Original Research Article

Solitary pulmonary nodule with extra pulmonary neoplasms

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Abstract

Background: A solitary pulmonary nodule is defined as a discrete, well - marginated, rounded opacity less than or equal to 3 cm in diameter that is completely surrounded by lung parenchyma, does not touch the hilum or mediastinum , and is not associated with adenopathy, atelectasis or pleural effusion. Lesions larger than 3 cm are considered masses and are treated as malignancies until proven otherwise. It is not uncommon for a patient who currently has or has previously had extra pulmonary neoplasm to develop a solitary pulmonary nodule. Such a nodule may be detected with chest radiography or computed tomography performed as part of the work - up or follow - up of the known extra pulmonary malignancy. The determination of the etiology of such a nodule is usually important to direct the appropriate therapy.

Aim and objectives: To evaluate the Chest Radiographs and CT characteristics of solitary lung nodule with a primary extra pulmonary neoplasm and to determine the presence and/or frequency of single lung metastasis , primary lung cancer and benign lesions in patients with solitary lung nodule and a primary extra pulmonary neoplasm.

Materials and methods: A retrospective analysis of CT and Chest Radiographs of 9 patients with an extra pulmonary malignant neoplasm and a solitary pulmonary nodule, done in our Dhiraj General Hospital. Images were reviewed for the presence of solitary lung nodule. If present, the following nodular characteristics were recorded: Distribution, CT attenuation, Shape, Size, Margins and Calcification. The histological characteristics of the nodule were correlated with those of the extra pulmonary neoplasm and with patient age and smoking history.

Results: Out of total number of 9 patients that were included in this study showed different pathologies and those were then those were evaluated in detail and showed: benign pulmonary nodule (1 case), metastatic deposit (1 case), primary bronchogenic carcinoma with brain metastasis (1 case),

lung metastasis (1 case), lung carcinoma in upper lobe of left lung (1 case), actinomycosis (1 case), lung metastasis with renal cell carcinoma (1 case), oesophageal carcinoma with primary bronchogenic carcinoma (1 case), primary bronchogenic carcinoma with bony metastasis (1 case).

Conclusion: Solitary lung nodule in patients with extra pulmonary malignancies showed a variety of patterns on CT. Nearly half of the non – calcified solitary pulmonary nodules identified in this series were malignant. The likelihood of a spread depends on the histological characteristics of the extra pulmonary neoplasm and the patient's smoking history. Lung cancer was more common than metastatic disease.

Key words

Solitary pulmonary nodule, Extra pulmonary, Neoplasm.

Introduction

A solitary pulmonary nodule is defined as a discrete, well - marginated, rounded opacity less than or equal to 3 cm in diameter that is completely surrounded by lung parenchyma, does not touch the hilum or mediastinum , and is not associated with adenopathy, atelectasis or pleural effusion. Lesions larger than 3 cm are considered masses and are treated as malignancies until proven otherwise [1].

It is not uncommon for a patient who currently has or has previously had extra pulmonary neoplasm to develop a solitary pulmonary nodule [2].

Such a nodule may be detected with chest radiography or computed tomography performed as part of the work - up or follow - up of the known extra pulmonary malignancy [3].

The determination of the etiology of such a nodule is usually important to direct the appropriate therapy e.g., observation, biopsy, resection, chemotherapy, radiation therapy or a combined approach. Sometimes it is difficult or impractical to obtain tissue and thus establish a definitive diagnosis [4].

Aim and objectives

- To evaluate the Chest Radiographs and CT characteristics of solitary lung nodule with a primary extra pulmonary neoplasm.
- To determine the presence and/ or frequency of single lung metastasis, primary lung cancer and benign lesions in patients with solitary lung nodule and a primary extra pulmonary neoplasm.

Materials and methods

This study aimed at following up cases of solitary pulmonary nodule presenting at Radiology Department of Dhiraj General Hospital, by using CT scan and X-ray. All the patients presented to Dhiraj General Hospital for the purpose of diagnosis and treatment was included.

