

Original Article

Lung Cancer in young patients

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ABSTRACT

Background: Lung Cancer is considered to be a disease of elderly and uncommon in patients of less than 40 years of age. Now a days people are becoming more interested to know the status of carcinoma in younger age group.

Aim: To study the occurrence of Lung Cancer in less than 40 years of age.

Material & Method: This is a retrospective study done at a tertiary level care and teaching centre, in north India, between July 1985 and December 2006. It included 799 consecutive, histopathologically proven cases of Lung Cancer. Patients with metastatic cancer in the lungs, carcinoid tumor, lymphoma or sarcoma of the lung were not included in the study.

Result: Out of 799 patients including 685 male and 114 female patients, 73(9.1%) patients; (59 males and 14 females) were <40 years of age.

Conclusion : Lung Cancer is not a rare disease in young (<40 Years) Patients.

Key Words : Lung Cancer, Young patients

INTRODUCTION

Lung Cancer was considered to be rare in the beginning of the century¹ but has now reached almost epidemic proportions. It is the leading cause of cancer deaths in developed countries and is also rising at alarming rates in developing countries². In India, Lung Cancer has been considered to be an infrequent entity³, but an increased rate of diagnosis of bronchogenic carcinoma was recognized in the early 1960s⁴. Lung Cancer is the commonest malignancy in men over 50 years of age and is uncommon in subjects below 40 years of age⁵. However there have been reports of an increase in the incidence of lung cancer in patients below 40 years of age⁶. This may be due to increase in smoking habits and also exposure to carcinogens. The present study was, therefore, planned as there were not many Indian studies regarding the pattern of lung cancer in patients below 40 years.

MATERIAL AND METHODS

The present study was conducted in the Department of Pulmonary Medicine, King George's Medical University, a tertiary level care and teaching centre, Lucknow, India between July 1985 and December 2006. This retrospective study included 799 consecutive, histopathologically proven cases of lung cancer that were referred from different parts of Uttar Pradesh. The patients were referred for confirmation of their diagnosis and to receive treatment. Seventy three patients below 40 years of age with lung cancer had been seen during the study period. Patients with metastatic cancer in the lungs, carcinoid tumor, lymphoma or sarcoma of the lung were not included in the study. All patients were diagnosed on the basis of clinico-radiological and histopathological examination. Details of smoking habits were noted carefully with regard to type (cigarette; bidi, which is tobacco wrapped in tendu tree leaves and smoked like a cigarette; chillum, which is a clay-pot containing tobacco lit by fire; or hucca, which is a system where a chillum is attached to one end of a separate long wooden tube while the other end of the tube is attached to a brass-pot containing water and another flexible tube is used to suck the smoke connected at other

end to wooden tube, smoke thus passes over the water before it is inhaled), amount and duration. A smoking index was calculated as the average number of bidi or cigarettes consumed per day multiplied by the duration of smoking in years. Socioeconomic status was recorded according to a modified Kuppuswamy scale⁷. Fibre-optic bronchoscopic findings were noted carefully with regards to side, site and type of lesion. The histological typing was based on the system for the clinical staging of lung cancer⁸ and the revised international system for lung cancer staging⁹. Attempts were made to categorize each tumor, but those tumours that could not be accurately classified were marked as unclassified.

RESULTS

Demographic Characteristics

A total of 799 cases of Lung cancer were diagnosed in our hospital from July 1985 to December 2006, including 685 male and 114 female patients. Out of these 799 patients, 73 patients (9.1%); 59 males and 14 females were below 40 years of age. Within this group of younger patients, 61 (83.6%) were 31-40 years of age, 10 (13.7%) were 21 to 30 years, and only 2 (2.7%) were below 20 years of age. In our study group the youngest patient was 16 years old and the oldest was 40 at diagnosis. The median age was 38 years. The diagnosis was made in 45 percent of the patients at the age 39 or 40. The ratio of men to women was 4.2:1.

According to socioeconomic status, the majority of patients belonged to the lower-middle (50.7%) and upper-lower (21.9%) class on the modified Kuppuswamy scale. Of the 73 patients, 55 (75.3%) were Hindu, 16 (21.9%) were Muslim, 1 (1.4%) patient was Sikh and 1 (1.4%) patient belonged to Christian religion. 56 patients (76.7%) were from rural areas.

Smoking and Occupational History

Fifty three patients (72.6%) were smokers and, of these, 40 (75.5%) were bidi smokers, 11 (20.7%) were cigarette smokers and 2 (3.8%) smoked hucca and chillum. All of the female smokers (2) smoked bidi exclusively. Thirty

three patients (62.3%) had a smoking index of >100, with the majority (94%) having smoked for more than 10 years. Occupational history was available for all patients; 3 of these gave a history of possible carcinogenic exposure. The three patients had the following occupations: traffic police, micro-welder, automobile mechanic. History of household smoke exposure was present in all female patients. Most of the other patients had no industrial jobs and were farmer, housewives or office workers.

