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Can chest x-ray be used as a clue for histologically subtyping lung adenocarcinoma?

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ABSTRACT
Aim: To describe the radiographic abnormalities seen in various pathological cell types of lung adenocarcinoma and correlation between chest radiographic presentation and the pathological cell type of lung cancer.
Study design and Place of study: An observational retrospective descriptive study conducted at St. John's National academy of Health sciences, Bangalore after approval of ethical committee
Materials and Methods: A total of 103 biopsies of lung adenocarcinoma cases diagnosed in the Department of Pathology, St. John's National institute of Health sciences were analysed. Details were collected from the Histopathology request forms and hospital record sheets. Slides were reviewed and parameters were calculated.
Results: Among the 103 cases studied, 55 were males and 48 were females. The age of all these patients ranged from 5th to 7th decade. Most carcinomas presented on the right side of lung (56.3%). 2.9% cases showed bilateral involvement. Mass lesion seen in chest X-ray was the predominant radiological finding followed by pleural effusion. Among the histological types, acinar adenocarcinoma was the most common type seen which had intermediate prognosis. X-ray findings in this type was predominantly mass lesion followed by pleural effusion. Other findings like collapse, consolidation, cavity formation, Superior vena cava obstruction, empyema and hilar lymph nodes were seen in 15.5% of cases.
Conclusion: Mass lesion in chest X- ray was the most common finding lung adenocarcinoma. Simple Chest X-ray which is always the initial and easiest method of investigation in a suspected case of Lung carcinoma in beneficial not only in an early diagnosis but also will provide a clue to the type of tumour.
Key words: Lung Adenocarcinoma, Chest X-ray, Mass lesion, Pleural effusion

I. INTRODUCTION

Carcinoma of Lung is one of most common cancers in the world. It involves 17.1% of all cancers in men, 6.7% in women, and 12.2% in both sexes.[1]Adenocarcinoma of lung has remained the most prevalent of all histological types in women, with slowly increasing incidence rates over time. On the other hand,incidence of squamous cell carcinoma (SqCC) which has historically been the common tumour type in menhas declined.

Early detection of lung cancer can increase the survival and chance of effective treatment among people. Chest radiography is often used as an adjuvant to clinical examination in patients presenting with chest symptoms. Lung cancer even though is one of the most common malignancies, there are no specific symptoms that can distinguish it from non-neoplastic chest pathology

Adenocarcinoma of the lung is histologically categorized into lepidic, acinar, papillary, micropapillary and solid types. Favourable prognosis is seen in lepidic pattern, intermediate prognosis in papillary and acinar and poor prognosis in solid and micropapillary patterns.[2] The aim of our study was to describe the radiographic abnormalities seen in various pathological cell types of lung adenocarcinoma and correlation between chest radiographic presentation and the pathological cell type of lung cancer.

II. PATIENTS AND METHODS

Patient data were retrieved from records of the department archives as well as from case charts obtained from the Medical Records Department of St. John's National academy of health sciences for this observational cross-sectional study. One hundred and three cases of lung adenocarcinoma with radiological findings were included in the study.
Inclusion criteria

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1.All histologically diagnosed lung adenocarcinomas with radiological findings (chest X-ray/ CT reports) were included in the study

Exclusion criteria

1.All the cases with inadequate data in the records were excluded

Histological examination of all the cases were done and adenocarcinomas were grouped into acinar, solid, papillary, micropapillary and lepidic types. The radiological findings of 103 patients with the diagnosis of primary lung adenocarcinoma were analysed, and the relationship with the pathological cell types was assessed. The present study being descriptive, results are expressed in terms of frequencies, mean and percentages. Representation of data is done in tables, pie charts and bar diagrams.

III. RESULTS AND ANALYSIS

Among the 103 cases studied, 55 were males and 48 were females. Most carcinomas presented on the right side of lung (56.3%). 2.9% cases showed bilateral involvement.

