

Clinicopathological profile of bronchogenic carcinoma in a tertiary care hospital in eastern part of India

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ABSTRACT

Background: Lung cancer is presently the most common malignant disease (12.34% of all cancers) and the leading cause of cancer deaths (17.8% of all cancer deaths) in the world in all age groups and in both sexes. It is the leading cause of cancer deaths in developed countries and is also rising at an alarming rate in developing countries. **Objective:** The present study was undertaken to explore the clinicopathological profile of bronchogenic carcinoma. **Materials and Methods:** A total of 60 consecutive patients with histopathologically proven bronchogenic carcinoma, hospitalized between 2009 and 2011 at a tertiary care Hospital, Eastern India, Kolkata, West Bengal, India, were analyzed. **Result:** Out of a total of 60 diagnosed cases, with an average age of 63 years, nearly 75.0% were males. Smoking was the risk factor in 71.67%. About 26.67% of female patients were smokers with a significant overlap in use of smoking objects. Four (6.67%) patients were <40 years of age at the time of diagnosis. Fiber optic bronchoscopy (15%) and fine-needle aspiration cytology (58.33%) were found to be the most efficient diagnostic procedures. Histologically, squamous cell carcinoma, adenocarcinoma, small cell carcinoma and large cell carcinoma were seen in 31.67%, 43.33%, 10% and 3.24% cases, respectively. Nearly 11.67% patients showed malignant cells only and marked as unclassified. Early stages (1 or 2) were found in 11.67% and late stages (3 or 4) in 88.33%. Metastases to nodes, liver, adrenals and bones were present in 55%, 13.33%, 8.33% and 16.67% respectively. **Conclusion:** This study shows that the most common type of lung cancer is adenocarcinoma. Patients with persistent pulmonary symptoms should be promptly evaluated for malignancy.

Key words: Bronchogenic carcinoma, clinicopathological, Eastern India

INTRODUCTION

Lung cancer is presently the most common malignant disease (12.34% of all cancers) and the leading cause of cancer deaths (17.8% of all cancer deaths) in the world,^[1] in both sexes.^[2,3] The incidence peaks between age 55 and 65 years. The age adjusted death rate is decreasing in male but is stable or increasing in females.^[4] Globally, 85% of lung cancer in male and 46% in the female is due to smoking.^[5] Approximately 10% of lung cancer patients are asymptomatic at presentation. However, most are symptomatic and may present with non-specific symptoms

such as weight loss or fatigue or with direct signs and symptoms caused by the primary tumor or intrathoracic or extrathoracic spread. To facilitate treatment and prognostic decisions, lung cancer is categorized as small cell carcinoma or non-small cell (NSC) carcinoma. The major histologic classes of NSC carcinoma are adenocarcinoma, squamous cell (SQ) carcinoma, large cell (LC) carcinoma and other less common tumor subtypes.

In India, lung cancer has been considered to be an infrequent entity,^[6] but an increased rate of diagnosis of bronchogenic carcinoma was recognized in the early 1960s by Viswanathan *et al.*^[7] Subsequently, there have been many sporadic reports on the clinical and pathological features of lung cancer from different parts of the country.^[8-15] According to the population based National Cancer Registry (2001-2004) of the Indian Council of Medical Research, carcinoma lung constitutes 7.6-11.10% of all cancers in men and 1.40-2.98% of all cancers in women in India,^[16] with varying figures in different areas of the country. Hospital based data have

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also shown a similar variability regarding risk factors, clinical presentations, radiological findings and histological diagnosis.

Significant differences in clinicopathological features have been observed in different geographical areas over the past 60 years. The present study was conducted to document the clinicopathological features of patients hospitalized with carcinoma lung to our center.

This study was carried out to observe the age distribution pattern, sex distribution pattern, smoking and histological patterns and stage of presentations of carcinoma lung in serving and retired soldiers of India and their family members who are admitted to our center and to see the prevalence of individual findings. The clinicopathological findings of the present study has been compared with those of other relevant studies made in the same field.

MATERIALS AND METHODS

Study population

All patients admitted under the Department of Oncology during the specified study period.

