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Original Research Article

Bronchogenic Carcinoma: A Serious Health Risk

Madhumita Nayak[1], Sumitra Soren[2], Rabindra Naik[3]

[1]Assistant Professor, Dept of Pulmonary Medicine, PRM Medical College, Baripada, India

[2]Assistant Professor, Dept of Medicine, PRM Medical College, Baripada, India

[3]Assistant Professor, Dept of Obstetrics and Gynaecology, SCB Medical College, Cuttack, India

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Corresponding author: Dr. Madhumita Nayak

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Abstract

Background: Prior research indicated that primary cancers of the lungs are infrequent in India. But the trajectory is shifting, and lung cancer cases are rising. This descriptive observational study was conducted to determine the risk factor profile of lung cancer patients.

Materials and Methods: At the Department of pulmonary medicine at MKCG Medical College, Berhampur, patients diagnosed with carcinoma lung Histologically or cytologically participated in this descriptive epidemiological study from a single center using a prospective observational design. Detailed information about the patient's age, sex, residence, smoking history, environmental tobacco smoke exposure, and indoor pollution.

Results: The most prevalent symptoms patients in this study reported were a productive and dry cough, which occurred in 38 instances (82.60%), chest pain in 31, and shortness of breath in 21, respectively. Dysphagia was observed in 2 cases (4.34%) and fever in 18 cases (39.13%) as additional symptoms. In 34 patients (73.39%), Pallor was the most prevalent condition, followed by clubbing in 19 cases (41.30%), Gynecomastia, and Hepatomegaly in one case (2.17%). Three cases (6.52%) of vocal cord paralysis were reported. The study shows that 24 males (77.41%) and one females (6.66) smoked, whereas only seven males case (22.58%) and fourteen female cases (93.33%) did not. Pleural effusion was seen in 27 cases (58.69%) of the chest exams, followed by masses in 14 cases (30.43%).

Conclusions: This study provides information on the risk factor profile of lung cancer patients in Berhampur, which can be used for future comparison with other Indian studies to educate the community and raise awareness about the prevalent lung cancer risk factors.

Keywords: Bronchogenic, Carcinoma, Diagnosis, Risk factors.

Introduction

Lung cancer accounted for 13% of all new cases of cancer and 18% of all cancer-related deaths globally in 2008 [1]. In the world, lung cancer is the most frequently diagnosed cancer and the leading cause of cancer-related death [2]. Lung cancer was seldom ever seen in the early 1900s. Malignant lung tumors used to make up about 1% of all cancers discovered during autopsies in the 18th century, but by the early 1900s, they had increased to 10-15% [3] as a result of gradual changes in lifestyle. "lung cancer" refers to tumors that develop in the bronchi, bronchioles, and alveoli of the respiratory epithelium. Squamous cell carcinoma (epidermoid cell carcinoma), small cell carcinoma, large cell carcinoma, and adenocarcinoma,

including bronchoalveolar cell carcinoma, make up most of all primary lung Neoplasms, according to the WHO classification [4]. In prior investigations, it was noted that primary lung malignancies were uncommon in India [5]. Lung cancer incidence is rising, representing a change in the trend. The relationship between smoking habits and variations in relative risk rates in different cultures based on smoking habits has been highlighted in studies from India. Additionally, various Histopathological types linked to various risk factors are investigated [6].