	<50 years	51-70years	>70years
Age distribution	22	69	12
Sex distribution	Males (53.4%)	Females (46.6%)	
Site of tumor	Right-56.3%	Left lung-40.8%	Bilateral-2.9%

Various radiologic findings in lung carcinomas

Mass lesion was predominantly seen in 36% of adenocarcinoma of lung. Pleural effusion in27% and both these together was seen 17.4% cases. Other findings were a total of 19.4% which included collapse/consolidation (6%) followed by one case of SVC obstruction, hydropneumothorax and cavity formation.

Distribution of radiological findings in ADC

Radiological feature	Number of cases (103)
Mass	37(35.9%)
Pleural effusion	28(27.1%)
SVC obstruction	1(0.97%)
Hydropneumothorax	1(0.97%)
Collapse	2(1.9%)
Consolidation	6(5.8%)
Hilar Lymph nodes	5(4.8%)
Cavity	1(0.97%)

Distribution of patterns in adenocarcinoma

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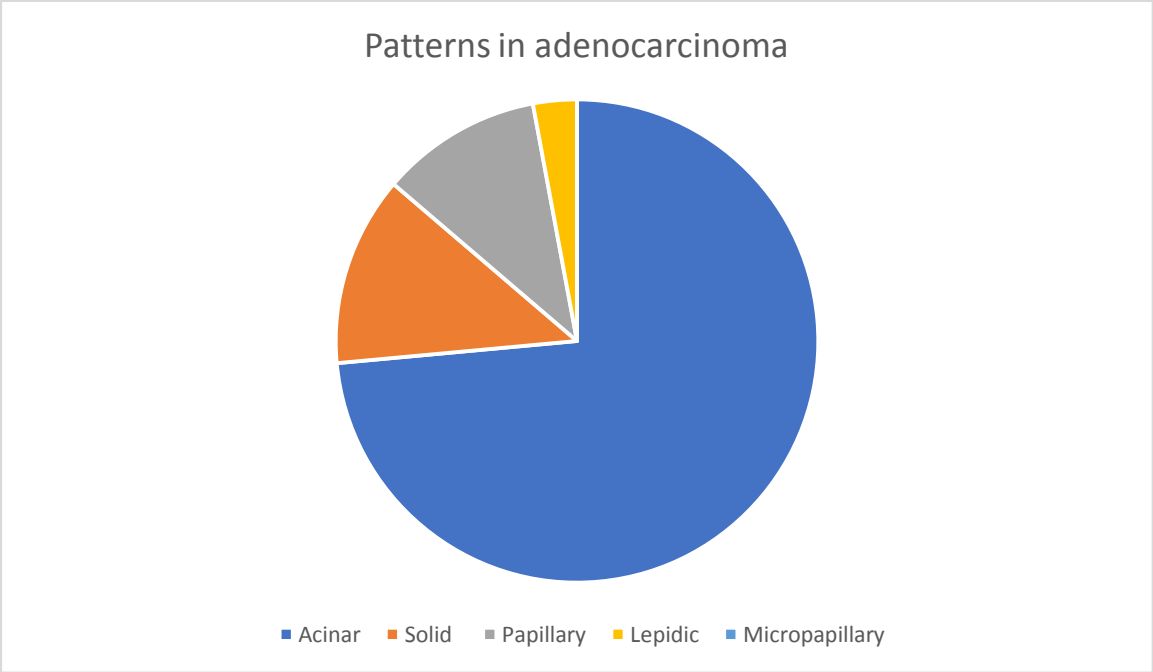

Pattern	Number of cases
Acinar	75 (72.8%)
Papillary	11 (10.7%)
Lepidic	3 (2.9%)
Solid	13 (12.6%)
Micropapillary	1(0.97%)

3cases were found to have mixed patterns with acinar as the major component with one case showing solid areas and other two with lepidic and micropapillary areas. They were grouped under acinar, as it was the major component