Inclusion criteria

- Only those patients who are willing to participate in study will be included.
- Patients referred to the radiology department for CT scan/ X-ray, and found to have solitary pulmonary nodule, will be included in this study.
- Already diagnosed cases of solitary pulmonary nodule, which need follow up radiological investigations and were referred to our radiology department, will be included in study.
- Patients coming for CT scan for diseases other than solitary pulmonary nodule, and are accidentally found to have solitary pulmonary nodule, will be included in this study.

Exclusion criteria

- Patients presenting to radiology department having solitary pulmonary

nodule in past and are cured completely will be excluded from the study.

Description of Tools

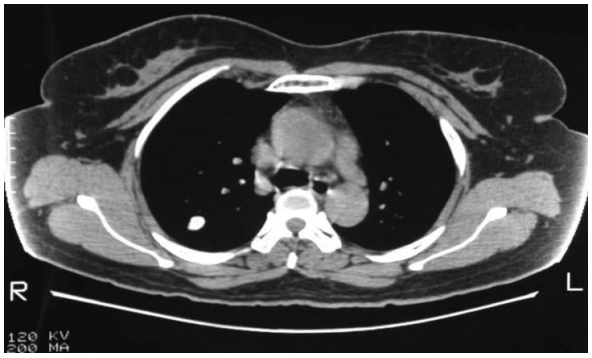
- **CT scan Machine:** Emotion semiens 16
- **Contrast agent used:** Urograffin

Cases

Benign pulmonary nodule

Right upper lobe nodule shows peripheral calcification and high Hounsfield unit enhancement, suggesting that the lesion is a calcified, benign pulmonary nodule (**Photo – 1**).

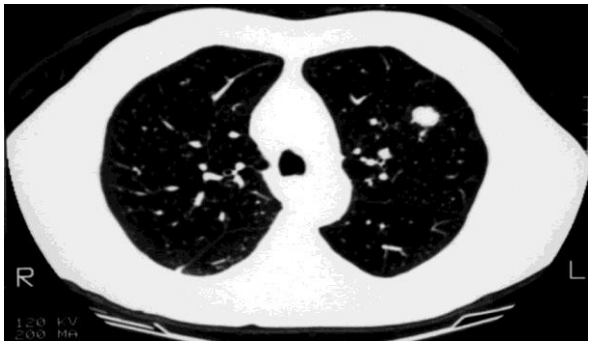
Photo – 1: Benign pulmonary nodule.



Metastatic deposit

A 1.5 – cm coin lesion in the left upper lobe in a patient with prior colonic carcinoma. Transthoracic needle biopsy findings confirmed this to be a metastatic deposit (**Photo – 2**).

Photo – 2: Metastatic deposit.



Primary bronchogenic carcinoma with brain metastases

Chief complaints of the patient were severe shortness of breath, headache, and altered mental status. History of smoking was present. CT of the brain performed revealed an enhancing intra-axial lesion. Pathologically was proven as a Bronchogenic Carcinoma (**Photo – 3**).