The Indian Council of Medical Research's national cancer registry effort in India gathered data from six different regions of the nation, revealing differing rates in rural and urban areas [7]. Multiple hospital data sets from various country regions have also demonstrated these data patterns. 87% of male and 85% of female lung cancer patients have a history of active cigarette use. Just 3% of cases have a history of passive smoking. In all metropolitan registries in India, lung cancer is the most prevalent type among men. An estimated 30,000 new instances of lung cancer are reported each year in India. Up until 51 to 60 years of age, the ratio gradually rises and then stays the same. In some studies, the ratio of smokers to non-smokers is as high as 20:1. Compared to Western nations 40 years ago, the demographic pattern of lung cancer in India is comparable [8]. A variety of risk factors accompanies lung cancer. Smoking, [9] ambient tobacco smoke exposure (ETS), and indoor pollutants are known risk factors for lung cancer. Arsenic and radon exposure from the environment, [10] to petroleum, alcohol consumption, hormone use, HIV infection, religion, location, race, etc., are additional risk factors. There is also evidence for the involvement of oncogenes and inherited susceptibility in lung cancer. Men's lung cancer mortality has decreased since the early 1990s, but women's lung cancer mortality has climbed and is only now reaching its peak among women, indicating changes in smoking habits over the past 30 years. Seventy to eighty percent of lung malignancies are non-small cell [11]. Curative surgery cannot be performed in these situations since more than 70% are in Stages III and IV. Presently, 16% is the combined relative 5-year survival rate for all stages of lung cancer, a small improvement from 13% for cases discovered in the 1970s–1980s [12].

Materials and Methods

This study, comprising confirmed bronchogenic carcinoma cases meeting one or more criteria, was conducted at the Department of pulmonary medicine at MKCG Medical College in Berhampur. This research was done on people with histologically or cytologically lung cancer. All the study participants underwent thorough radiographic, cytological, and clinical examinations and meticulous history collection. The institutional ethical committee and review board approved the study. All patients gave their prior agreement to be a part of this prospective observational trial.

Inclusion Criteria

As the study subjects, all indoor and referral patients with carcinoma lung confirmed by histology or cytology were chosen.

Exclusion Criteria

Patients who have been diagnosed with lung cancer using a method other than cytology or histopathology additionally, the study patients underwent a thorough workup that included collecting information on their name, age, sex, and place of residence.

The following information was included in the detailed history's risk factor questionnaire: the basic information mentioned above; a detailed smoking history; environmental tobacco smoke exposure; indoor pollution; a history of alcohol use; HIV infection; structural lung

disease; religion; geography; and a consideration of the lung cancer type's clinical history. According to the WHO classification for primary lung tumors, squamous cell carcinoma, small cell carcinoma, adenocarcinoma, and large cell carcinoma are the different histopathological forms of lung cancer. Undifferentiated carcinoma was the term used to describe a tumor when the cell differentiation was unclear.

Statistical Analysis

The collected information was managed on an Excel spreadsheet. The categorical and continuous variables of the clinical characteristics of the study population were presented as percentages and meant standard deviations, respectively. The Chi-Square test was used to compare the significance of the difference in the distribution of discrete variables. Non-parametric tests The Mann-Whitney test was used to compare the statistical significance of differences in the means of continuous variables. Two-tailed significance at<0.05 was used as a measure of statistical significance. Epi-Info version 3.5.1 was used to do all the research.

Ethical approval

The study procedure was explained to each patient, and consent was obtained. The hospital's Ethical Committee has authorized the research protocol.

Results

Most cases, 73.90%, were seen to be between 40 and 80 years old. Only one out of all cases was over 80 years old, indicating a late-onset disease. In terms of sex distribution, there were 31 men and 15 women. The ratio of men to women was 2.6:1 (Fig. 1).