Study period

Duration of the study period between 2010 and 2011.

Study techniques

This study included histopathologically proven cases of bronchogenic carcinoma those either presented 1st time in this institute or were referred for confirmation of their diagnosis and to receive treatment. Detailed history of the present- and past-illnesses were taken into an account and smoking habits and exposure were noted carefully with regard to type, amount and duration.

All patients were followed-up for the next 6 months to observe the evolution of new symptoms, clinical findings and pathological abnormalities. The findings of clinical examination, all routine hematological and biochemical investigations were recorded and previous findings were reviewed thoroughly.

The patients were classified according to the major histologic groups: Small cell carcinoma, adenocarcinoma, LC carcinoma, SQ carcinoma, poorly differentiated carcinoma, carcinoid tumor and others. Attempts were made to categorize each tumor, but those tumors that were not accurately classified were marked as undifferentiated.

Plan for analysis of data

Standard statistical averages, standard deviation and

mean deviation will be calculated. Calculation of statistical significance will be carried out by the Student's test and Chi-square test for univariate analysis and ANOVA test for multivariate analysis as applicable. Key values would be expressed with 95% confidence limits. $P < 0.05$ will be considered to be statistically significant.

REVIEW OF LITERATURE

Bronchogenic carcinoma remains the leading cause of cancer-related mortality in the developed world and its incidence is rising in developing countries.^[17] According to the population- and hospital-based National Cancer Registry (1986) of the Indian Council of Medical Research, primary bronchogenic carcinoma constitutes 8% of all cancers in men and less than 1% of all cancers in women in India. The findings of a study by Prasad *et al.*^[18] showed that the clinicopathological features of bronchogenic carcinoma differ in certain respects from those in developed countries. The most noteworthy of these is the younger age of the patients in the present study and the higher proportion of non-smokers. The peak frequency of lung cancer was found to be in the 51-60 year age group. The National Cancer database (1996) in the USA reported that the age group most commonly affected was 70-79 years.^[19] The younger age range of Indian patients is similar to that observed approximately 40-50 years ago in developed countries.^[13] The average age of bronchogenic carcinoma patients was 57 years, which is quite similar to that reported in other Indian studies.^[9,20,21] The maximum incidence was found between 50 and 59 years in men and between 40 and 49 years in women. Nine and a half per cent of patients were <40 years old. A similar proportion of patients (9-14%) in other Indian studies were <40 years old.^[13,20,21] Nearly 22% of the patients in the present study were initially misdiagnosed as having pulmonary tuberculosis and were prescribed antituberculosis treatment.

In a series reported from India by Jindal and Behera, 95% of patients presented at a late stage.^[15] In many developed countries, surgery cannot be offered to more than 80% of patients because of presentation at a late stage of disease. The late diagnosis of bronchogenic carcinoma in India could be a result of late reporting of such cases to health-care facilities and a number of patients are misdiagnosed on initial presentation and treated by their doctors as cases of pulmonary tuberculosis. Lack of diagnostic and treatment facilities at peripheral health centers could be another cause of delay in diagnosis of bronchogenic carcinoma.

In a study done by Gupta *et al.*^[22] found in a retrospective study undertaken in a teaching hospital, 86% were males with an average age of 57 years, smoking was the risk factor

in 81.6%. Nearly 40% of female patients were smokers with a significant overlap in use of smoking objects. Twenty four (8.8%) patients were <40 years of age at the time of diagnosis. Average duration of illness was 4.5 months. Weight loss (77%) and fever (34%) were the most common general symptoms. Other chest symptoms include cough (68%), dyspnea (59%), chest pain (22%), hemoptysis (20%) and dysphagia (6%). Fiber optic bronchoscopy (75%) and fine-needle aspiration cytology (74.8%) were found to be the most efficient diagnostic procedures. Histologically, SQ carcinoma, adenocarcinoma, LC carcinoma and small cell carcinoma were seen in 42%, 20%, 18% and 14% cases, respectively. Nearly 6% of the patients showed malignant cells only and marked as unclassified. Radiologically, obstructive pneumonitis was the most common presentation (59.5%) followed by mass lesion (31.8%) and rib destruction (5.1%). In spite of its limitation, this study for the 1st time reports lung cancer pattern from mid-west Rajasthan.

