COMPUTED TOMOGRAPHIC EVALUATION OF CHEST MASSES AND ITS CORRELATION WITH HISTOPATHOLOGICAL DIAGNOSIS IN A TERTIARY CARE HOSPITAL, VSS MEDICAL COLLEGE AND HOSPITAL, SAMBALPUR, BURLA, ODISHA

Manish Madan[1], Vikas Agrawal[2]

[1]Associate Professor, Department of Radiodiagnosis, Institute of Medical Sciences and Sum Hospital, Siksha "O" Anusandhan University, K8 Kalinga Nagar, Bhubaneswar, Odisha, India.
[2]Associate Professor, Department of Radiodiagnosis, Hi-Tech Medical College and Hospital, Pandara, Bhubaneswar, Odisha, India.

ABSTRACT

BACKGROUND

Computed Tomography (CT) offers a precise guidance to the needle biopsy making it a viable alternative for the invasive procedures. The thoracic cavity consists of right and left pleural cavity and a mid-cavity in between called mediastinum.[1] Thoracic diseases are common and include a wide spectrum of lesions involving distinct compartments, i.e. lung parenchyma, pleura, chest wall and mediastinum.

MATERIALS AND METHODS

Study was conducted in a tertiary care hospital, VSS Medical College and Hospital, Burla. Fifty (50) patients who had chest findings were included in the present study. Relevant lab investigations and CT was done to determine the size, morphology, margin, density, calcification and various other characters.

RESULTS

The patients were in the age group of 15-65 yrs. Radiological diagnosis was approached for 26 lung lesion and it was correct in 21 cases (80.76%). Histopathological diagnosis was approached for twelve cases and it was correct in 10 cases (83.3%). Radiological diagnosis was approached for 24 cases of mediastinal masses. It was correct in 21 cases (87.5%). Histopathological diagnosis was approached for 22 cases and it was correct in 17 cases (77.2%). Calcification was not seen in any of the four tubercular lesions in this study.

CONCLUSION

CT diagnosis was correct in 80.77% cases of the lung and 87.5% of the mediastinal cases.

KEYWORDS

Chest Masses, Computed Tomography, Burla.

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BACKGROUND

The thoracic cavity consists of right and left pleural cavity and a mid-cavity in between called mediastinum.[1] Thoracic diseases are common and include a wide spectrum of lesions involving distinct compartments, i.e. lung parenchyma, pleura, chest wall and mediastinum.

Conventional radiographs can be used to arrive at the diagnosis based on the localisation of the lung masses, however, Computed Tomography (CT) is appropriate for diagnosis based on the direct observation of the tissue or structure from which the mass is arising rather than its location.[2]

CT offers a precise guidance to the needle biopsy making it a viable alternative for the invasive procedures[3] like mediastinoscopy, mediastinotomy or thoracotomy. With CT, it has become possible to achieve the cytological/histopathological diagnosis in more difficult chest lesions and to use the cutting needle safely in selected cases.

The present study was conducted with an objective to correlate the CT findings of the lesions with pathological diagnosis.

MATERIALS AND METHODS

The study was conducted for a period of two years in the Department of Radiodiagnosis, V.S.S. Medical College, Burla, in collaboration with the Department of Chest and TB and Department of Pathology. All the patients who had plain radiographic diagnosis of chest mass or suspected chest mass on conventional radiography or a strong clinical

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Corresponding Author:
Dr. Manish Madan,
Flat No. 602, Tower-2, Z1, Apartments,
Raghunathpur, Bhubaneswar, Odisha.
E-mail: drmanishmadan@gmail.com
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suspicion of chest mass on chest radiographs were included for the present study.

A total number of 50 patients of various age groups who fulfilled the inclusion criteria were included for the present study after obtaining their informed consent. Relevant lab investigations and CT with Hitachi 3rd Generation with techniques varying per need of the specific lesion were performed. The CT diagnosis was made based on the size, morphology, margin, density, calcification and various other characters.

A CT guidance was used for FNAC/needle biopsy in most of the lesions because it helps to determine the best approach, demonstrate the relationship of vital structures to the lesion and indicates the depth of lesion. The position of the needle can also be confirmed before the biopsy.

RESULTS

All the subjects were between 15 to 65 years of age. Lung lesions constituted 52% and mediastinal lesion 48%. No pleural or chest wall mass was found.

CT Features	Type of Lesion			
	Tuberculosis	Hydatid Cyst	Aspergilloma	Malignancy
Character				
Predominantly solid	5	-	-	11
Predominantly cystic	1	4	2	3
Homogeneous	2	2	-	-
Non-homogeneous	4	2	2	14
Margin				
Smooth	-	2	1	-
Lobulated	2	-	-	5
Irregular	4	2	1	9
Contrast Enhancement				
Homogeneous	-	-	-	2
Non-homogeneous	3	1	-	10
Peripheral	-	3	-	-
Absent	3	-	-	2
Calcification	-	-	-	2
Air bronchogram	2	2	1	2
Lymph nodes	1	-	-	4
Pleural effusion	2	-	-	8
Mediastinal invasion	-	-	-	7
Chest wall invasion	-	-	-	2
Adjacent pleural thickening	2	-	-	2
Adjacent lung infiltration	3	-	1	4

Table 1. Distribution of Subjects Based on Computed Tomography (CT) Findings in Lung Lesions

Calcification was not seen in any of the four tubercular lesions in this study. CT value of tubercular lesions ranged from 10-78. Air bronchogram and/or adjacent lung infiltration was seen in 50% of the tubercular lung lesions.