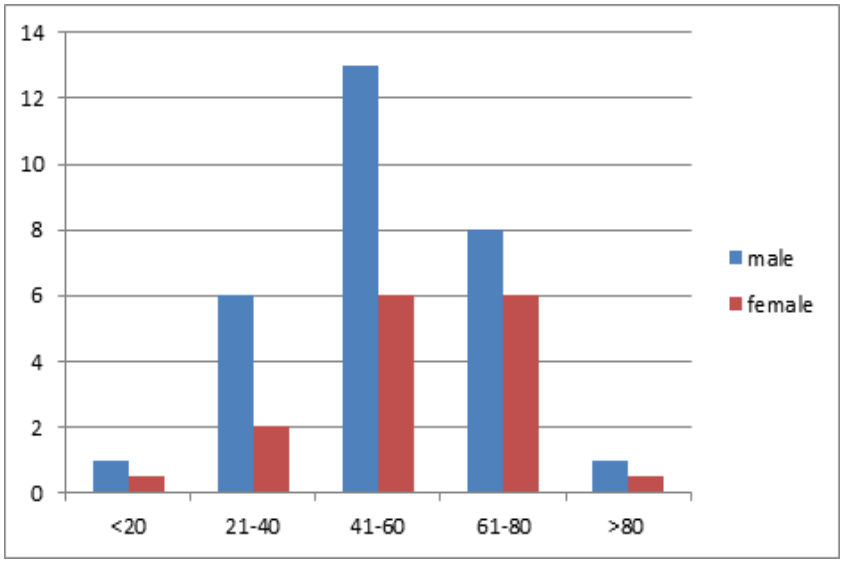

Figure 1: Age and sex distribution

The most prevalent symptoms patients in this study reported (Table 1) was a productive and dry cough, which occurred in 38 instances (82.60%), chest pain in 31, and shortness of breath in 21, respectively. Dysphagia was observed in 2 cases (4.34%) and fever in 18 cases (39.13%) as additional symptoms.

Pallor was most prevalent, occurring in 34 cases (73.39%), followed by clubbing (41.30%), Gynecomastia (one case), and hepatomegaly (one case, i.e. 2.17%). In three cases (6.52%), vocal cord paralysis was observed.

Table 1: Presenting Symptom (N=46) and Physical Sign

S. No.	Symptom	No.	Percentage
1.	Cough	38	82.60%
2	Chest pain	31	67.39%
3	Shortness of breath	21	35.65%
4	Haemoptysis	14	30.43%
5	Loss of weight	17	36.95%
6	Loss of Appetite	08	17.39%
7	Hoarseness of voice	05	10.86%
8	Dysphasia	02	4.34%
9	Fever	18	39.13%
Physical Sign			
1	Pallor	34	73.91%
2	Clubbing	19	41.30%
3	Lymphadenopathy	15	32.60%
4	Gynaecomastia	01	2.17%
5	Superior Venacaval syndrome	05	10.86%
6	Vocal cord paralysis	03	6.52%
7	Hepatosplenomelgy	01	2.17%

In a study of smoking behavior (Table 2), it was discovered that among males, 24 were smokers (77.41%) and seven were non-smokers, whereas among females, only one was a smoker (6.66%), and 14 were non-smokers (93.33%). 19 out of 25 smokers (76%) had a smoking index of 1-300. Eight percent of the cases had a smoking index greater than 600, while 16 percent had a smoking index between 300 and 600.

Table 2: Smoking Status and Physical Signs (N=46)

Sex	No. of patients	Smoker		Nonsmoker	
		No.	%	No.	%
Male	31	24	77.41%	07	22.58%
Female	15	01	6.66%	14	93.33%
Total	46	25		21	
Smoking index					
Smoking index	**No. of pt**	**Total number of smokers**		**Percentage**	
0	21	-		-	
1-300	19	25		76%	
301-600	04	25		16%	
>600	02	25		8%	
Physical Sign					
S. No.	**Pulmonary**	**No.**		**Percentage**	
1	Mass	14		30.43%	
2	Collapse	07		15.21%	
3	Consolidation	04		8.69%	
4	Pleural effusion	27		58.69%	
Radiological Pattern of Lesion		**No. of Pt**		**Percentage**	
Mass		16		34.78%	
Collapse		08		17.39%	

Consolidation	04	8.69%
Hilar enlargement	05	10.86%
Pleural effusion	27	58.69%
Mediastinal	04	8.69%
Rib erosion	02	4.34%
Pneumothorax/Hydropeumothorax/ others	-	-

On the chest examination, pleural effusion was the most prevalent finding in 27 cases (58.69%), followed by mass in 14 cases (30.43%) and consolidation in 4 cases (Table 2). In this study, pleural effusion was the most frequent radiological finding, occurring in 27 cases (58.69%). (Fig.2) followed by mass in 16 cases (34.78%). Other radiological patterns included eight instances of collapse (17.39%), five instances of Hilar enlargement (10.86%), and two instances of rib erosion (4.34%).

