A profile of present trends in bronchogenic carcinoma

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Abstract

Background: Bronchogenic carcinoma is the most common malignancy primarily linked to smoking, pollution and industrial carcinogenic material which enters into human body through inhalation. This malignancy is in uptrend in the last 5 to 7 decades. There are different histological types in lung malignances which responds to different treatment modalities differently.

Methodology: A prospective study of patients in OP and respiratory wards of GGH Kakinada over a period of 18 months between Jan 2017 and July 2018 are taken for the study.

Results: This study comprises of 150 patients out of which males were 121 and females were 29. They are subjected to different kinds of tests and pathological diagnosis are arrived for 125 patients by a battery of tests. 104 were males and 21 were females for which the statistical analysis was made.

Conclusions: The most common histological variant in this study is squamous cell carcinoma followed by adeno carcinoma suggesting that tobacco smoking is an important risk factor for lung cancer even after continuing health awareness and education programs in India. Adeno carcinoma is most common variant among women and nonsmokers.

Keywords: Bronchogenic carcinoma; Bronchoscopy; Squamous cell carcinoma; Targeted therapy.

Introduction

Bronchogenic carcinoma is the most common malignancy primarily linked to smoking, pollution and industrial carcinogenic material which enters into human body through inhalation route [1]. This malignancy is in uptrend in the last 5 to 7 decades [2]. There are different histological types in lung malignances [3]. Each having their own propensity towards different carcinogenic materials. Even in women there is an increased tendency of smoking leading to same histological patterns as observed in males. Previously in women adeno carcinoma was of highest prevalence. But now there is a change in prevalence and are showing squamous cell carcinoma on par with male in many studies. Passive smoking is also said to be a risk factor among non-smokers especially women [4].

Now, after the awareness of smoking hazards [5], there is a tendency once again growing towards adeno carcinoma in both sexes. In India also the trends are very similar to rest of the world especially like western countries and Europe [6].

Off late not only due to the advent of different diagnostic facilities like flexible bronchoscopy, rigid bronchoscopy, low dose CT scan, PET scan but also there was an increase in number of smokers, increasing industrial contamination and increased survival of older people (due to increased medical facilities) there was increase in no. of cases diagnosed of lung malignancy [6].

The present study was a prospective study of latest trends in bronchogenic carcinoma among different age groups.

Materials and Methods

A prospective study of patients in outpatient and respiratory wards of GGH Kakinada over a period of 18 months between Jan 2017 and July 2018. The study protocol included complete history of smoking habits, exposure to industrial carcinogens, associated risk factors, onset of the disease, course of the disease and complications. An ethical committee approval and informed consent of study subjects was obtained.

Inclusion Criteria: All the patients who presented symptoms, signs and roentgenological features suggestive of bronchogenic carcinoma were included.

Exclusion Criteria: All the patients whose histopathological evidence does not confirm bronchogenic carcinoma were excluded.

Procedure: After proper selection of the patients which satisfy the inclusion criteria were selected. All the patients who satisfy the exclusion criteria are excluded from the study.

Symptoms and Signs: The symptoms and signs which were included were cough, expectoration, chest pain, shortness of breath, loss of weight, fever, hoarseness of voice, unable to swallow food, symptoms related to paraneoplastic syndromes, SVC (superior vena cava) syndrome and lung metastasis.

Investigations: A proper general and systemic examination of the whole body was performed and are subjected to a battery of tests like complete blood picture, chest X-ray PA view, lateral view, ultra sound abdomen and CT scan were performed [7].

Bronchoscopy: Certain patients where endo bronchial lesion is present were subjected to bronchoscopy and appropriate sample was taken and sent to pathology dept. for histopathology. Bronchial washings were obtained and sent for cytological analysis. In patients with peripheral lesions were subjected to ultra sound guided or CT guided FNAC/Biopsy done. Certain patients with peripheral lymph node were subjected to FNAC/Biopsy. Patients with pleural fluid were sent for pleural fluid analysis including malignant cytology by cell block method.

Results

This study comprise of 150 patients out of which males were 121 and females were 29. They were subjected to different kinds of tests and pathological diagnosis are arrived for 125 patients but 25 patients even though features suggestive of malignancy were confirmed on chest X-ray and CT scan but same could not be confirmed on histopathology. Out of 25 patients 15 were proved to be Koch's positive and were kept on anti-tubercular therapy. The rest of 10 patients were proved to be inconclusive and no pathological diagnosis could be made.

