



Radiological Patterns of Primary Bronchogenic Carcinoma in South Indian Females

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ABSTRACT

Background: Morbidity and mortality due to primary bronchogenic carcinoma in female is rising in developed countries. Developing countries like India is no longer ahead from this race. Early detection by radiological imaging may help in both tumor staging and treatment planning.

Aim: To evaluate the Radiological patterns of histopathologically proven Primary Bronchogenic carcinoma(ca) in south Indian females with chest x-ray and Computerized Tomography (CT) of Chest.

Methods and Material: Our study is an open prospective study. Only patients with a confirmed pathological cell type of Bronchogenic ca included in this study. We study the Radiological pattern of histopathologically proven primary bronchogenic carcinoma in female patients who attended Thoracic Medicine Department. 31 female patients were included in this study over a period of 15 months. This study was approved by the local ethics committee. Chest x-ray and CT chest with upper abdomen were done to characterize the lesions further to help to stage the disease.

Statistical analysis used: Results: Total number of patients diagnosed to have Primary bronchogenic carcinoma during the period of study was 163. Of these 132 males and 31 females were diagnosed as Primary bronchogenic carcinoma. Hence the F: M ratio was 1:4.3 which contributes 19% of the total. Out of 31 cases included in this study, 23 patients were Adeno Carcinoma, 6 patients were Squamous cell Carcinoma, 1 patient each for Small cell Carcinoma and Anaplastic Carcinoma. In this study the age range was from 28 to 68 years with a mean age of 49.35 years. Maximum number of patients were presented between 41 to 50 years of age. No patient in this study was an active smoker.

Conclusions: For diagnosis, determination of treatment and for staging Bronchogenic ca radiological patterns have a particular importance. Presence of each country's statistical information reflecting its own profile is also important.

KEYWORDS : Lung cancer, Females, Radiological patterns

Introduction: Bronchogenic carcinoma is a leading cause of cancer death globally. Over several decades Bronchogenic carcinoma was considered as a carcinoma of males. This is due to high male smoking prevalence globally. But there had been a fourfold increase in Bronchogenic ca in Females over the past 40 years and it is estimated that this rise will not plateau even after several decades. This increase in lung cancer in women has been referred to as a contemporary Epidemic¹. The rise in bronchogenic ca-related mortality among females has significantly altered the male/female ratio in this disease. In recent days there is an increase in the incidence and prevalence of Bronchogenic ca in females has been observed in India despite their lowest level of smoking prevalence.

Subjects and Methods: The present, prospective study was conducted over a period of 15 months on female patients with histopathologically proven primary bronchogenic carcinoma. Total number of patients diagnosed to have Primary bronchogenic carcinoma during the period of study was 163. Of these 132 males and 31 females were diagnosed as Primary bronchogenic carcinoma. 31 females patients diagnosed with lung malignancy were included in the study. Chest radiographs were evaluated based on site, location, distribution and other characteristics of the lesions including details of calcification, cavitation, pleural effusion, satellite lesions and involvement of adjacent structures if any. Computed tomography (CT) Thorax was done to confirm the chest radiographs findings and stage the tumor.

Results: Total number of patients diagnosed to have Primary bronchogenic carcinoma during the period of study was 163. Of these 132 males and 31 females were diagnosed as Primary bronchogenic carcinoma. We found the male/female ratio as 4.3:1 which was comparable with Dey et al., 2012 study² in which the male/female ratio has been found as 4.14:1. M:F ratio contributed 19% of the total. Radiologically upper zone is the most involved zone (51.61%) followed by mid zone (35.48%) and lower zone (12.91%). Left lung (47.83%) was most common site of primary bronchogenic ca, followed by Right lung (34.78%) and both lung (17.39%). The most common radiological presentation was mass lesion, which was seen in 13 patients (56.52%) followed by combined presentation 6 (26.09%) and pleural