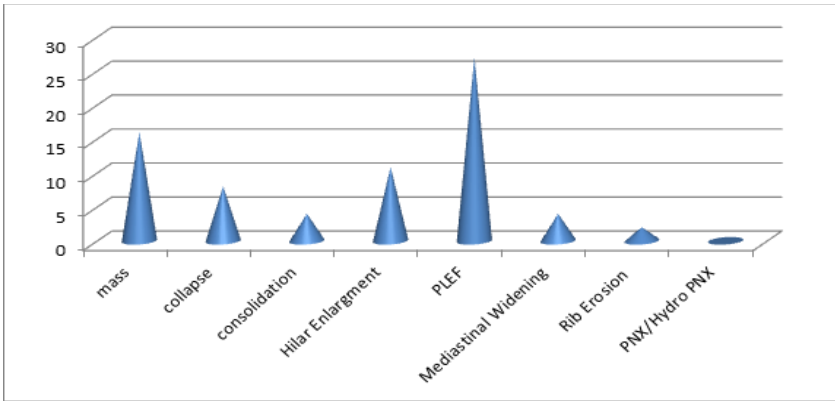

Figure 2: Radiological pattern

In this analysis, adenocarcinoma accounted for most cases (22 cases, 47.82%), followed by Squamous cell carcinoma (15 cases, 32.60%), small cell carcinoma (6 cases, 13.04%), and large cell carcinoma (3 cases, 6.52%). The most prevalent finding on a bronchoscopic examination was intra luminal growth (66.66%), followed by vocal cord palsy (55.55%). Carina enlargement and bronchus constriction were observed in four cases each. (Table 3).

Table 3: Distribution of Histological types and Bronchoscopic observation

Cell type	**No. of Patients**	**Percentage**
Squamous cell	15	32.60%
Adeno Carcinoma	22	47.82%
Large cell carcinoma	03	6.52%
Small cell carcinoma	06	13.04%
Bronchoscopic observation		
Bronchoscopic finding	No. of Patients	Percentage
Vocal card Palsy	05	55.55%
Intraluminal growth	06	66.66%
Widening of Carina	04	44.44%
Narrowing of Bronchi	04	44.44%

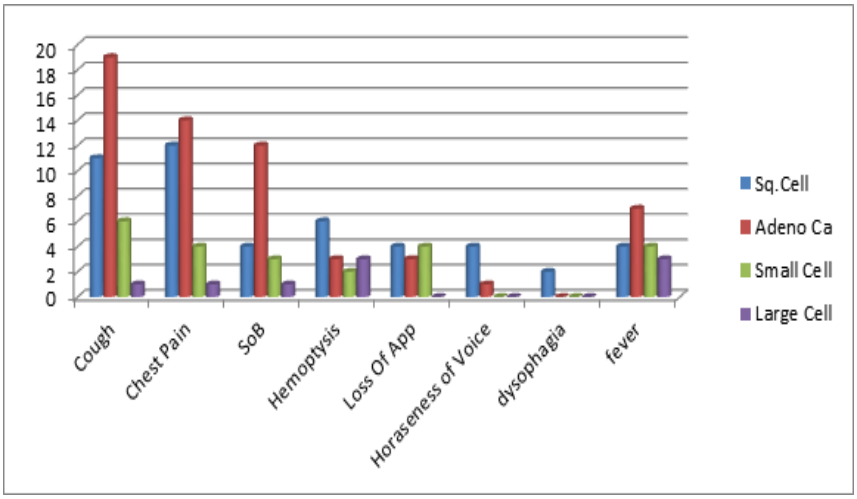

Figure 3: Histological type and clinical symptoms

In the present investigation, Squamous cell carcinoma was most prevalent in males (12 cases, or 80%), adenocarcinoma was equally prevalent in males and females (11 cases each), large cell carcinoma was found only in males (3 cases), and small cell carcinoma was most prevalent in males (5 cases, or 83.33%). Smoking was discovered to be associated with 52% (13 cases) of Squamous cell carcinoma, followed by 28% (7 cases) of adenocarcinoma. Large cell carcinoma 3 cases (12%) and small cell carcinoma 2 cases (8%). Non-smokers did not exhibit a single instance of large cell carcinoma.