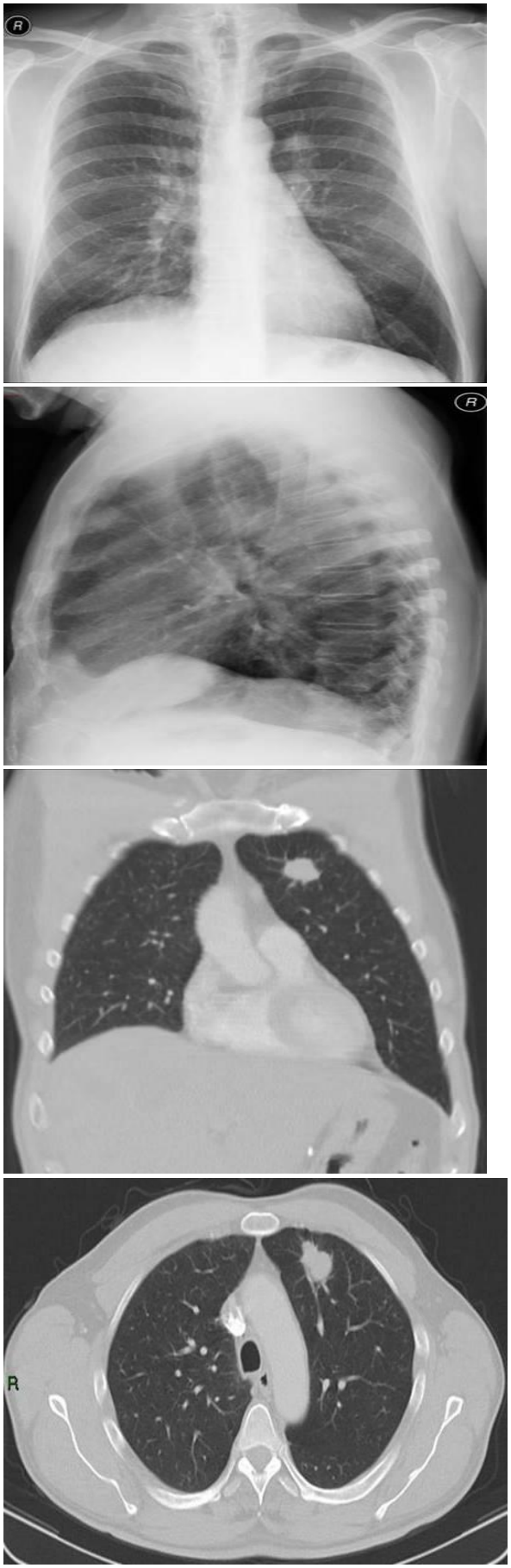
Photo – 3: Primary bronchogenic carcinoma with brain metastasis.

Lung metastases

Multiple calcified as well as soft tissue nodules in both the lung fields suggestive of lung metastases. Multiple enlarged necrotic mediastinal nodes seen, largest tracheo - bronchial node. Left para hilar lingual lobe of lung shows calcified scarring with surrounding heterogeneously enhancing soft tissue lesion of size 42 x 28 mm. Multiple poorly enhancing hypodense lesions seen in both lobes of liver of average size 1 – 3 cm, suggestive of liver metastases (**Photo – 4**).

Photo – 4: Lung metastases.

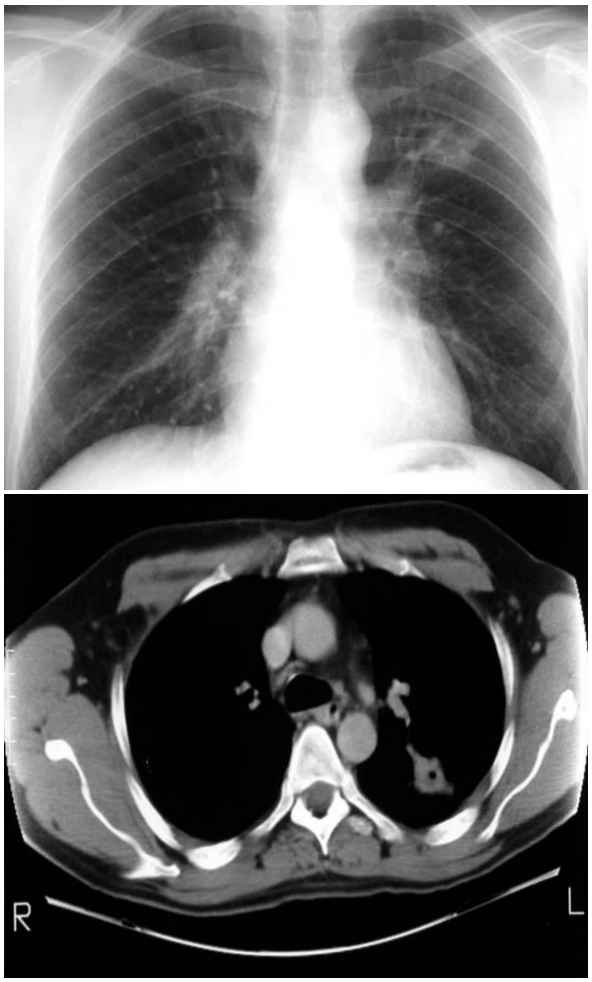
Photo – 5: Lung cancer left upper lobe.



