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Endoscopic Presentation of Bronchogenic Carcinoma at a Tertiary Care Centre

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INTRODUCTION

There is a change in the histology of bronchogenic carcinoma worldwide due to the increased awareness regarding the ill effects of smoking. Adenocarcinoma now ranks first amongst the most prevalent form of bronchogenic carcinoma worldwide. In India however the picture is different, in contrast to the rest of the world the histology shows a preponderance of squamous cell carcinoma which is closely related to smoking. As per WHO, Lung cancer has been the most common cancer in the world for several decades, and by 2008, there were an estimated 1.61 million new cases, representing 12.7% of all new cancers. It was also the most common cause of death from cancer, with 1.38 million deaths (18.2% of the total). The majority of the cases now occur in the developing countries (55%). Lung cancer is still the most common cancer in men worldwide (1.1 million cases, 16.5% of the total), with high rates in Central-Eastern and Southern Europe, Northern America and Eastern Asia. Very low rates are still estimated in Middle and Western Africa (ASRs 2.8 and 3.1 per

100,000 respectively). In India, approximately 63,000 new lung cancer cases are reported each year [1]. We present various endobronchial manifestations of bronchogenic carcinoma at a tertiary care centre and the predominant histopathological types with regards to morphology, site and side of presentation.

AIMS & OBJECTIVES

The aim of our study was to study the morphology, site and histopathology of bronchogenic carcinoma endoscopically.

METHODOLOGY

The retrospective study was done at our tertiary care centre. 70 diagnosed cases of lung malignancy of either sex were selected for the study. The diagnosis of bronchogenic carcinoma was made either by bronchoscopy, bronchoalveolar lavage, brushing, biopsy, CT guided biopsy. Fiberoptic bronchoscopic findings were noted carefully with regard to side, site, and type of lesion & histopathology.

DISCUSSION

As per the study there were 49 (70%) males and 21 (30%) females with the sex ratio was 2.3:1. This was lower than previously conducted Indian studies [2]-[4]. The sex ratio of the incidence of bronchogenic carcinoma varies widely in different parts of the world, ranging from 13·5 : 1 in Holland to 1 : 1 in Nigeria. In India lung cancer largely remains the malignancy diagnosed in the male population. This can be attributed mainly to the cultural differences in the western and Indian population such as smoking habits.

There was not much difference in the prevalence of lung cancer in each decade after the age of 50 years. However maximum cases were in the age group of 51 to 60 years. This was in comparison to study done by SK Jindal et al at PGI where lung cancer was most commonly seen in the age group of 51-60 years. In a study conducted by A Dey et al at Kolkota National Medical College [5] in 2012 the mean age was 60.37 years. Prasad et al [6] at King Goerge University, Lukhnow in 2004 found that the average age of the bronchogenic carcinoma patients was 57 years. As per the SEER data (Surveillance, Epidemiology and end results from 2006-2010, the median age at diagnosis for cancer of the lung and bronchus was 70 years of age. Approximately 0.0% were diagnosed under age 20; 0.3% between 20 and 34; 1.4% between 35 and 44; 8.8% between 45 and 54; 21.3% between 55 and 64; 31.4% between 65 and 74; 28.1% between 75 and 84; and 8.7% 85+ years of age.These rates are based on cases diagnosed in 2006-2010 from 18 SEER geographic areas. Lung cancer was predominantly seen in the sixth decade as per our study and several previously conducted Indian studies.

The morphology observed on bronchoscopy largely depends upon the stage of malignancy and histology. As per the study the most common

presentation endocopically of lung malignancy is exophytic mass 26(37.14%) followed by external compression 18 (25.71%), nodular mass 13(18.57 %), irregular mucosa 11(15.71%) and the least common presentation is ulceration 2(2.85%). The morphology correlates to the symptoms produced by the lesion. The exophytic tumour and external compression are most likely to produce symptoms such as cough, hemoptysis and airway obstruction. Hence they seem to be encountered most commonly on bronchoscopy. Irregular mucosa and ulceration seem to produce less symptoms thereby manifesting as lesser prevalent lesions at our centre.