Age Distribution

25-80 Age Group were selected and taken for study

Table 1

Age	No. of patients	%
<31	4	3.20
31-40	6	4.80
41-50	26	20.80
51-60	35	28.00
61-70	37	29.60
>70	17	13.60
Total	125	100.00

Table 2

Type	Female		Male	
	No	%	No	%
Squamous cell carcinoma	6	4.8	64	51.20
Adenocarcinoma	14	11.2	31	24.80
Small cell carcinoma	1	0.80	6	4.8
Large cell carcinoma	0	0.00	3	2.4
Total	21	16.80	104	83.20

Histological types in males and females

Males 104 Females: 21 Sex ratio → 4.9:1

Smoking: In the current study 24 patients were non-smokers out of 125. Rest were smokers. Among the 21 females 7 were smokers out of which 2 were reverse smokers. 14 patients were exposed to bio mass fuel for more than 10 years.

Table 3

Pack Years	Patients	%
0	24	19.20
<5	6	4.80
5-15	19	15.20
>15	76	60.80
Total	125	100.00

The most common histological variant among smokers is squamous cell carcinoma and among non-smokers is adeno carcinoma followed by squamous cell carcinoma

Chest X-ray observations

Table 4: Radiological presentations

Histological variants		Right sided lesion	Left sided lesion	Hilar mass	Mediastinal Widening
Squamous Cell Carcinoma	No.	40	30	12	9
	percentage	54.05	58.82	60	81.81
Adeno carcinoma	No.	28	17	2	0
	percentage	37.83	33.33	10	0
Small cell carcinoma	No.	4	3	6	2
	percentage	5.40	5.88	30	18.18
Large cell carcinoma	No.	2	1	0	0
	percentage	2.70	1.96	0	0
Total		74	51	20	11

In this study most of the lesions are on the right side. Among the histological variants the most common is squamous cell carcinoma followed by adeno carcinoma. Among these variants also there was a slight right sided propensity. Radiological picture show a Hilar mass was observed among 20 patients and 60% of them were of squamous cell carcinoma followed by small cell carcinoma (30%). Mediastinal widening was observed among 11 patients. 9 of them were of squamous cell variant and 2 of them were small cell variant.

Table 5

Histological variants		Consolidation	COLLAPSE(endo-bronchial/extrinsic compression)	Lung Mass
Squamous Cell carcinoma	No.	5	12	46
	percentage	50	92.30	80.70
Adeno carcinoma	No.	3	0	7
	percentage	30	0.00	12.28
Small cell carcinoma	No.	2	1	1
	percentage	20	7.69	1.75
Large cell carcinoma	No.	0	0	3
	percentage	0.00	0.00	5.26
Total		10	13	57

Most of the chest X-rays were presented as lung mass followed by collapse and consolidation. 13 patients presented as Collapse and were subjected to bronchoscopy and 8 of them were having an endo bronchial lesion and rest of them were presented with extrinsic compression [8]. 57 cases were presented as lung mass 25 cases are subjected to U/S guided FNAC/Biopsy and 31 cases were subjected to CT guided FNAC/Biopsy and other one is proved by FOB guided Biopsy. 10 patients were presented with Consolidation which was due to obstruction of bronchus by endo bronchial lesion.

Table 6

Histological Variants		RIB Erosion	Pleural Effusion	Pericardial Effusion	Diaphragm Elevation
Squamous Cell	No.	5	22	6	4
	percentage	62.5	62.85	66.66	57.14
Adeno carcinoma	No.	0	12	2	3
	percentage	0.00	34.28	22.22	42.85
Small cell carcinoma	No.	0	0	1	0
	percentage	0.00	0.00	11.11	0.00
Large cell carcinoma	No.	3	1	0	0
	percentage	37.5	2.85	0.00	0.00
Total		8	35	9	7

The above table shows various complications that occurred due to the lung malignancy. Rib Erosions were observed among 8 patients and 5 were due to squamous cell carcinoma. Rib Erosion is ascribed to pressure effect of tumor in the lung. 35 patients were presented with pleural effusions and are subjected to thorough pleural fluid analysis including cytology.