effusion in 3 patients (13.04%). Adeno Carcinoma present as a peripheral mass is 65.22% followed by combined (central and peripheral) mass in 21.74% and central lesion in 13.04% patients. Squamous cell carcinoma presents as central lesion in 66.66% and as a peripheral mass in 16.67% of patients. 1 patient of small cell carcinoma was present as a central lesion (100%). CT thorax was done in 31 patients. The features detected on CT thorax are shown in Table 3. Out of these, mass lesion was detected in 17 (54.84%). Mediastinal lymphadenopathy was detected in 12 (38.71%) cases. Pleural Effusion, Consolidation and Calcification were seen in 4 (12.90%) cases each. Satellite lesions was present in 3 (9.68%) cases. 2 cases (6.45%) had rib erosion. Of 31 patients, Collapse 1 case (3.23%), Vertebral Involvement 1 case (3.23%), Diaphragm palsy 1 case (3.23%) and Cavitation 1 case (3.23%) were detected by CT imaging. Metastasis to Ipsilateral Lung was found in 6 cases (19.35%), Opposite/Bilateral 4 (12.90%), Liver 2 (6.45%) and Adrenal 1 (3.23%). In our study also adenocarcinoma was found to be the commonest histological subtype 23 (74.19%) followed by squamous cell carcinoma 6 (19.35%).

Discussion: Many factors may influence the difference in Bronchogenic Ca incidence between male and female. Incidence of Bronchogenic ca in female varies between countries Cigarette smoking, second hand smoking, diet, occupational exposure, indoor exposure and also with some host factors that can protect against or expedite the development of the cancer. Our study focuses on variety of radiological patterns of primary bronchogenic ca in females. Age is the major determinant of cancer risk in females. The peak of incidence was noted in 41-50 years of age group in our study. Majority of Female were non smokers. We found the male/female ratio as 4.3:1 which was comparable with Dey et al., 2012 study² in which the male/female ratio has been found as 4.14:1. M:F ratio contributed 19% of the total. Male female ratio is still lower than in other countries. Our results are contrary to other Indian studies that reported male to female ratio to vary from 5.76:1 to 6.7:1 (Bahera and Balamugesh, 2004)³, 7.9:1 (Rajasekaran et al., 1993)⁴ and 8.4:1 (Tippanna et al., 1999)⁵. Gupta et al 2001 7.8:1⁶. Radiologically upper zone is the most involved zone (51.61%) followed by mid zone (35.48%) and lower zone (12.91%). Left lung (47.83%) was the most common site of primary broncho-

genic ca , followed by Right lung (34.78%) and both lung (17.39 %). The most common radiological presentation was mass lesion, which was seen in 13 patients (56.52 %) followed by combined presentation 6 (26.09%) and pleural effusion in 3 patients (13.04 %); similar to reports published in Indian literature (Bahera and Balamugesh, 2004; Khan et al., 2006; Jagadish et al., 2009)⁷. Adeno Carcinoma present as a peripheral mass is 65.22 % followed by combined (central and peripheral) mass in 21.74% and central lesion in 13.04% patients. Squamous cell carcinoma presents as central lesion in 66.66% and as a peripheral mass in 16.67% of patients. 1 patient of small cell carcinoma was present as a central lesion (100 %). CT thorax was done in 31 patients. The features detected on CT thorax are shown in Table 3. Out of these, mass lesion was detected in 17(54.84%). Mediastinal lymphadenopathy was detected in 12 (38.71%) cases. Pleural Effusion, Consolidation and Calcification were seen in 4(12.90%) cases each. Satellite lesions was present in 3(9.68%) cases. 2 cases (6.45%) had rib erosion. Of 31 patients ,Collapse 1 case(3.23%), Vertebral Involvement 1case(3.23%), Diaphragm palsy 1case(3.23%) and Cavitation 1case (3.23%) were detected by CT imaging. Metastasis to Ipsilateral Lung was found in 6 cases(19.35%), Opposite/Bilateral 4(12.90%), Liver 2(6.45%) and Adrenal 1(3.23%). The pattern of Bronchogenic ca has been changing in the west and is being increasingly diagnosed in women, and adenocarcinoma has overtaken squamous cell carcinoma as the commonest histological type. In our study also adenocarcinoma was found to be the commonest histological subtype 23(74.19%) followed by squamous cell carcinoma 6(19.35%). There could be several reasons for this difference in cell patterns between

the Western and Indian studies. Firstly, Smoking is the main etiologic and risk factor for the development of Bronchogenic carcinoma in both male and female. There was a strong correlation between smoking status and Bronchogenic carcinoma. But our patients were never smokers. Cigarette smoking is less common among women in India, as opposed to the West, where it is rising.