The histopathology of lung malignancy was studied along with morphology. As per the study the predominant endobronchial malignancy was squamous cell carcinoma (SCC) 30 (42.85%) , followed by adenocarcinoma 14(20%) and small cell carcinoma 8(11.42%). Findings of Indian studies are in contrast to the worldwide SEER data where Adenocarcinoma (38%) is the commonest histopathology followed by squamous cell carcinoma (20%). The two main types of lung cancer are small cell lung cancer (SCLC) and non-SCLC (NSCLC); NSCLC accounts for approximately 85% of all cases of lung cancer [7],[8]. The pattern of lung cancer has been changing in the West. Lung cancer is being increasingly diagnosed in women and adenocarcinoma has over taken SCC as the most common histological cell type [9] Worldwide adenocarcinoma is more prevalent than squamous cell carcinoma due to a decreasing trend of male smokers and higher prevalence of female smokers. However, the pattern seen at our hospital was different. Squamous cell carcinoma was still the commonest cell type seen, followed by adenocarcinoma. This was similar to reports from other part of India. This difference in histopathology may be due to the fact that smoking is less prevalent among women in India as opposed to the West, where it is rising; and urbanization, that exposes the patient to other carcinogens, risk factors or a complex interaction among gender, race, smoking status in West. In India although there is a rise in number of female smokers in the urban population the overall scenario still has male predominance of smokers. Thus our study in comparison to previously conducted Indian studies [2]-[5]shows the highest prevalence of squamous cell carcinoma followed by adenocarcinoma.

The histology of the morphological presentations was studied. It was found that most of the exophytic growth were squamous cell carcinoma 17 (65.38%). A squamous cell carcinoma is often preceded for years by squamous cell metaplasia or dysplasia in the respiratory epithelium of the bronchi, which later transforms to carcinoma in situ. In carcinoma in situ, atypical cells may be identified by cytologic smear test of sputum, bronchoalveolar lavage or samples from endobronchial brushings . However, squamous-

cell carcinoma in situ is asymptomatic and undetectable on X-ray radiographs. Eventually, it becomes symptomatic, usually when the tumor mass begins to obstruct the lumen of a major bronchus, often producing distal atelectasis and infection. On histopathology, these tumors range from well differentiated, showing keratin pearls and cell junctions, to anaplastic, with only minimal residual squamous cell features [10] Currently, four variants (papillary, small cell, clear cell, and basaloid) of squamous cell carcinoma of the lung are recognized. Of these variants, there is some evidence that the basaloid [11] and poorly differentiated small-cell variants may have worse prognoses than "conventional" squamous cell carcinomas. The papillary variant occurs more frequently as a primarily superficial, endobronchial lesion, with a modestly better prognosis [12]. The nodular mass showed an equal proportion of squamous cell carcinoma 5 (38.46%) and small cell carcinoma 5 (38.46%). Both the cases presenting as ulceration were adenocarcinoma. Adenocarcinomas are highly heterogeneous tumors, and several major histological subtypes are currently recognized [13] are Acinar, Papillary, Bronchioloalveolar adenocarcinoma and Solid adenocarcinoma with mucin production. Adenocarcinoma of the lung tends to stain mucin positive as it is derived from the mucus producing glands of the lungs. Similar to other adenocarcinoma, if this tumor is well differentiated (low grade) it will resemble the normal glandular structure. Poorly differentiated adenocarcinoma will not resemble the normal glands (high grade) and will be detected by seeing that they stain positive for mucin (which the glands produce).

The site of bronchogenic carcinoma was predominantly on left side 38 (54.28%). The lobar bronchi 35 (50%) were involved in maximum cases the most common lobar bronchus being the left lower lobe bronchus 16 (22.85%).The right main bronchus 21 (30 %) was most commonly involved individually. Squamous cell carcinoma was the most common subtype 11 (34.37%) on the right side followed by small cell carcinoma 9 (28.12%). On the left side lobar bronchi 28 (73.68%) were involved more showing predominantly squamous cell carcinoma 5 (62.5%) and small cell carcinoma 3 (37.5%). Segmental bronchi showed 2 (100%) cases of adenocarcinoma.

