

Role of MDCT in the Evaluation of Bronchogenic Carcinoma

Dr. Ravi Ningappa¹, Dr Ashwini², Dr. Deepa Susan John³, Dr. Santosh⁴.

¹(Associate Professor Department of Radio-Diagnosis,

Bangalore Medical College and Research Institute Bangalore, India)

^{2,3,4}(Department of Radio-Diagnosis, Bangalore Medical College and Research Institute Bangalore, India)

Abstract

Aims:

1. To describe various imaging presentations of lung carcinoma on computed tomography
2. To evaluate the role of mdct in the staging of bronchogenic carcinoma.

Settings and Design:

All patients referred to the department of radio diagnosis with clinical suspicion of lung mass or those with a chest radiograph showing suspicious pulmonary lesion. The study was done with SIEMENS SOMATOM 6 SLICE CT SCAN¹⁰. All patients included in the study underwent CT imaging of the thorax with iopamidol contrast given intravenously.

Materials and Methods:

A prospective study of 50 patients over a period of 1 year with clinical or radiological suspicion of bronchogenic carcinoma and confirmed histopathological diagnosis was undertaken. CT of the thorax was done using 10 mm collimation sections from the level of lung apices to the diaphragm and routinely including the adrenals.

Results:

Squamous cell carcinoma and small cell carcinoma are typically central and present as hilar masses, atelectasis or pneumonia. Adenocarcinoma and undifferentiated large cell carcinoma are generally peripheral lesions manifesting as solitary pulmonary nodules or masses.

Conclusion:

Computed tomography is the imaging modality of choice for evaluation of bronchogenic ca because of its better spatial resolution.

CT provides precise characterization of the size, contour, extent and tissue composition of the suspicious lesion and also helps in the staging process.

Keywords: Bronchogenic carcinoma, Hilar masses, Lung cancer, Multi detector computed tomography, Smoking.

I. INTRODUCTION

Bronchogenic carcinoma is the single most important cause of cancer-related deaths with approximately 1.5 million cases occurring world-wide every year.⁽¹⁾ Multidetector computed tomography (MDCT) is the modality of choice for evaluating bronchogenic carcinoma because of its better spatial resolution.⁽²⁾ The role of imaging ranges from screening for lung cancer in high risk individuals to diagnosis and staging of bronchogenic carcinoma. Staging of bronchogenic carcinoma plays a very important role in deciding the treatment and also helps in assessing the prognosis.

Lung cancer is divided into two major histologic groups :non small cell lung carcinoma (NSCLC) and small cell lung carcinoma. NSCLC is further subdivided into the following histologic types : squamous cell carcinoma, adenocarcinoma and large cell carcinoma.⁽³⁾

The main morphologic characteristics that help differentiate benign from malignant lesions on CT include : Margins- malignant lesions have an irregular, ill defined, lobulated or spiculated margin while benign lesions tend to have a smooth, sharply defined edge, Shape- lung carcinomas tend to be irregular, lobulated or notched while hamartomas and metastases may be round or oval and Pattern of opacity- with pure ground glass opacity (GGO) and mixed GGO more likely to be malignant than a solid opacity.⁽⁴⁾

The various radiologic appearances of bronchogenic carcinoma include- hilar mass/ mediastinal enlargement, solitary pulmonary nodule, atelectasis/ consolidation, and pleural effusion.

A wide variety of pulmonary conditions present with imaging features that mimic those of primary lung cancer. These include metastases, benign tumors like hamartoma, mesenchymal tumors, infections like tuberculosis, aspergillosis, hydatid cyst, round pneumonia and lung abscess.⁽⁵⁾ Improvements in CT like HRCT and MDCT has made it possible to show the morphological characteristics of a disease and thus arrive at a correct diagnosis. CT helps determine the

precise anatomic location of the mass, relationship of the mass to the vascular, hilar or mediastinal structures and the extent of the disease. ⁽⁶⁾*Aims and objectives:* were to describe various imaging presentations of lung carcinoma on Computed Tomography and to evaluate the role of MDCT in the staging of bronchogenic carcinoma.

II. MATERIALS AND METHODS

This study role of MDCT in the evaluation of bronchogenic carcinoma was conducted between February 2014 to January 2015. All patients referred to the department of radio diagnosis from departments of medicine, surgery and pulmonary medicine with clinical suspicion of lung mass or those with a chest radiograph showing suspicious pulmonary lesion were included in the study. Our study consisted of 50 patients.

The study was done with SIEMENS SOMATOM 6 SLICE CT SCAN¹⁰. Sections of the thorax were chosen in the transverse plane at thickness of 8 to 10 mm.

In contrast enhanced CT thorax about 30 to 50 ml iodinated contrast agent, Iopamidol was injected intravenously for optimal study results. CT scan images were viewed in lung window, mediastinal window and bone window. CT findings were interpreted as follows

Mass lesion based on tumor site - right/left, central/peripheral, lobar/segmental location; size - 1-2 cms, 2-3 cms or > 3 cms; tumor contour - spiculated, lobulated, smooth; enhancement pattern; presence of any cavitation, calcification, air bronchograms within the lesion, satellite lesions.

III. OBSERVATION

Total number of patients included in our study were 50 out of which 48 patients were males (96%) and 2 patients were female (4%). Age of the patients varied from 35 years to 80 years. The various radiologic appearance of lung cancer are as follows: solitary pulmonary nodule/mass, hilar enlargement/mediastinal mass, pleural effusion, atelectasis and consolidation. Majority of the lesions were greater than 3 cm showing predominantly heterogeneous enhancement.

A. Solitary Pulmonary Nodule

A solitary pulmonary nodule is defined as a discrete, well-marginated, rounded opacity less than 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. In our study only 2 cases presented as solitary pulmonary nodule (4%)

B. Lung mass

Majority of the cases presented as lung mass, consisting of 41 out of 50 cases. (82%). Out of these 28 cases presented as central hilar mass (68% of the lung masses were central). Nodules had spiculated margins in 32 cases (80%), lobulations in 20 cases (50%) and smooth margins in 3 cases (8%). Extrathoracic metastases were observed in 40% of cases. Adrenal metastasis was observed in 6 out of 50 cases (12%). Most of the patients in this study at presentation were already in advanced stage of disease both in non-small cell carcinoma and small cell carcinoma group.

C. Pleural Effusion

Pleural effusion occurred along with hilar/peripheral mass and was present in 12 out of 50 cases. (24%)

D. Mediastinal lymphadenopathy

Mediastinal lymph node involvement was observed in 24 out of 50 cases (48%).

E. Consolidation

Only 2 cases presented with consolidation (4%). Bronchoalveolar carcinoma, a subtype of adenocarcinoma is the most common type of lung cancer that presents as consolidation with cavitation. The most common histologic type of bronchogenic carcinoma that undergoes cavitation is squamous cell carcinoma. Peripheral squamous cell carcinoma is the most common type to cause pancoast's syndrome. In our study there was one case of pancoast's syndrome.

IV. DISCUSSION

In conclusion, computed tomography is the modality of choice for evaluating bronchogenic carcinoma because of its better spatial resolution. The prognosis in bronchogenic carcinoma is directly related to the tumor stage at patient's initial presentation. Thus CT plays a very important role in precise characterization of the size, contour, extent and tissue composition of the suspicious lesion. It also helps in identifying sites of potential metastasis.

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