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Short Review

Global Patterns of Lung Cancer Incidence

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Abstract

It is well known that smoking is injurious to health which causes lung cancer. Although not all smokers develop lung cancer, fraction of lifelong non-smokers will die from lung cancer. Lung cancer is a major cause of cancer related death in developed countries with extremely poor overall survival rate. In present study we set out epidemiological pattern with clinical profile of lung cancer patients in northern india population.

Aim

We evaluate the effect of smoking with age distribution on histopathology in lung cancer patients.

Material & Methods

We enrolled 218 patients after confirmation of histopathology and also collected demographic data.

Results

Out of 218 patients of lung cancer, having median age of 56 years, we found 149 (68.3%) were smokers and 69 (31.6%) were nonsmokers. In histopathology 54.1% patients had squamous cell carcinoma, 29.2% adenocarcinoma, 12.4% Mixed cell, 3.7% Small cell. We also found 63.1% smoker to have squamous cell carcinoma and 50.7% non-smoker have adenocarcinoma.In our study middle age group patients were more frequent in smoking group. While higher age group patients has squamous cell and middle group have adenocarcinoma. Therefore patients group with high smoking are found to develop have more risk to develop small cell carcinoma rather than in case of non-smoker higher age groups have sqamous cell carcinoma type.

Conclusion

In this study we found middle age group subjects of smoker having more squamous cell and nonsmoker having adenocarcinoma.

Background

Lung cancer mainly develops by tobacco usage and this is often viewed solely as smoker disease. However, a significant number of patients with lung cancer have no smoking history. Globally approx 1.61 million new cases of lung cancer occur per year, with 1.38 million deaths. This data on cancer patients with lung cancer is a major cause of morality in all over cancer [1]. In india, approxmately 63,000 new lung cancer cases are reported each year [2].

Introduction

The major risk for developing lung cancer in tobacco use and this disease is often viewed solely as a smoker disease.although multiple risk factors, including environmental,hormonal, genetic and viral have been implicated in the pathogenesis of lung cancer in never-smokers, no distinct eiological factor has emerged that can explain the relatively high incidence of lung cancer in never smokers and the marked geographic difference in gender proportions. Molecular studies, in particular of the TP53, KRAS, and epidermal growth factor receptor (EGFR), GST genes, demonstrate strikingly different mutation pattern and frequencies in lung cancer patients in non-smoker and smokers [3]. In our study, we set to find out clinically meaningful difference between smoker and non smokers, in relation with lung cancer development.

Materials and Methods

It is an observational study, in which we collect data through screening of patients from OPD through diagnosis of lung cancer patients,

Discussed in the thoracic oncology multidisciplinary meeting at a tertiary care hospital in Lucknow, India, during a 2 year period. The survey was conducted by trained clinical research coordinators under the supervision of physicians using a detailed questionnaire. 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. The final therapy plan was noted. Data was entered and analyzed using SPSS software (SPSS for Windows, Version 15).

In the present study 218 patients diagnosed according to histopathology between November 2007 and November 2009. A summary of the patient data is provided in [Table 1].

	Controls n=238	Cases n= 218	OR (95% CI) p value
Mean Age± SD (Year)	56.15±7.84	56.14±11.91	
Sex Male Female	191 (80.3%) 47(19.7%)	189 (86.7%) 29 (13.3%)	0.078
Smoking History Smoker Ex-smoker Non-smoker	34 (14.3%) 32 (13.4%) 172 (72.3%)	128 (58.7%) 21 (9.6%) 69 (31.7%)	
Pack Year	10.53±5.62	13.95±7.93	
Histopathology Squamous cell Adenocarcinoma Mixed cell Small cell		118 (54.1%) 65 (29.2%) 27 (12.4%) 8 (3.7%)	

Table1: Demography characteristic of lung cancer patients and healthy controls.

Smoking status

Out of 218 patients, 128 patients (58.7%) have smoked, 21 (9.6%) ex-smoker and 69 (31.7%) non-smokers. Patients had smoked both cigarettes and beedis. Pack Year 13.95 ± 7.93 Years.

Sex

Out of 218 patients, there were 189 (86.7%) males and 29 (13.3%) females i.e. a male: female ratio of approximately 8.6:1.4.

Risk analysis of carcinogen exposures in association of histopathology with smoking history

Out of 218 patients, Smokers have 63.1 % smokers squamous cell, 20.1% adenocarcinoma, 13.4% mixed type 3.4% small round and in case of non smoker 34.8%, 50.7%, 10.1%, 4.3%. The data of our study show that these re smoker have a more squamous cell and those are non smokers have adenocarcinoma.

Age distribution of patients based on histopathology

Out of 218 patients, In the 0-40 age group have 47.5% squamous cell cell, 25.0% adenocarcinoma, 17.5% mixed type 10.0 % small round, In age group (40-64), 51.4% squamous cell cell, 34.1% adenocarcinoma, 13.0% mixed type 1.4% small round, and above 65 years age 70.0% squamous cell cell, 20.0% adenocarcinoma, 5.0% mixed type 5.0 % small round.