Character	Type of Lesion						
Density	Tuberculosis	Hydatid Cyst	Germ Cell Tumour	Thymoma	Lymphoma	Epicardial Fat	Neurogenic Tumour
Solid	4	-	4	6	4	1	2
Cystic	-	-	3	-	-	-	-
Homogeneous	4	-	1	-	-	-	1
Non-homogeneous	-	-	6	6	4	1	1
Margin							
Smooth	2	-	4	4	1	1	1
Lobulated	2	-	2	2	2	-	1
Irregular	-	-	1	-	1	-	-
Contrast Enhancement							
Homogeneous	-	-	1	-	-	-	1
Non-homogeneous	-	-	5	3	2	-	1
Peripheral	1	-	-	-	1	-	-
Absent	1	-	1	3	1	1	-
Calcification	2	-	3	2	-	-	-
Pleural effusion	-	-	1	1	-	-	-
Lymph nodes	1	-	-	-	4	-	-

Table 2. Distribution of Subjects Based on CT Findings in Mediastinal Lesions

All the cases of tubercular mediastinal involvement presented as solid homogenous masses. Out of which, one was a dense calcific lesion attached to left cardiac border associated with adjacent pleural thickening. Rest of the three cases presented as bilateral hilar lymphadenopathy.

Fat and calcification was seen in all the cases of teratoma and thus easily diagnosed on CT.

Lesion	Radiographic Diagnosis			Histopathological Diagnosis		
	Correct	Inconclusive	Incorrect	Correct	Inconclusive	Incorrect
Lung						
Tuberculosis	2	2	2	2	2	2
Hydatid cyst	3	1	-	-	-	-
Aspergilloma	2	-	-	-	-	-
Malignancy	14	-	-	10	-	-
Mediastinum						
Tuberculosis	3	1	-	2	2	-
Hydatid cyst	-	-	-	-	-	-
Germ cell tumour	7	-	-	7	-	-
Thymoma	4	2	-	4	2	-
Lymphoma	4	-	-	3	1	-
Epicardial fat pad	1	-	-	1	-	-
Neurofibroma	2	-	-	2	-	-
Total	**42**	**6**	**2**	**31**	**7**	-

Table 3. Comparison between Radiographic and Histopathological Diagnosis

Radiological diagnosis was approached for 26 lung lesion and it was correct in 21 cases (80.76%). Histopathological diagnosis was approached for twelve cases and it was correct in 10 cases (83.3%). Radiological diagnosis was approached for 24 cases of mediastinal masses. It was correct in 21 cases (87.5%). Histopathological diagnosis was approached for 22 cases and it was correct in 17 cases (77.2%).

DISCUSSION

The present study included 50 patients with chest masses who presented to the Department of Radiology, V.S.S. Medical College Hospital, Burla. Among the study subjects, 35 were males and 15 were females. Majority of them were in the age group of 15-26 years.

It was observed that none of the benign lesions showed any calcification. Because of the excellent contrast resolution between air-containing bronchus and airless lung, air bronchogram was better demonstrated by computed tomography. It was seen in 36.67% of lung cancers in the present study. A study by Kuriyama et al has demonstrated air bronchogram in 72% of adenocarcinomas of the lung and have suggested that when an air bronchogram is detected, suspicion of malignancy should be high.[4] However, in the present study, 33% of the tubercular lung lesions also demonstrated air bronchogram.

In the present study, computed tomography showed additional features in all cases of primary carcinoma of the lung in the form of metastatic lymphadenopathy or mediastinal or chest wall invasion. Findings were similar like in other studies.[5]

Six cases of thymoma were evaluated. All of them presented with a solid, non-homogenous anterior mediastinal mass. Two cases of thymoma showed dense calcific ring. Two cases had associated clinical signs and symptoms of myasthenia gravis. The classical teaching is that roughly 50% of patients with thymoma have myasthenia gravis and 10-15% of patients with myasthenia gravis have an underlying thymoma.[6] Because of its noninvasive nature and highly accurate results, it is believed that CT should be imaging modality of choice following chest radiographs. When a thymic lesion is suspected, CT can differentiate between thymoma and thymic hyperplasia in a patient presenting with myasthenia gravis. Similar findings have been observed in various other studies.[7]

Based on the comparison of radiological and histological approach, radiological diagnosis was approached for 26 lesions. It was correct in 21 cases, inconclusive in 3 cases and was incorrect in 2 cases. Two incorrect cases had tuberculosis, which showed similar features as that of malignant lesions. Histopathological diagnosis was approached for 12 cases. It was correct in 10 cases (83.33%) and was inconclusive in 2 cases of tuberculosis. These findings were in correlation with the studies done by Zerhouni et al.[8]

Regarding mediastinal masses, radiological diagnosis was approached for 24 cases of mediastinal masses. It was correct in 21 cases (87.5%) and was inconclusive in one case of tuberculosis and 2 cases of thymoma. Histopathological diagnosis was approached for 22 cases. It was correct in 17 cases (77.27%) and was inconclusive in two cases each of tuberculosis and thymoma and one case of lymphoma. These findings were in correlation with the various other studies.[9,10]

CONCLUSION

CT diagnosis was correct in 80.77% cases of the lung, while it was inconclusive in 11.53% of the cases and incorrect in 7.6% of the cases. In mediastinal masses, CT diagnosis was correct in 87.5% of the cases and was incorrect in 12.5% of the cases. Histopathological diagnosis was correct in 83.3% of the cases of lung lesions and inconclusive in 16.67% of the cases. In mediastinal masses, histopathology was

correct in 73.68% of the cases and inconclusive in 26.32% of the cases.

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