Cough, chest distress, and weight loss were typical signs of squamous and small-cell carcinoma. In 19 cases (86.36%) of adenocarcinoma, dyspnea is the most prevalent symptom, followed by chest pain in 14 cases (63.63%). In six cases (100%) of small cell carcinoma, weight loss and loss of appetite were observed. In 3 cases of large cell carcinoma, there was hemoptysis (100 percent); in 2 cases, there was dysphagia (13.33 percent); in 4 cases of squamous cell carcinoma (26.66 percent), and in 1 case of adenocarcinoma (4.54%).

The study determined that pallor, clubbing, pleural effusion, and mass were the most typical presentations of Squamous cell carcinoma and adenocarcinoma, respectively. Lymphadenopathy, pleural effusion, and mass lesions were more prevalent in small cell carcinoma. Only one case (6.66%) of Gynecomastia was found to be associated with Squamous cell carcinoma. Vocal cord palsy was observed in 2 cases (13.33%) of Squamous cell cancer, 1 case (33.33%) of large cell carcinoma, and only 1 case (33.33%) of small cell carcinoma in which HPOA was present. In instance 3 of large cell carcinoma, the collapse was the most frequent manifestation (100%). It was shown that pleural effusion and mass collapse were the two most common radiological features in squamous cell cancer. The prevalent pattern in adenocarcinoma was pleural effusion. Mass pleural effusion was a common radiological finding in small cell cancer. Squamous and small cell carcinoma each had one case of rib erosion. Three cases of Squamous cell carcinoma and one case of adenocarcinoma both had mediastinal expansion.

Discussion

Lung cancer is one of the primary causes of cancer in India, with male-to-female ratios ranging between 2.9% and 7.8% [13,14]. With its incidence increasing in developing nations such as India and particularly in the state of Orissa, where smoking-related disease awareness is extremely low, lung cancer is on the rise. In addition, this disease has no special

registration or notification requirements, so its true incidence is unknown. In addition, physician awareness is low, and therefore there is no meticulous work to identify the disease. Thus, the diagnosis is made very late, resulting in nearly 100 percent mortality within a very brief time frame. In the present study, 73.90 percent of cases occurred between the ages of 40 and 80. This is confirmation of other studies that Bronchogenic carcinoma occurs commonly in the age range of 40 to 80 years, as found by various authors in their studies. In 54 years, Gupta et al. documented 86% of cases [15]. Due to the high prevalence of smoking among males, males have a higher risk of developing lung cancer than females. The sex ratio, as confirmed by Guleria et al. [16], is 7:6; Lam et al. [17] 1.9:1; G Tipima [18] 8.4:1; T S Chandrashekhar et al. 1.1:1 [19], increase in the incidence of lung cancer in female noted in our studies could be due to biomass fuel and exposure to passive smoking among most of the females who are from a rural background where they use biomass fuel for cooking. T S Chandrashekhar et al. found a sex ratio of 2.06:1 in a previous investigation. The pattern of the sex ratio in the present study is nearly identical.

It is abundantly clear from the study above that 82.60 percent of participants had a cough, chest pain (67.39 percent), shortness of breath (35.6 percent), and other symptoms, including hemoptysis (30.43 percent), hoarseness of voice (10.68 percent), and fever (39.13 percent). Our findings are consistent with those of T S Chandrashekhar et al. [19], Gupta et al. [15], Jindal and Behra [20], and Shetty et al. [21]. All authors cite cough as a prevalent symptom, even when patients are smokers. Due to pleural extension, peripheral tumors frequently cause chest distress. Invasion of nerve fibers has also been attributed to dull, throbbing chest pain.