Age distribution of patients based on histopathology and smoking

Out of 218 patients, Smokers In the 0-40 age group have 26.7% squamous cell, 53.3% adenocarcinoma, 20.0% mixed type 0.0 % small round. In age group (40-64), 28.2% squomas cell, 61.5% adenocarcinoma, 7.7% mixed type 2.6% small round, and above 65 years age 60.0% squomas cell, 20.0% adenocarcinoma, 6.7% mixed type,13.3 % small round.Non-Smokers In the 0-40 age group have 60.0% squomas cell, 8.0% adenocarcinoma, 16.0% mixed type, 16.0 %

Age

The median age of the patients in our study was 56 years (S.D=11.91) with a range from 30-80 years. The median age of non-smokers were significantly lower than that of smokers (53 versus 59 years, P<0.05). Approx 17% of patients were in the 0-40 age group smoker and 22 % non smokers in age group (40-64) 66.4% smokers and 56.5% nonsmokers, above 65 years age 16.8% smokers and 21.7% non smokers [Table 2].

Histopathology Type	Smoker	Non-smoker
Squamous cell	94 (63.1%)	24 (34.8%)
Adenocarcinoma	30 (20.1%)	35 (50.7%)
Mixed Type	20 (13.4%)	7 (10.1%)
Small round	5 (3.4%)	3 (4.3%)

Age distribution of patients based on smoking status

	Smoker	Non-smoker
0 (25-39)	25 (16.8%)	15 (21.7%)
1(40-64)	99 (66.4%)	39 (56.5%)
2(65>)	25 (16.8%)	15 (21.7%)

Age distribution of patients based on histopathology

Age Distribution	Squamous cell	Adenocarcinoma	Mixed	Small
0	19 (47.5%)	10 (25.0%)	7 (17.5%)	4 (10.0%)
1	71 (51.4%)	47 (34.1%)	18 (13.0%)	2 (1.4%)
2	28 (70.0%)	8 (20.0%)	2 (5.0%)	2 (5.0%)

Age distribution of patients based on histopathology and smoking

Smoker with age distribution	Squamous cell	Adenocarcinoma	Mixed	Small
0	4 (26.7%)	8 (53.3%)	3 (20.0%)	0 (0.0%)
1	60 (60.6%)	23 (23.2%)	15 (15.2%)	1 (1.0%)
2	9 (60.0%)	3 (20.0%)	1 (6.7%)	2 (13.3%)
Non-smoker				
0	15 (60.0%)	2 (8.0%)	4 (16.0%)	4 (16.0%)
1	11 (28.2%)	24 (61.5%)	3 (7.7%)	1 (2.6%)
2	19 (76.0%)	5 (20.0%)	1 (4.0%)	0 (0.0%)

Table 2: Risk analysis of carcinogen exposures in association of histopathology with smoking history.

Age distribution of patients based on histopathology and smoking

small round, In age group (40-64), 60.6% squaomas cell, 23.2% adenocarcinoma, 15.2% mixed type, 1.0% small round, and above 65 years age 76.0% squomas cell, 20.0% adenocarcinoma, 4.0% mixed type, 0.0 % small round.

Discussion

Relating to measured time in cancer histology are often difficult to study because changes in diagnosis or classification may mimic true changes in disease occurrence [4,5]. In a study from Singapore, 32.5% of lung cancer patients has been never-smokers, [6] while in the United States, approximately 10% of lung cancer cases occur in non-smokers [7].

Over the earlier periods distribution of NSCLC pathology has been modified. Squamous-cell carcinoma was the most common histological type of NSCLC, however, since about 1975, there has been a dramatic increase in the incidence of adenocarcinoma, making it the predominant histological subtype of NSCLC [8]. Thus far, not much information was available as to the distribution of the histological subtypes in India. Squamous-cell carcinoma was still the predominant histological subtype of NSCLC [9]. In our study we found that squamous cell carcinoma accounts for (54.1%) of NSCLC, while only (29.2%) are adenocarcinoma.

Conventionally, Squamous-cell carcinoma of the lung was thought to be smoking-related, rather than adenocarcinoma. The increase in the incidence of adenocarcinoma was thought to be mainly attributable to a change in smoking pattern and an increased preference for filter cigarettes that have low tar, but high nitrate content [10]. Earlier studies reported that the increased incidence of adenocarcinoma was confined to smokers [11,12]. In contrast, we found a statistically higher occurrence of adenocarcinoma in non-smokers as compared to smokers. This is supported by other studies in the literature [13-16]. Thus, our study and other recent studies suggest that the increase in adenocarcinoma is not solely due to a change in pattern of cigarette smoking, but must be due to non-smoking-related factors, since the increase is demonstrated in non-smokers as well.

Bidi are more carcinogenic than cigarettes [17], however, it is not known if bidi smoking preferentially causes a particular cancer subtype or if there are any clinical or pathological features that are different in a lung cancer caused by bidi smoking as compared to that caused by regular cigarette-smoking. Among our patients with a history of smoking, the proportion bidi smokers (25.4%) were higher than the so-called "safe" cigarettes (19.4%). Given the wide prevalence of bidi smoking in our country, this may be an important factor to consider while evaluating the Indian epidemiologic profile. Whether there were any significant differences between cancers in bidi smokers compared to that in cigarette smokers is beyond the scope of this study.

Conclusion

In this we found that squamous cell carcinoma is higher in in northern Indian population rather than adenocarcinoma, and it also confirmatory statement that smoker having more squamouse cell and nonsmoker having adenocarcinoma in the middle age group.

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