Thus it was observed that the central bronchi were the site of malignancy in most cases, the main bronchus on right and left lower lobe lobar bronchus on left. These airways showed predominantly squamous and small cell carcinomas. Adenocarcinoma was seen in the peripheral airways. This was in comparison to findings of Travis et al as well as Mitchell et al where adenocarcinoma was seen peripherally in the lungs, as opposed to small cell lung cancer and squamous cell lung cancer, which both tend to be more centrally located [14],[15]. Several

previously published reports in literature show that lung malignancy commonly presents as a mass followed by collapse consolidation with slight predominance of right lung [16],[17]. The adenocarcinoma commonly manifests as peripheral mass or a malignant pleural effusion. Similar finding were also reported in other studies [18],[19]. The SCLC presented commonly as central lesion, which was in agreement with other studies [20].

Lack of awareness coupled with delay between occurrence of symptoms and seeking medical attention results in most of the malignancies in India to progress at an advanced stage. Hence there should be emphasis on the need for more effective methods for early detection of lung cancer cases among general population when the malignancy is treatable.

RESULTS

Bronchogenic carcinoma was studied for bronchoscopic findings in 70 cases out of which 49 were males and 21 were females. Thus bronchogenic carcinoma was seen predominantly in males (70%) compared to females (30 %). The sex ratio was 2.3:1. The age distribution of the lung cancer showed 19 (27.14%) cases between the age 25 to 50 years, 22 (31.42%) cases between the age 51 to 60 years, 19 (27.14%) cases between the age 61 to 70 years and 10 (14.28%) cases more than 71 years. In our study, maximum patients were in 51-60 years age group. The distribution of cases as per age was studied.(Table. 1).

Table 1: Distribution of Cases As Per Age.

AGE (YEARS)	NO. OF PATIENTS	PERCENTAGE (%)
25-50	19	27.14
51-60	22	31.42
61-70	19	27.14
>71	10	14.28
TOTAL	70	100

The morphology of bronchogenic carcinoma was studied. The morphological presentations observed were exophytic polypoidal mass 26 (37.14%) (Fig. 1,2), nodular mass 13(18.57 %), irregular mucosa (Fig.4) 11(15.71%), ulceration 2(2.85%), narrowing of bronchi with distortion of anatomy due to external compression in 18 (25.71%) (Fig. 3) cases. As per the study the most common presentation endocopically of lung malignancy is exophytic mass followed by external compression, irregular mucosa and the least common presentation is ulceration.

Fig 1. Bronchoscopic view showing exophytic smooth surfaced area showing areas of haemorrhage, partially obstructing the lumen.

Fig 2. Bronchoscopic view showing irregular surface exophytic growth partially obstructing the lumen.

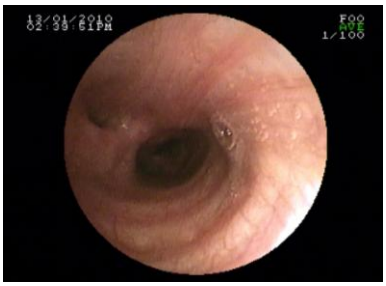


Fig 3. Bronchoscopic view showing luminal narrowing due to external compression.

Fig 4. Bronchoscopic view showing irregular mucosa with loss of rugosity .

The histopathology of lung malignancy was studied along with morphology. (Graph 2) Out of 70 cases , 30 (42.85%)were squamous cell carcinoma,18 (25.71%) were adenocarcinoma, 14(20%) were small cell, 8(11.42%) were undifferentiated and other miscellaneous types. As per the study the predominant endobronchial malignancy was squamous cell carcinoma, followed by adenocarcinoma and small cell carcinoma.

Out of the 26 cases showing exophytic growth (Gra ph. 3), 17 (65.38%) were squamous cell carcinoma,5 (19.23%) were small cell carcinoma, 2 (7.69%) were adenocarcinoma and 2 (7.69%) were undifferentiated.Out of the 13 cases showing nodular mass, 5 (38.46%)were squamous cell carcinoma,5 (38.46%) were small cell carcinoma, 2 (15.38%) were adenocarcinoma and 1 (7.69%) was undifferentiated. Out of the 11 cases showing irregular mucosa, 5 (45.45%) were squamous cell carcinoma,4 (36.36%) were small cell carcinoma, 1 (9%) was adenocarcinoma and 1 (9%) was undifferentiated. Out of the 18 cases showing external compression, 3 (16.66%) were squamous cell carcinoma,3 (16.66%) were small cell carcinoma, 8 (44.44%) were adenocarcinoma and 4 (22.22%) were undifferentiated. Out of the 2 cases showing ulceration, 2 (100%) were adenocarcinoma.