RESULTS AND OBSERVATIONS

Demographic characteristics

A total of 60 cases of lung cancer were diagnosed in our hospital from December 2009 to June 2011. The youngest patient was 27 years old and the oldest was 87 at diagnosis. The peak incidence of bronchogenic carcinoma was found in the 61-70-year age group. The age distribution was as depicted in Figure 1.

Out of a total of 60 patients, 46 were males (76.67%) and 14 were females (23.33%). The ratio of men to women in this group was 4.2:1. The mean age was 63 years for all and of the male and female patients were 63.4 and 59.9 years, respectively. Sex distribution was as depicted in Figure 2.

Smoking history

Among all the patients, 43 (71.67%) were smokers; 39 out of the 45 males (86.67%) and 4 out of the 15 females (26.67%) had a history of smoking. Smoker to the non-smoker ratio in male were 6.5:1 in males and 0.36:1 in females. Fifteen of the patients were never exposed to tobacco in any form. Average duration of smoking was 27.44 pack years among all smokers. It was 27.56 pack years among male smokers

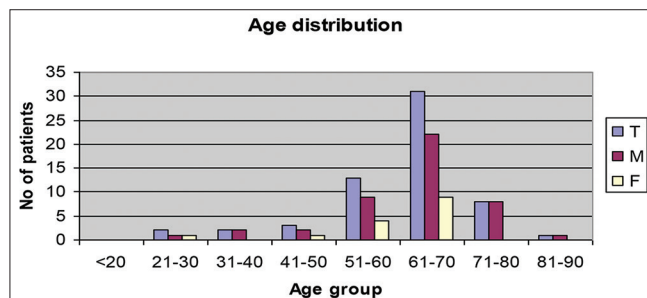


Figure 1: Age distribution

and 26.25 pack years among female smokers.

Among the histological subtypes, 75% of SQ CA, 69.23% of adeno CA, 80.0% of small cell CA, 50.0% of LC CA and 71.42% of the other types were tobacco users. Table 1 shows the distribution of histological types in our study.

Stages at presentation

At the time of initial presentation, 2 patients were in stage 1 (3.33%), 5 patients were in stage 2 (8.33%), 17 patients were in stage 3 (28.33%), 36 patients were in stage 4 (60.0%). Of non-small-cell lung carcinoma patients, 14.89% had stage 1 or stage 2 disease, 29.78% had stage 3 and 55.32% had stage 4 disease. Of small-cell lung carcinoma patients, none had stage 1 or 2 disease, 16.67% had stage 3 and 83.33% had stage 4 disease. Table 2 shows the stage distribution at presentation.

DISCUSSION

Bronchogenic carcinoma remains the leading cause of cancer-related mortality in the developed world and its incidence is rising in developing countries. The epidemiology of lung cancer is changing all over the world from late 1940s to the current time. According to the population-and hospital-based National Cancer Registry (1986) of the Indian Council of Medical Research, primary bronchogenic carcinoma constitutes 8% of all cancers in men and less than 1% of all cancers in women in India. The present study has explored the clinical profile and histological patterns of bronchogenic carcinoma in patients presenting to our center.

The findings of the present study show that the clinicopathological features of bronchogenic carcinoma differ in certain respects from those in developed countries. The most noteworthy of these is the younger age of the patients in the present study and the higher proportion of non-smokers. In the present study, the peak frequency of lung cancer was found to be in the 61-70-year age group in

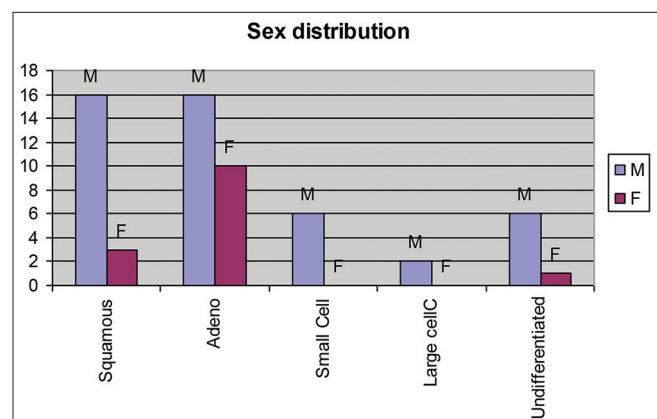


Figure 2: Sex distribution

Table 1: Distribution of histological types according to smoking status (n=60)