	Acinar	Solid	Papillary	Lepidic	Micropapillary
Mass	25(24.3%)	8(7.7%)	3(2.9%)	1(0.97)	-
Pleural effusion	21(20.4%)	1(.97%)	6(5.8%)	-	-
Both	13(12.6%)	2(1.9%)	-	2(1.9%)	1(0.97%)
Others	16(15.5%)	2(1.9%)	2(1.9%)	-	-

Majority of the cases in the present study were of acinar morphology which was of intermediate prognosis type which had a variety of findings. Most common of those findings was the mass lesion followed by pleural effusion and 15.5% of other findings which included collapse, consolidation, cavity formation, SVC obstruction, empyema and hilar lymph nodes. Pleural effusion was the major findings in papillary type of lung cancer. 3 cases of Lepidic type of adenocarcinoma which has good prognosis showed as mass lesion and pleural effusion in chest X-ray. Other findings like hilar lymph nodes, collapse of lung, consolidation was not found in lepidic type of adenocarcinoma. So, by just radiological examination categorisation to lepidic (good prognosis) and acinar/papillary (intermediate prognosis) was not possible. Solid and micropapillary type with poor prognosis had solid masses as the major presentation. Pleural effusion alone was seen in only 1 case.

DISCUSSION

Primary lung cancer has reached epidemic proportions in recent years in India. Radiography being one of the 1stnoninvasiveinvestigationdone has major role in diagnosis. The most common radiographic findings of bronchogenic adenocarcinoma were pulmonary masses, pleural effusion, consolidation and hilar masses.

The most common age group was in the 5th to 7th decade which was consistent with the study done by Bhaskarapillai et al.[3]

Male to female ratio was 1.14:1. This was comparable to study done by Shokaralla et al.[4] The ratio was almost equal suggesting that the incidence of adenocarcinomas was increasing in females.

On radiological examination, involvement of the right lung more than left lung was seen. Most common radiological finding was mass lesion (54%). This correlated with the study done by Kumar et al.[3] This might be because of late stage of presentation. In the study by Mandal et al.[5]mass lesion was seen in 82 cases followedby pleural effusion in 12 and consolidation/collapse in 9 cases. Ourstudy findings were similar tothis. The predominant radiologicpresentations were hilar masses and collapse in the study by Maula etal.[6]

Lobe of the lung involved by adenocarcinoma were upper lobe (25), middle lobe (8) and lower lobe (17). Hilum was involved in 6 cases. Slight increase in upper lobe involvement can be due to deposition of inhaled particles occurring more in the airways of upper lobes, especially in the right upper lobe. Our study found that the lobe predilection was not statistically significant. In the study Sharma et al.[7] adenocarcinomas were not found to maintain any zonal distribution.

Comparison of Histological distribution and radiological presentation in lung carcinoma

Authors	Radiological finding	ADC
Mandal et al[72]	Mass	82
	Consolidation-collapse	9
	Pleural effusion	12
Present study	Mass	37
	Consolidation-collapse	6
	Pleural effusion	28
	SVC obstruction	1
	Mass+ Pleural effusion	18

Comparison of histologic patterns of ADC

Authors	Acinar	Papillary	Lepidic	Solid	Micropapillary
Sica et al[2](n=73)	35	14	-	14	10
Present study(n=103)	75	11	3	13	1

Although Computerised tomography is now used which can assess margins, bronchial cut-off sign, signs of dilated bronchial arteries, signs of vascular bundle thickening, signs of short burrs, spinous processes, and pleural indentation, use of chest X-ray is also important as it is mostly always the first investigation done

Cohen et al.[8]	Invasive lung adenocarcinoma spectrum and CT findings	
	Solid & acinar types- Solid nodule	Lepidic predominant- Part-solid ground glass opacity, variable proportion of solid component

IV. CONCLUSION

Acinar and papillary type of adenocarcinoma with intermediate prognosis was the commonest type in this study. They had variety of features on radiological examination while poor prognosis type had solid mass lesion as the major presentation. Chest radiography can thus be used to get a clue about the type of adenocarcinoma.

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