The site of bronchogenic carcinoma was studied (Graph. 4) The site of malignancy endoscopically was predominantly on left side 38 (54.28%) while 31 (44.28%) cases showed changes on right side and 1 (1.42%) case showed lesion on both sides.The lobar bronchi 35 (50%) were involved in maximum cases followed by the main bronchi 29 (41.42%) and the segmental bronchi 5 (7.14%)were the least involved. The most common lobar bronchus involved was the left lower lobe bronchus 16 (22.85%).The right main

bronchus 21 (30 %) was most commonly involved individually. The site and histopathology were studied on right (Graph. 5) and left (Graph. 6) side.

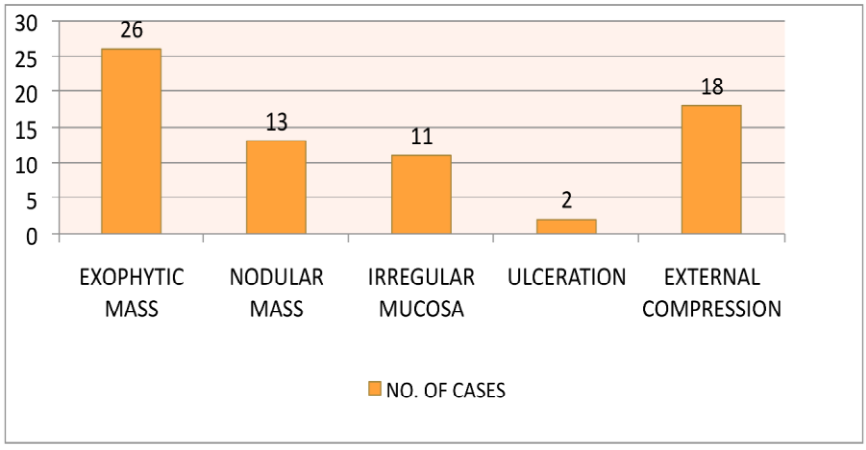
On the right, the main bronchus was predominantly involved in 21 (65.62%) cases. Squamous cell carcinoma was the most common subtype 11 (34.37%), followed by small cell carcinoma 9 (28.12%), and undifferentiated 1 (3.12%).There was no adenocarcinoma on right side.Bronchus intermedius showed single subtype of squamous cell carcinoma.The lobar bronchi were involved in equal proportion with Squamous cell 3 (9.37%) and adenocarcinoma 3 (9.37%).Segmental bronchi showed only adenocarcinoma.

On the left side lobar bronchi 28 (73.68%) were involved more than main bronchus 8 (21.05%)and segmental 2 (5.26%). The left main bronchus showed predominantly squamous cell carcinoma 5 (62.5%) and small cell carcinoma 3 (37.5%). Lobar bronchi showed equal proportion of squamous cell carcinoma 10 (38.46%) and small cell carcinoma 10 (38.46%) followed by undifferentiated 6 (23.07%). Segmental bronchi showed 2 (100%) cases of adenocarcinoma.

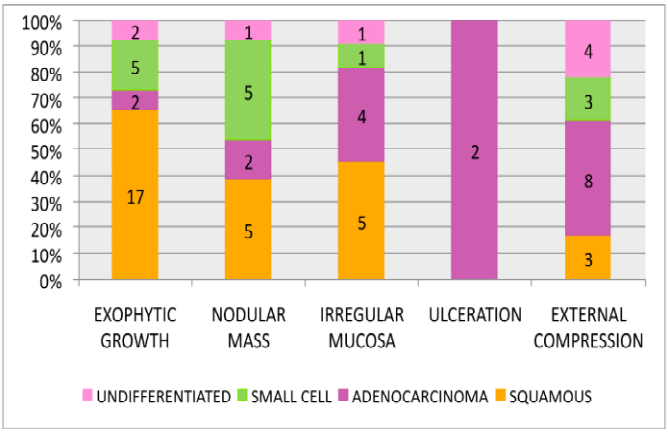
CONCLUSION

As per our study the most common endobronchial manifestation of bronchogenic carcinoma is exophytic irregular surface growth, in right main bronchus and the histopathological type being squamous cell carcinoma. This study validates that in India there is still skewing of the bronchogenic carcinoma towards it being squamous cell carcinoma thereby emphasizing the fact that smoking remains the primary cause of the malignancy. This calls for better awareness regarding the ill effects of smoking amongst the Indian population.