Histological type	Smokers	Non-smokers	Smokers: Non-smokers
Squamous-cell carcinoma	14	5	2.80:1.0
Small-cell carcinoma	5	1	5.00:1.0
Adenocarcinoma	18	8	2.25:1.0
Large-cell carcinoma	1	1	1.00:1.0
Undifferentiated	5	2	2.50:1.0
Total	43	17	2.53:1.0

Table 2: Stage on initial presentation

Stage	Total n=60 (%)	UD n=7 (%)	NSC n=47 (%)	SC n=6 (%)
1	2 (3.33)	0 (0)	2 (4.25)	0 (0)
2	5 (8.33)	0 (0)	5 (10.64)	0 (0)
3	17 (28.33)	2 (28.57)	14 (29.78)	1 (16.67)
4	36 (60)	5 (71.43)	26 (55.32)	5 (83.33)

SC: Small cell, NSC: Non-small cell, UD: Undifferentiated, SQ: Squamous cell, A: Adenocarcinoma, LC: Large cell

both men and women. Other Indian studies have reported the peak between 51 and 60 years age group. The National Cancer database (1996) in the USA reported that the age group most commonly affected was 70-79 years. The younger age range of Indian patients is similar to that observed approximately 40-50 years ago in developed countries.

The average age of bronchogenic carcinoma patients was 63 years, which is quite similar to that reported in other Indian studies, which reported mean age between 47.6 and 58 years. Nearly 6.67% of patients were less than 40 years old, whereas a slightly higher proportion of patients (9-14.6%) in other Indian studies were <40 years old.

The ratio of male to female patients in the present study was 4.3:1.0, which is similar to the ratios in other Indian studies. Indian cancer registry also reported a ratio varying from 2.6:1 to 7.0:1 in different regions. However, the ratio of male to female patients was lower (3:1) in those aged <40 years in other studies. Gupta *et al.* in their study also reported a higher incidence of females <40 years old, with a ratio of male to female patients of 1.9:1. Literatures from other countries reported male to female ratio between 1.4:1 and 6.0:1. The higher prevalence of lung cancer in males may be a result of the greater frequency of smoking in men and of a higher exposure to atmospheric pollution due to increased outdoor activities in comparison to women in India. Higher proportion of females among studies conducted in western populations in the younger patients may be explained partly by the fact that a high percentage of young women smoke in western countries. There is also evidence that women have an increased susceptibility to lung carcinogens.

In the present study, the smoker to the non-smoker ratio

was found to be 2.5:1.0 and a similar ratio of 2.7:1.0 was reported by Jindal and Behera. In other studies range of this ratio were from 1.9:1 to 5.3:1. Literature from other countries has shown the ratio between 3.35:1 and 15.67:1 in various studies. The majority of smokers (62.79%) were bidi smokers in the present study. Notani and Sanghvi, in a retrospective study of 520 cases from Mumbai (Bombay), reported that bidi smoking is an important contributory factor in the development of bronchogenic carcinoma in India. Notani and Sanghvi reported a higher risk of lung cancer in bidi smokers compared with cigarette smokers. There is a higher risk of bronchogenic carcinoma with increasing smoking index.

CONCLUSION

Lung cancer is presently the most common malignant disease and the leading cause of cancer deaths in the world^[1] in all age groups. Its incidence in our country is also rising, more in the females. The result our study correlates well with those found in other studies in India.

In this study, the most common lung cancer is adenocarcinoma. Smoking is the most common risk factor, more in males. Most of them present at a late stage of the disease.

This study and others suggest that regardless of age or sex, patients who have persistent signs of pulmonary disease and a history of heavy smoking must be considered at risk for lung cancer. Diagnostic tests should be performed early to exclude the possibility of lung cancer.

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