Conclusion: At present Bronchogenic ca surpassed breast cancer as the leading cause of cancer deaths in women. There is definitely an increasing trend in the incidence of Primary Lung Cancer in females. This disturbing trend inline with global situation needs further evaluation. Maximum number of patients were between 41-50 years of age. Bronchogenic ca is most treatable when identified in the earliest stages. Radiological patterns of chest may have impact on early diagnosis, treatment, and outcome. Presence of each country's statistical information reflecting its own profile is also important. The study points towards a need to create awareness about Female lung carcinoma with radiological patterns among the general practitioners for an early detection of lung cancer.

1. Histo Pathological Types in this Study

| Cell type | No of Patients | Percentage |
|-------------------------|----------------|---------------|
| Adeno Carcinoma | 23 | 74.19 |
| Squamous cell Carcinoma | 6 | 19.35 |
| Small cell Carcinoma | 1 | 3.23 |
| Ana plastic Carcinoma | 1 | 3.23 |
| Total | 31 | 100.00 |

2.X-ray findings of patients

| Findings | Cell type | | | | | | | | | |
|-------------------------|-----------|-------|----------|-------|------------|-----|------------|-----|-------|-------|
| | Adeno | | Squamous | | Small cell | | Anaplastic | | Total | |
| | No | % | No | % | No | % | No | % | No | % |
| Site | | | | | | | | | | |
| Right lung | 8 | 34.78 | 2 | 33.33 | 1 | 100 | 0 | 0 | 11 | 35.48 |
| Left lung | 11 | 47.83 | 4 | 66.67 | 0 | 0 | 0 | 0 | 15 | 48.39 |
| Bilateral | 4 | 17.39 | 0 | 0 | 0 | 0 | 1 | 100 | 5 | 16.13 |
| Locations | | | | | | | | | | |
| Central | 3 | 13.04 | 4 | 66.66 | 1 | 100 | 0 | 0 | 8 | 25.81 |
| Peripheral | 15 | 65.22 | 1 | 16.67 | 0 | 0 | 1 | 100 | 17 | 54.64 |
| Central+ Peripheral | 5 | 21.74 | 1 | 16.67 | 0 | 0 | 0 | 0 | 6 | 19.35 |
| Distribution | | | | | | | | | | |
| Upper zone | 12 | 52.17 | 3 | 50 | 1 | 100 | 0 | 0 | 16 | 51.61 |
| Mid zone | 8 | 34.78 | 2 | 33.33 | 0 | 0 | 1 | 100 | 11 | 35.48 |
| Lower zone | 3 | 13.04 | 1 | 16.67 | 0 | 0 | 0 | 0 | 4 | 12.91 |
| Lesions | | | | | | | | | | |
| Collapse | 1 | 4.35 | 0 | 0 | 0 | 0 | 1 | 100 | 1 | 3.23 |
| Mass | 13 | 56.52 | 2 | 33.33 | 1 | 100 | 0 | 0 | 17 | 54.84 |
| Pleural effusion | 3 | 13.04 | 2 | 33.33 | 0 | 0 | 0 | 0 | 5 | 16.12 |
| Combinations | 6 | 26.09 | 2 | 33.33 | 0 | 0 | 0 | 0 | 8 | 25.81 |
| Special features | | | | | | | | | | |
| Cavitation | - | | | 3.23 | | | | | | |
| Calcification | - | | 1 | 3.23 | | | | | | |
| Rib involvement | 2 | 6.45 | 4 | 2.90 | | | | | | |
| Satellite lesions | 2 | 6.45 | 1 | 3.23 | | | | | | |
| Diaphragm Palsy | 1 | 3.23 | | | | | | | | |

3.CT Findings of the patients

| CT findings | No. of cases (%) |
|-----------------------------|------------------|
| Mass | 17 (54.84%) |
| Mediastinal Lymphadenopathy | 12 (38.71%) |
| Effusion | 4(12.90%) |
| Consolidation | 4(12.90%) |
| Calcification | 4(12.90%) |
| Satellite lesions | 3(9.68%) |
| Rib erosion | 2(6.45%) |
| Collapse | 1(3.23%) |
| Vertebral Involvement | 1(3.23%) |
| Diaphragm palsy | 1(3.23%) |
| Cavitation | 1(3.23%) |
| Metastasis: | |
| Ipsilateral Lung | 6(19.35%) |
| Opposite/Bilateral | 4(12.90%) |
| Liver | 2(6.45%) |
| Adrenal | 1(3.23%) |

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