The interventional procedures had very minimal complications with no mortality. 4 patients developed pneumothorax during CT guided biopsy, of which only 2 patients needed intercostal drainage, the rest settled with symptomatic treatment, 3 patients had minimal hemoptysis. During fiber optic bronchoscope 8 patients had hemoptysis which was mild to moderate and are treated symptomatically.

Table 7: Methods used to prove malignancy

Methods	No.	%
FOB	56	33.73
U/S Scan	25	15.06
CT Scan	31	18.67
FNAC/BIOPSY(lymph node)	19	11.44
Pleural fluid analysis	35	21.08
Total	166	100.00

The above table shows various methods used to prove the lung malignancy. Some of the patients required more than one investigation to prove. 56 patients were subjected to FOB and were informed about the procedure and procedure related complications. They were subjected to trans bronchial needle aspiration (TBNA), Biopsy and other procedures to obtain adequate specimen [9]. Supra Clavicular Lymph Node and Axillary Lymph Nodes were present in 19 patients and tissue sampling is done by FNAC/Biopsy to prove the malignancy.

Summary of histological variants:

Table 7

Histological Variants	No. of patients	%
Squamous cell carcinoma	70	56.00
Adeno carcinoma	45	36.00
Small cell carcinoma	7	5.60
Large cell carcinoma	3	2.40
Total	125	100.00

The above table shows incidence of various histological variants in the study. 25 patients were not proven as having any malignancy by the above means. Out of them 15 were proven to be due to kochs and were subjected to anti tuberculosis therapy. Rest of them were inconclusive.

Discussion

Bronchogenic carcinoma is the most common cause for death in both males and females among cancer deaths [10]. The incidence has been rising off late, thanks to the latest tools in diagnosing lung cancers. There has also been an increased trend towards usage of tobacco and its products in the world [11]. About 85% cases are attributed to cigarette smoking [12]. The symptoms of lung cancer can vary from simple cough to chest pain, weight loss, excruciating chest pain, massive to mild hemoptysis [13]. The metastatic disease may present with or without any clinical symptoms. Usually, the initial investigation of choice is simple chest X- ray. For to make a confirmed diagnosis is by obtaining biopsy either by transcutaneous or through FOB [14]. Chest CT scan has simplified the diagnosis of lung cancer. Treatment of lung cancer depends on the stage of presentation it includes surgery, chemotherapy, and radiotherapy or sometimes include all of them. Now a day's radio frequency oblation, where high frequency electrical current is used to destroy the cancer cells. The role of immunotherapy which helps in controlling the body immune system to eliminate the cancer is used to treat stage 4 non-small cell lung cancer. Adjuvant chemotherapy after surgery can be used in stage 2 or 3 diseases or stage IB with tumor size more than 4cm [15].

Targeted therapy for non-small cell lung cancer is the art of medicine now. Molecular analysis is done especially for adeno carcinomas [16] there has been rise in after the advent of newer drugs based on EGFR(epidermal growth factor receptor) and TKI (tyrosine kinase inhibitors). The HPE appearance is an important tool for the treatment and it also dictates the prognosis.

In this study 150 patients were selected randomly and out of which 121 were males and 29 were females. They were subjected to different kinds of tests and pathological diagnosis was arrived for 125 patients. Rest of the 25 patients even though the features are suggestive of malignancy as confirmed by CT or X- ray but on HPE examination no confirmative diagnosis of malignancy could be established. Out of this 25 patients 15 were proved to be of tuberculosis and were kept on ATT. Rest of the 10 patients were of inconclusive diagnosis and no pathological etiology.

In this study 25 to 80 yrs age group were taken. Most of the patients belong to 40 to 70 yrs age group indicating that the disease is prevalently a middle aged predominance. Even though as the age advances the malignancy also rows but due to decrease in survival rate after 70 yrs the incidence is also decreased proportionately. The HPE pattern dictates the 5 year mortality rate. The mortality is more in small cell lung cancer compared to other HPE variants. The sex ratio observed in our study is app. 4.9:1 among males and females can be ascribed to more prevalence of smoking habit among males but recently the trend has been increasing and going in favor of females due to urbanization and westernization of the society [17].

