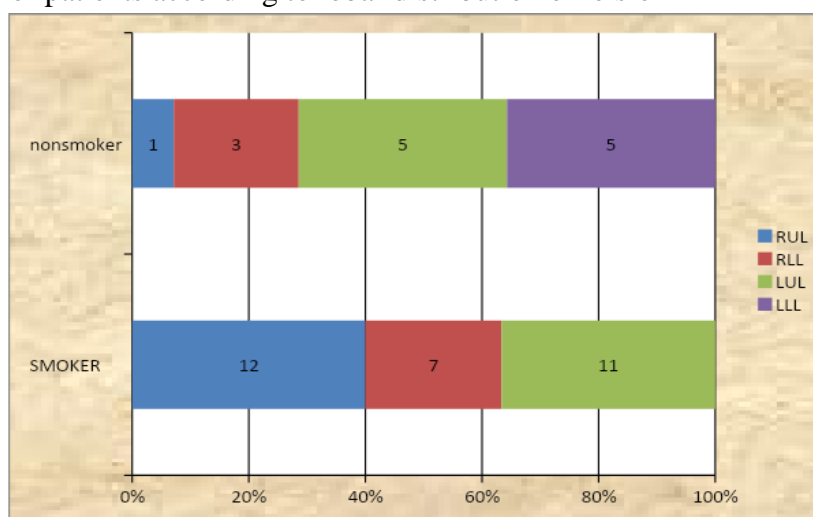
Table 2: Distribution of study population according to radiology

Radiological findings	Smoker (n ₁ =30)	%	Non-smoker (n ₂ =14)	%	P value
Collapse+central mass	9	30	2	14.3	p> 0.05
Mass lesion(only)	7	23.3	4	28.6	
Rt pleural effusion	6	20	3	21.4	
Lt pl eff	7	23.3	4	28.6	
Both pl eff	1	3.3	1	7.3	
Metastasis local	6	20	1	7.3	
Rib metastasis	4	13.3	1	7.3	
Mediastinal l.n.	16	53.3	3	21.4	p<.05
Distal metastasis liver	2	6.7	2	14.3	p> 0.05
Distal metastasis adrenal	2	6.7	2	14.3	
D/M opp lung	3	10	1	7.3	
D/M phr nv.	1	3.3	0	0	

Significant number of smokers presented with mass in right upper lobe and significant number of

non smokers presented with mass in left lower lobe as shown in figure 3

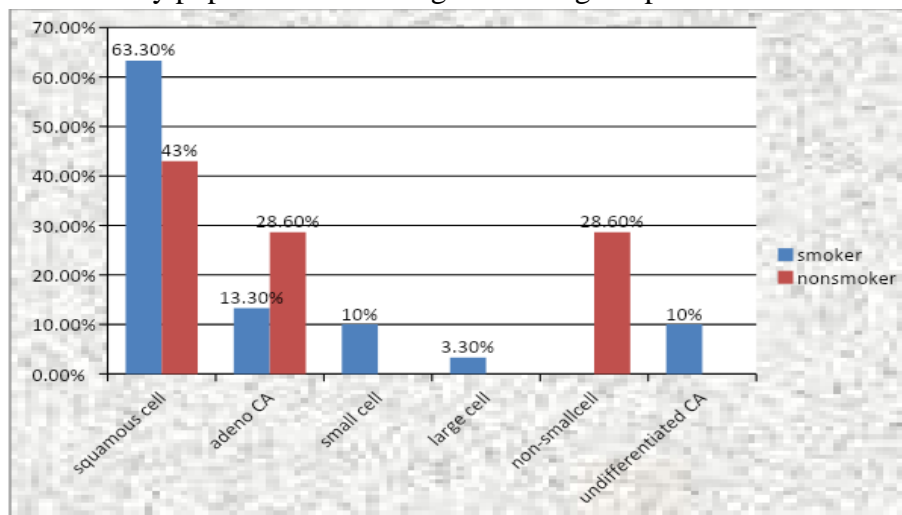
Figure 3: Distribution of patients according to lobar distribution of lesion



63.8% smokers with lung cancer had squamous cell carcinoma. Significant number of non

smokers with lung cancer had non-small cell ca as shown in figure 4.

Figure 4: Distribution of study population according to histological pattern



53.4% smokers with smoking habit of ≥ 30 py suffered from squamous cell carcinoma. 100% of smokers in 5 to 30 pack years group were suffering from Squamous cell CA. In less than 5 pack years group 100% were suffering from Adenocarcinoma. 50% and 35.8% patients of squamous cell ca presented with central mass in smokers and non-smokers respectively. 3.3% and 21.4% of adenocarcinoma patients presented with central mass in smokers and non-smokers respectively. Non smoking forms of tobacco intake among non-smokers was 35.7%, where as among smokers, prevalence of non-smoking forms of tobacco was 3.3%.

Discussion

The mean age of smokers with lung cancer was 59 ± 17.72 years which was significantly higher than that for non smokers whose mean age was 54.21 ± 27.64 years. In contrary to our study Santoro IL et al⁶ found no significant difference between never and ever smokers with regard to age.

Male female ratio in case of smokers was found as 29:1 and in case of non smokers male female ratio was found as 2:5. Dey et al⁷ in their study found similar result with 93.9% males among smokers with lung cancer whereas females with lung cancer were 77.12% among non smokers.