General features of patients

The average duration of illness at the time of diagnosis was 8.1 months. Cough (91.8%) was the most common symptom, followed by chest pain (72.6%), breathlessness (72.6%), fever (69.9%), anorexia (68.5%), expectoration (58.9%), haemoptysis (31.5%), hoarseness of the voice (19.2%), dysphasia (9.6%) and facial swelling (11%). Peripheral Lymphadenopathy was noted in 42.5% of patients, Anaemia in 31.5%, clubbing in 26%, Superior vena caval syndrome in 9.6% and Horner's syndrome in 2.7% of patients.

Twenty-seven per cent of the patients were misdiagnosed as having pulmonary tuberculosis and were prescribed antituberculosis drugs before coming to King George's Medical University.

Radiological Pattern

Forty four patients (60.3%) presented with a mass lesion, 32 (43.8%) with pleural effusion, 14 (19.2%) with collapse/ consolidation, 9 (12.3%) with mediastinal widening, 1 (1.4%) with rib erosion and cavitations was found in 1 case (1.4%).

Diagnostic procedures

Diagnosis of lung cancer in 36 cases (49.3%) was made by Trans thoracic FNAC, followed by fibre-optic bronchoscopy in 24 cases (32.9%), pleural fluid cytology in 26 cases (35.6%), fine-needle aspiration cytology of lymph node in 24 cases (35.6%), sputum cytology in 10 cases (13.7%) and pleural biopsy in 3 cases (4.1%).

Histological typing

Among the 73 cases of lung cancer, squamous-cell carcinoma was the most common type (32.8%) followed by small-cell carcinoma (19.2%) and Adenocarcinoma (19.2%). Smokers dominate the small-cell carcinoma, squamous-cell carcinoma and large-cell carcinoma groups (smoker: non-smoker ratio 13.0:1.0, 3.0:1.0 and 3.0:1.0, respectively), whereas smoking was not a significant factor in Adenocarcinoma (smoker: non-smoker ratio 1.0:1.0). The majority (88.1%) of non-small-cell carcinoma patients had advanced stage disease (III b and IV) and 64% of small-cell carcinoma patients had limited disease at the time of diagnosis.

DISCUSSION

Lung cancer is a major health problem worldwide. The incidence is increasing globally at a rate of 0.5% per year. It is the leading cause of cancer mortality in most of the countries in the world¹⁰. It remains the most lethal form of cancer in men and has now surpassed breast cancer in women as well in USA, where 170,000 new cases are diagnosed per year¹¹. The world wide incidence is 14% whereas it constitutes 6.8% of all cancers in India¹². In India the incidence is increasing rapidly due to progressive change in life style¹³. In one study, Lung carcinoma was a frequent diagnosis amongst all types of chest diseases¹⁴. The survey conducted in Uttar Pradesh in 1966 showed that the incidence was 4.2 per 10,000 hospital admissions and 2.1 per cent of all malignancies¹⁵.

It is usually considered to be a disease of elderly males with a peak frequency between 50-60 years¹⁶. Cases of lung cancer below age of 40 years are seen less frequently. Hence they are likely to be overlooked in young subjects particularly when they are non-smokers and females. In the present study, 9.1% of patients seen at a single, academic centre were below 40 years of age at diagnosis, a figure that is consistent with the percentage of younger patients in previous reports¹⁷⁻²¹.

One difficulty in comparing the results of prior studies on young lung cancer patients is the variability of the age cutoff used to define young. A summary comparing our findings

with the results obtained in our systematic review is presented in table 1 & 2. There are many similarities between the finding in our study population and other reported in the literature. In all of the reports that include both men and women there are more women in the younger group than in the general population of patients with lung cancer. The lowest male to female ratio in the younger patient (1.2) was reported from Canada²⁸ and the highest ratio (5.5) was from Kuwait³³. Our findings of a male to female ratio of 4.2:1 is consistent with these other re-

ports, while our general tumor registry population of patients with lung cancer had a ratio of 6:1 (Table 3). This low male: female ratio in younger patients may suggest that women may be more susceptible to lung carcinogens. In support of this hypothesis, a population-based registry study found that women developed lung cancer at an earlier age while smoking fewer cigarettes. In addition, in a recent report women had a 1.5-fold higher relative risk of lung cancer, even when controlling for body size and exposure to cigarette smoke³⁷.

Table 1 :
Results of the systematic review of the published literature from other countries

Author	Country	Year	Age cut-off years	No. of young patients	The leading cell types in young patients (%)	Current and previous smokers	M/F ratio
Ganz PA25	U.S	1980	40	96	AC 28	82	1.74:1
DeCaro26	U.S.	1982	40	35	AC 49	97	1.5: 1
Tsai27	Taiwan	1988	40	40	AC 59	41	1.6: 1
MucDuffie28	Canada	1989	50	187	AC 33	85	1.2: 1
Jubelirer SJ29	U.S.	1991	40	52	AC 54	77	2.0: 1
Capewel30	Scotland	1992	45	48	SC 34	94	1.8: 1
Kreuzer31	Germany	1998	45	251	AC 42	95	2.6: 1
Sekine32	Japan	1999	40	91	AC 79	66	1.5: 1
Behbehani33	Kuwait	1999	45	72	Sq 33	74	5.5: 1
Gadgeel SM 34	U.S.	1999	50	126	AC 48.4	92.1	2: 1
Liam CK 35	Malasiya	2000	40	36	AC 66.7	41.7	2: 1
Arthur T36	U.S.	2000	40	91	AC 46	80	1: 1.12