In this study among males the most common type of histological pattern is squamous cell carcinoma (51.20%) followed by adeno carcinoma (24.80%). Among females adeno carcinoma accounts for 11.20% followed by squamous cell carcinoma which accounts for 4.80%. In males due to the smoking habits squamous cell carcinoma account for most of the cases. In females adeno carcinoma accounts for majority of cases [18].

In the current study out of 125 patients 24 patients were non-smokers rest were smokers [19]. Among 21 females 7 were smokers out of which 2 were reverse smokers [20]. Bio mass fuel more than 10 years was also ascribed as a cause for carcinoma is seen in 14 patients. 60% of patients having history of more than 15 pack years were observed to have HPE findings of malignancy [21]. 19% of the study population who were non-smokers also had malignancy but of other histological variant which is adeno carcinoma at most times [22]. In smokers the commonest variant is squamous cell carcinoma. This is in consistent with studies with studies conducted by Samjet JM and published in chest journal 1993. Adeno carcinoma is the most common histological variant in nonsmokers this is in consistent with studies conducted by Arora VK et al in 1990.

The important investigating tool in diagnosing lung cancer is chest X- ray. Radiologically there are several types of presentations of lung cancer detected on chest X- ray. 74 patients presented with a right side lesion and 51 patients presented as left side lesion. 20 patients had hilar mass, most of them were squamous and small cell variants 11 patients had chest X- ray in the form of mediastinal widening, most of them were squamous cell variants. Chest X-ray showing consolidation as a presentation were seen in 10 patients most of them were squamous cell variants. Consolidation was due to obstruction of the bronchus by endobronchial lesion. 13 patients presented on X-ray as a collapse may be due to endo

bronchial obstruction or having extrinsic compression, most of them being proved as a squamous cell carcinoma variants which was proved by obtaining Biopsy/FNAC using flexible bronchoscopy. 57 patients presented as lung mass most of them were squamous and adeno carcinomas [23]. Various complications of lung cancer were presented on chest X-ray as Rib erosions, pleural effusions, pericardial effusions and diaphragmatic elevations. 8 chest X-rays showed Rib erosions out of which 5 were proved to have under lying squamous cell lung carcinoma and 3 were has large cell carcinoma. Rib erosions are probably due to pressure effect of the under lying tumor. 35 patients presented as pleural effusions. These effusions were sent for bio chemical analysis and malignant cytology by cell block method. Most of them were haemorrhagic effusions 10 were of non haemorrrhagic effusions. 9 patients showed cardiac complications like pericardial effusion 6 of them proved to be having squamous cell carcinoma. 7 patients presented with uni lateral diaphragm elevation. 5 times seen in left side. The diaphragm elevation has been ascribed to involvement of recurrent laryngeal nerve causing diaphragmatic palsy.

Several methods were used to prove malignancy. In the present study 33% of patients were subjected to flexible bronchoscopy and FNAC/Biopsy were done to prove the malignancy. 21% of the subjects were subjected to pleural fluid analysis and proven by doing malignant cytology by cell block method. 33% of the patients were obtained Biopsy/FNAC using either ultra sound scan or CT scan to arrive at the diagnosis.

Out of the 150 patients 25 patients were of not proven status for malignancy so alternative diagnosis was made and kept on alternative treatments. Among the rest most common histological variant is squamous cell carcinoma followed by adeno cell carcinoma [24]. This is in consistent with study conducted by Thippanna et al.

Conclusions

1. The most common histological variant in this study is squamous cell carcinoma followed by adeno carcinoma suggesting that tobacco smoking is an important risk factor for lung cancer even after continuing health awareness and education programs in India.
2. Adeno carcinoma is most common variant among women and nonsmokers.
3. Screening chest X- Ray every six months or screening low dose CT scan for every two years is advised as they are important tools in diagnosing lung cancer inn smokers more than 40 years age.
4. Latest advances in bronchoscopy CT scan and PET scans have made the approach easier and accurate in diagnosing lung cancer and metastasis.
5. The advanced treatment modalities like immunotherapy, targeted therapy using molecular diagnosis like EGFR mutations and TKI have decreased two year and five year mortality rates.

Conflicts of Interests: None declared.

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