In our study majority of lung cancer patients were residents of rural areas in both the smokers and non smokers group. Other Indian studies^{8,9,10} found similar results. Majority of lung cancer patients both smokers and non smokers were Hindus (66.7% and 57% respectively) This is similar to that reported in other Indian studies^{8,9,10}.

In our study 93% of the non smokers had cough at initial presentation which was significantly higher than that of the smoker group. Whereas 23 % of the smokers had wheeze at presentation which was significant when compared to none among non smokers. Chest pain (73.3%), cough (63%), haemoptysis (57%) weight loss (50%), and shortness of breath (47%), were the most common symptoms among smokers. Among non smokers

cough was present in 93%, chest pain in 64.3%, loss of weight in 57%, shortness of breath in 43%, haemoptysis in 43% and anorexia in 42.9% of cases. Prasad et al¹¹ reported that in young patients, cough was the most common symptom (91.8%), followed by chest pain (72.6%), breathlessness (72.6%), fever (69.9%), anorexia (68.5%), expectoration (58.9%), hemoptysis (31.5%), hoarseness of the voice (19.2%), dysphagia (9.6%), and facial swelling (11%). In the older patients he reported haemoptysis was the most common complaint (81.9%) followed by breathlessness (62.5%), anorexia (62.1%), cough (56.1%), hoarseness of voice (7.2%), dysphagia (2.8%) and facial swelling (1.9%). Clubbing (23.3%), Pallor (50%), palpable lymph node (36.7%) and signs of pleural effusion (46.7%) were the presentations among smokers. Among other manifestations among smokers 16.7% had pericardial effusion, 13.3% had rib metastasis, 6.7% had adrenal metastasis 6.7% had liver metastasis, 6.7% had chest wall swelling, 6.7 % had frontal swelling. Among non smokers 7.1% had clubbing, 64.3% had pallor, 14.3% had neck glands, 57.1% had pleural effusion, 21.4 % had Pericardial effusion, 14.3% had liver and adrenal metastasis and 7.1% had rib metastasis. Dey et al(2013)⁷ reported SVCO in 7.2% cases, hoarseness of voice in 7% cases and patients with metastasis in liver, brain, adrenal or bone or chest wall or nodules in opposite lung were detected in 27.02%.

In the present study, radiologically visible mediastinal lymph nodes were significantly associated with smokers. Pleural effusion was seen in 46.3% of smokers and 57.1 % of non smokers. Among smokers 63.3% had central lesion and 36.7 % had peripheral lesion. Among non smoker, central lesion was present in 78.6% and peripheral lesion was present in 21.4% cases. Among smokers rib erosion and diaphragmatic paralysis were observed in 13.3% and 3.3% cases respectively. 7.3% of non smoker patients had rib erosion and none of the them had phrenic nerve palsy. In our study right upper lobe was involved

in 40% of the smokers which was significant when compared to non smokers. Among non smokers left lower lobe was significantly involved (35.7%) compared to the smokers. Squamous cell presented as central mass in 50% of smokers and in 35.8% of non smokers. Adenocarcinoma presented as central mass in 3.3% cases and as peripheral mass in 10% among smokers. Among non smokers adenocarcinoma presented as central mass in 21.4% cases and as peripheral mass 14.3% cases. Non small cell presented as only central mass in 21.4% non smoker patients. According to D. Behra et al¹⁰, Mass with or without collapse was the commonest radiological finding in lung cancer. Other findings in his study included pleural effusion in 25.1%, rib erosion in 4.8% and lymphangitis in 2.8 percent. A normal chest X-ray was found in 0.4% of cases of lung cancer. Upper zone was involved in most cases followed by mid zone (32.7%), lower zone (16%) and the entire lung (8.8%). Adenocarcinoma presented as peripheral mass in 61% cases and in 38.3% as a central lesion. Presentation as a central mass (72.2% cases) was more common among squamous cell carcinoma than as a peripheral lesion (27.8%). Small cell cancer also presented more commonly as a central lesion (83.6%) than as a peripheral lesion (16.4%). Isolated pleural effusion has been reported in 3.8% in squamous cell lung cancer, 22% in Adenocarcinoma and only 4% in small cell lung cancer.¹² In our study 63.3% of smokers with lung cancer had squamous cell carcinoma. Among the smokers, adenocarcinoma was seen in 13.3% of the cases followed by small cell and undifferentiated carcinoma in 10% respectively and large cell carcinoma in 3.3% of the cases. Amongst non smoker, the most prevalent lung carcinoma was squamous cell carcinoma (43%) followed by Adenocarcinoma and non small cell carcinoma both in equal frequency (28.6%). Adenocarcinomas were more prevalent among the non smokers. Whereas small cell carcinoma was only present in smokers. Dey et al⁷ reported that squamous cell carcinoma was more common among

smokers and adenocarcinoma among non smokers. No significant association could be established between smoking status and histopathological variety. Santaro IL et al also reported predominance of adenocarcinoma among never smokers which was consistent with the previous studies^{13,14,15}

Jindal and Behera¹⁶ reported that after the age of 40 years, squamous cell type is the commonest type in smokers and adenocarcinoma in non smokers¹⁷⁻²¹ In contrary to the above mentioned studies our study found that the squamous cell carcinoma was the predominant type in both the smoker and non smokers. This finding may be due to the small number of non smokers. Also there were greater number of rural females amongst non smokers who were more exposed to the indoor air pollution. Predominance of females among never-smokers with tumors, even without exposure to cigarette smoke carcinogens, has been previously described, suggesting that aspects related to hormonal factors may interfere with tumor carcinogenesis.^{22,23}

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