Actinomycosis

A left upper lobe nodule with central lucency and poorly circumscribed margins was diagnosed as actinomycosis based on needle biopsy findings. After needle biopsy, the presence of classic sulfur granules confirmed a diagnosis of actinomycosis (**Photo – 6**).

Photo – 6: Actinoycosis.



Lung metastases with renal cell carcinonma

Left Renal mass arising from midpole with perinephric involvement suggestive of malignant mass - Renal Cell Carcinoma. Subcentimeter lung nodule in right basal lung suggestive of lung metastases (**Photo – 7**).

Oesophageal carcinoma with primary bronchogenic carcinoma

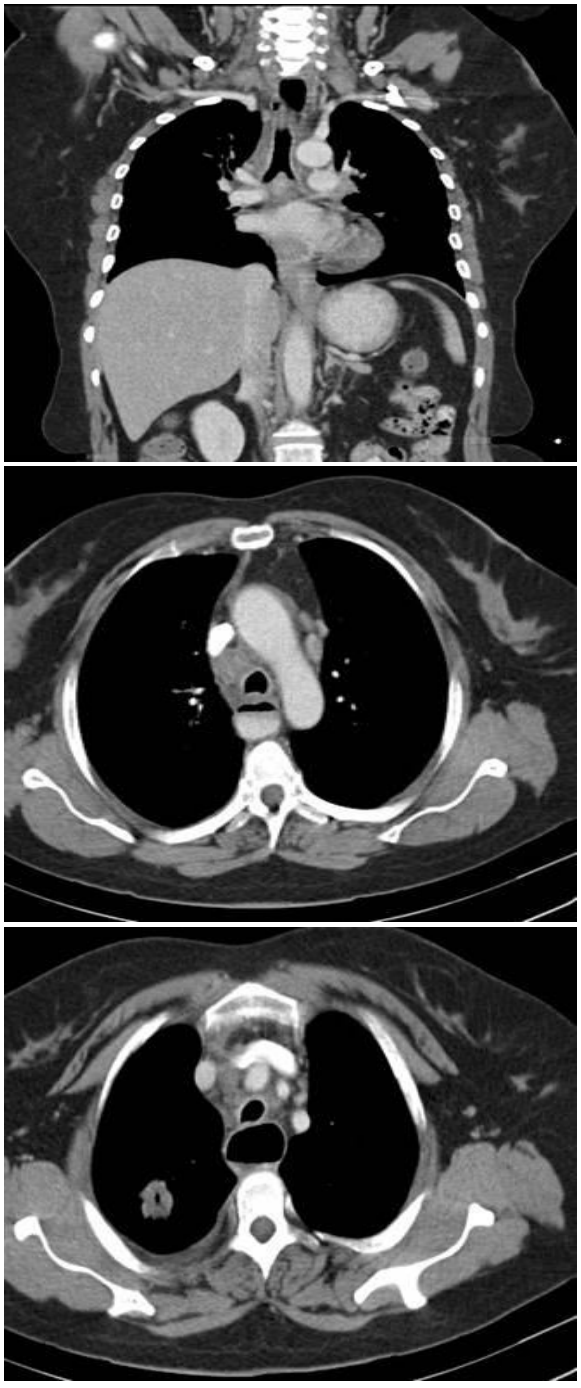
Right upper lobe posterior segment of lung shows enhancement, cavitatory nodule with irregular margins. Malignant oesophagus mass involving mid and lower thoracic oesophagus with mediastinal nodal , lung , lytic bony metastasis (**Photo – 8**).

Photo – 7: Lung metastasis with renal cell carcinoma.

Primary bronchogenic carcinoma with bony metastases

Left lower lung shows collapse with underlying heterogeneously enhancing lesion. Multiple cervico-dorsal vertebrae at C6, C7, D2, D12, L1, L2 and L3 levels and in manubrium and sternum. Left lower lung mass with bilateral lung, liver and bony secondaries (**Photo – 9**).