Abbreviations

AC = adenocarcinoma

Sq = squamous carcinoma

SC = small cell carcinoma

Ud = undifferentiated carcinoma

Table 2 :
Results of the systematic review of the published Indian literature

Author	Year	Age cut-off years	No. of young patients	The leading cell types in young Patients(%)	Current and previous smokers (%)	M/F Ratio
Gupta22	1984	35	26	Ud 35	39	1.9:1
Bhattacharya23	1996	40	26	Sq 50	58	4.2: 1
Rao21	1992	40	50	Ud 26	64	3.2: 1
Arora24	1998	40	24	AC 42	58	2.0:1
Our study	2006	40	73	Sq 33	73	4.2:1

Table 3 :
A Comparison of Clinicopathologic features of Lung Cancer in Persons of Up to 40 years age with the General Population

Variable	Young n = 73	Total n = 799
Male/female ratio	4.2: 1.0	6.0: 1.0
Positive smoking history	72.6% (53/73)	82.1% (656/799)
Duration of symptoms Mean (months)	8.1	9.67
Pathology		
Squamous cell	24 (32.8%)	403 (50.4%)
Small cell	14 (19.2%)	106 (13.3%)
Adenocarcinoma	14 (19.2%)	140 (17.5%)
Large cell	8 (11.0%)	79 (9.9%)
Unclassified	13 (17.8%)	71 (8.9%)
Non small cell carcinoma		
Total	59	693
Stage I and II	9 (15.3%)	112 (16.2%)
Stage III and IV	50 (84.75)	581 (83.8%)
Small cell carcinoma		
Total	14	106
Limited	9 (64.0%)	35 (33.0%)
Extensive	5 (36.0%)	71 (67.0%)

The cause for this early onset of lung cancer may be due to heavy smoking, environmental exposure to carcinogens, and perhaps due to genetic predisposition³⁸. In present study, 72.6% patients were smoker and majority of the smokers (75.5%) were bidi smokers. In a retrospective study of 520 cases from Mumbai, it was reported that bidi smoking is an important contributing factor in the development of lung cancer in India³⁹. Higher risk of lung cancer was reported in bidi smokers as compared with cigarette smokers^{39, 40}. There is a higher risk of lung cancer with increasing smoking index. In the present study 62.3% patients had a smoking index of >100. All female patients were housewives and used firewood for cooking. The hydrocarbons from the firewood burning might have contributed to carcinogenesis in female patients. It was found that the average exposure to benzo (a) pyrene during cooking in four villages in western India was nearly 4000 ng/m³, which is equivalent to smoking approximately 20 packs of cigarettes per day⁴¹. Three patients were also exposed to occupational carcinogens.

Mean duration of symptoms in our study was 10.2 months which is more than the mean duration of symptoms in general population. 27% patients were incorrectly assessed and were given treatment for tuberculosis. It had been suggested that lower degree of suspicion in younger patients, could account for this finding.

All the studies from America^{25, 26, 29, 34, 36}, China²⁷, Germany³¹, Japan³² and Malasiya³⁵ showed that Adenocarcinoma was the leading cell type in young patients. The study from Scotland showed that small cell carcinoma was the predominant type, while the study from Kuwait³³ showed that Squamous cell carcinoma was still the predominant type in young patients. India also reported squamous cell carcinoma as the predominant cell type²³. In the present study also Squamous cell carcinoma was the predominant type. The higher prevalence of smokers in our study could be the cause of this finding in our study. Whereas other studies from India showed that undifferentiated cell carcinoma was the predominant type^{21, 22, 24}.

In present study, majority (88.1%) of non-small-cell carcinoma patients had advanced stage disease (III b and IV) and 64% of small-cell carcinoma patients had limited disease at the time of diagnosis. One difficulty in comparing the staging of lung cancer in young patients with the prior studies on young lung cancer is that prior studies used the same system of staging for both small cell and non small cell cancer. It is unknown why patients of younger age group are first seen with advanced disease. Because lung cancer in young age group is rare, both public and professional awareness is limited. Younger patients would seem to have a higher potential for successful resections and cure because they lack serious underlying medical problems that might preclude operation. This same factor, however, may contribute to a delay in seeking medical attention and further delay diagnosis until the disease is more advanced and no longer curable. More ever, physicians often may not suspect an underlying carcinoma despite persistent pulmonary symptoms or abnormal findings on chest roentgenograms. Lack of diagnostic and treatment facilities at peripheral health centre could be another cause of delay in diagnosis of lung cancer.

The study and others suggest that patients, who have persistent signs of pulmonary disease and a history of heavy smoking, regardless of age or sex, must be considered at risk for lung cancer. Diagnostic tests should be performed early to exclude the possibility of lung cancer. If non-small cell lung cancer is diagnosed and signs of distant metastasis are lacking, exploration should be done because improved survival depends on surgical resection.

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