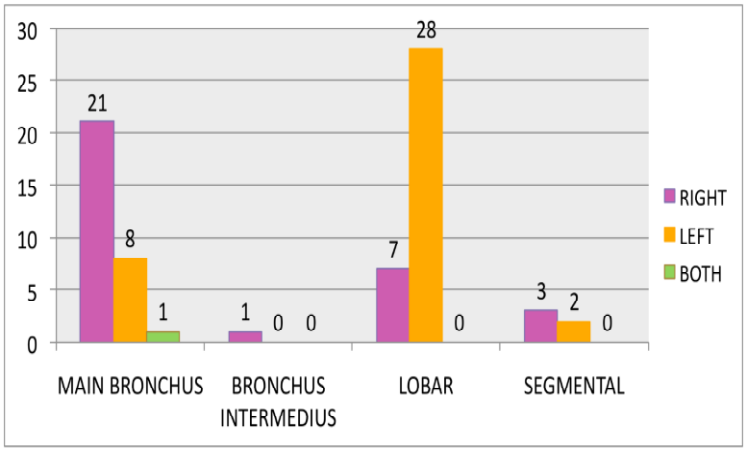
GRAPH 2: Morphology



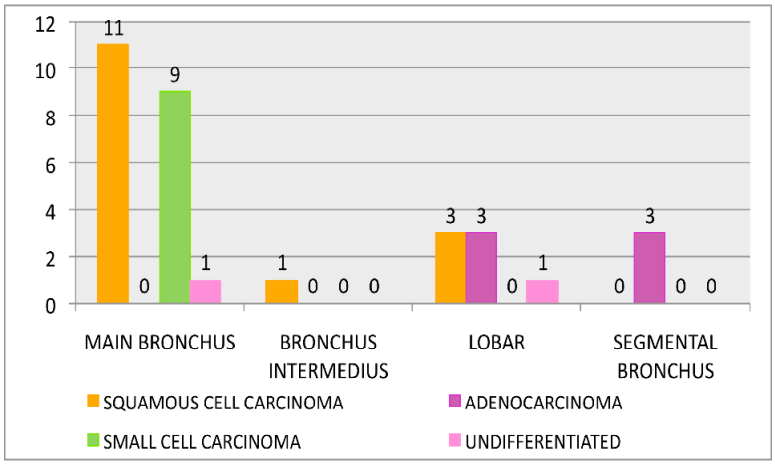
Graph 3 : Morphology & Histopathology



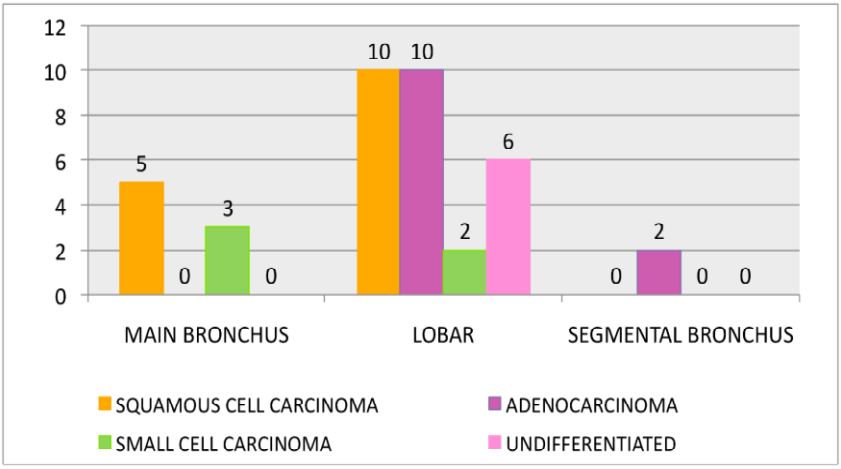
Graph 4 : Sites Involved Endoscopically



Graph 5 : Site & Histopathology On Right Side



Graph 6 : Site & Histopathological Type On Left Side



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