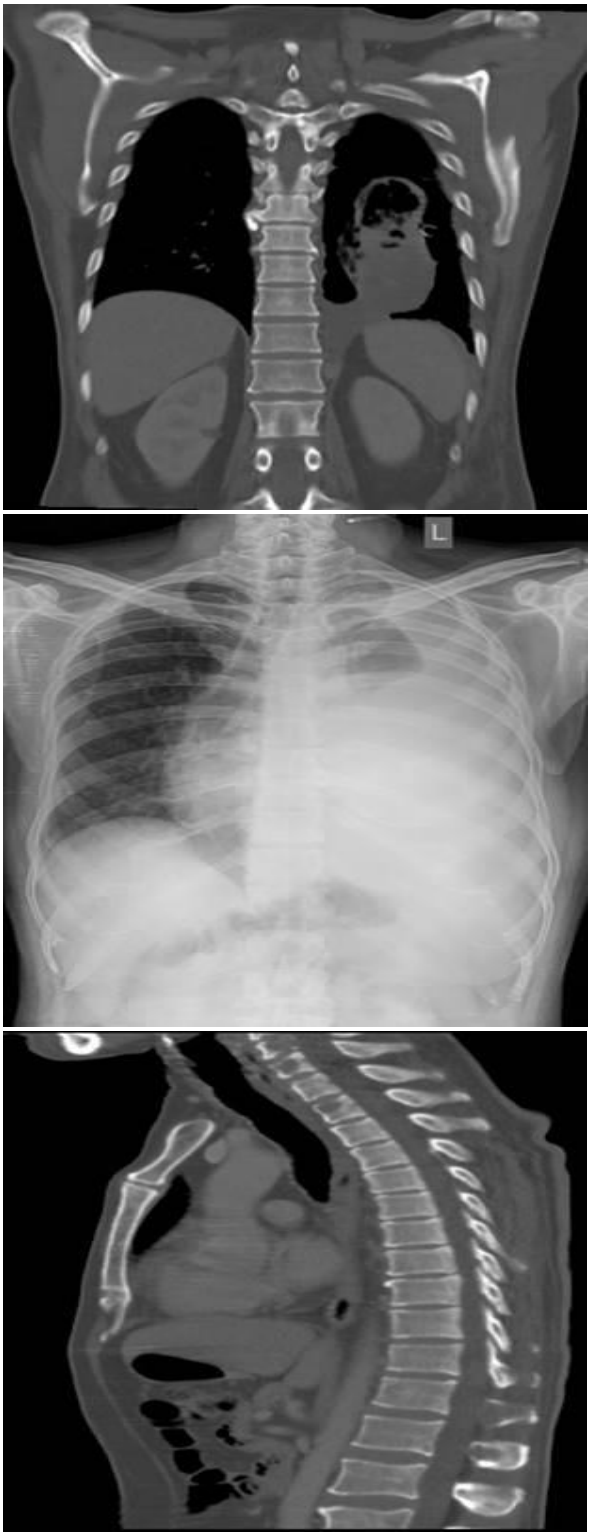
Photo – 8: Oesophageal carcinoma with primary bronchogenic carcinoma.



Results and Discussion

Out of total number of 9 patients that were included in this study showed different pathologies and those were then those were evaluated in detail and showed: benign pulmonary nodule (1 case), metastatic deposit (1 case), primary bronchogenic carcinoma with brain metastasis (1 case), lung metastasis (1 case), lung carcinoma in upper lobe of left lung (1 case), actinomycosis (1 case), lung metastasis with renal cell carcinoma (1 case), oesophageal carcinoma with primary bronchogenic carcinoma (1 case), primary bronchogenic carcinoma with bony metastasis (1 case).

Photo – 9: Primary bronchogenic carcinoma with bony metastases.



Conclusion

Solitary lung nodule in patients with extrapulmonary malignancies showed a variety of patterns on CT. Nearly half of the non – calcified solitary pulmonary nodules identified in this series were malignant. The likelihood of a spread depends on the histological characteristics of the extra pulmonary neoplasm and the patient's smoking history. Lung cancer was more common than metastatic disease.

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