Some patients who have a normal chest imaging examination may also have hemoptysis. It can be the initial sign of Bronchogenic carcinoma. In our investigation, radiological abnormalities were present in all instances. Pallor is the most frequent physical examination finding in this study's subjects, followed by clubbing (19 cases) and lymphadenopathy (15 cases). Pleural effusion was seen in 27 cases (58.65%) of chest exams, followed by masses in 14 cases (30.43%) and collapse in 7 cases (15.21%). The most frequent symptoms of Squamous cell carcinoma include cough (73.33%), chest pain (80.7%), weight loss (53.33%), and hemoptysis (40%), which indicates a central tumour. As a peripheral tumour, adenocarcinoma most frequently present with a cough (86.36%), chest pain (63.63%), and shortness of breath (54.54%). Small cell carcinoma most frequently manifests as weight loss in six cases (100%), appetite loss in four cases (66.66%), coughing in all cases (100%), and chest pain in six cases (66.66%), which is a central tumor. Only one metastasis to other organs and twelve cases of chest wall pain were observed. Less frequent occurrences of metastatic nodes are caused by the absence of better and more accurate diagnostic tools such as the PET scan, mediastinoscopy, and bone scintigraphy.

In the current research, 77.41% of men and 6.66% of women smoke. The association between smoking and Squamous cell carcinoma is 52%, followed by adenocarcinoma with 7 cases (28%). Three large and two small cell carcinoma cases (eight percent) have been reported. In contrast, there was no single case of large cell carcinoma among non-smokers. The aetiology of these cases could be attributed to the use of biomass fuels, as all the female patients were from rural areas. The risk of lung cancer increases as the smoking index rises. It is the product of the average number of daily cigarettes and

the cumulative number of years smoked. Notani et al. [22] determined that the relative risk of all categories of smokers compared to nonsmokers is 2.45, that of Bedi smokers is 2.64-3.38, and that of cigarette smokers is 2.22 to 2.36. Bedi is more carcinogenic, as Jussawalla and Jain [23] discovered. Nafac et al. [24] documented that hookah has been linked to lung cancer. In the current investigation, pleural effusion is the most common radiological finding in 27 cases (58.69%), followed by mass in 16 cases (34.78%), collapse in 8 cases (17.39%), Hilar enlargement in 5 cases (10.86%), and rib erosion in 2 cases (4.34%). In his study, Jindal et al. [20] noted mass lesion and collapse in 68.7% of cases, pleural effusion in 22.7%, and rib erosions in 3 cases. In our study, we found that mass lesion is commonly observed in four cases of small cell carcinoma (66.66%), pleural effusion in sixteen cases of adenocarcinoma (72.72%), and collapse in three cases (100%) due to its peripheral tumor.

In 9 cases, the bronchoscopic observation helped make a diagnosis, with intraluminal growth and vocal cord palsy being discovered in 66.66% and 55.55% of cases, respectively. In 4 cases each, the carina widened, and the bronchus narrowed. Only one of the 22 cases of adenocarcinoma that underwent bronchoscopy to diagnose the disease had vocal cord palsy. Adenocarcinoma accounted for the largest percentage of the 46 cases analysed (47.82%), followed by the more prevalent Squamous cell carcinoma (32.6%). This agreed with studies by Quin et al. [25] and Chhajed et al. [26] that found adenocarcinoma to be 36% and Squamous cell to be 28%, respectively. [27] Females were more likely to present with adenocarcinoma than males, who were more likely to present with Squamous cell carcinoma.

Conclusion

Based on the results of this study, we recommend that the government vigorously promote smoking awareness campaigns and firmly enforce the laws that forbid smoking in public areas. The education program at the school level must include instruction on the negative effects of smoking. It's important to consider the impact of risk factors other than smoking in prevention. Future research will be needed to examine the role of risk factors besides smoking. In conclusion, lung cancer is a significant global and Indian health issue. The epidemiology of lung cancer has changed significantly during the past few decades. Like a previous study, most people live in rural areas, and lung cancer is still more common in men. Lung cancer occurrences have migrated from the sixth to the seventh decade of life. Although Bidi smoking remains the most popular type, the number of people who smoke cigarettes is rising, which is relevant to the rising incidence of adenocarcinoma. The entire study population had been exposed to biomass fuel.

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