

EVALUATION OF CHEST MASSES BY USING COMPUTED TOMOGRAPHY IN A TERTIARY CARE HOSPITAL, BURLA

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ABSTRACT

BACKGROUND

Thoracic diseases are common and include a wide spectrum of lesions involving distinct compartments, i.e. lung parenchyma, pleura, chest wall and mediastinum. 'Chest masses' is a vast topic and includes all the lung, mediastinal, chest wall and pleural tumour whether benign or malignant. Compared to other noninvasive techniques, Computed Tomography (CT) can better delineate the local extent of lung tumours as well as visualise the mediastinal nodes.

MATERIALS AND METHODS

Study was conducted in a tertiary care hospital, VSSMCH, Sambalpur, Burla. All 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

All the patients were in the age of 15-65 years. The incidence of benign lesion was maximum below the age of 35 years. All the malignant lesions were above the age of 45 years. Lung lesions constituted 52% of the cases, while mediastinal masses constituted 48% of the cases. Out of the lung lesions, 53.84% of the lesions turned out to be malignant, whereas 46.14% of the lesions were benign.

CONCLUSION

Majority of the lung lesions were malignant and tuberculosis was the commonest among the benign lesions. Among the mediastinal lesions, germ cell tumour was found to be the commonest lesion.

KEYWORDS

Chest Masses, Computed Tomography, Burla.

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BACKGROUND

Thoracic diseases are common and include a wide spectrum of lesions involving distinct compartments, i.e. lung parenchyma, pleura, chest wall and mediastinum. 'Chest masses' is a vast topic and includes all the lung, mediastinal, chest wall and pleural tumour whether benign or malignant.

Detailed clinical history and physical examination have a big role in the evaluation of chest masses. This is generally followed by radiological evaluation with Posterior Anterior (PA) and lateral chest radiograph, which together are an invaluable source of information about the nature and extent of lesions.¹

Computed Tomography (CT) is not a screening procedure in the evaluation of chest masses. In the majority

of cases, CT is called on for further investigation or classification of pathology already detected by conventional chest radiography. Only in a minority of cases, CT is primarily needed to detect suspected, but not demonstrated pathology, e.g. abnormal sputum cytology with normal chest x-ray, myasthenia gravis not responding to treatment, search for pulmonary metastases in melanoma or osteosarcoma.

Compared to other noninvasive techniques, CT can better delineate the local extent of lung tumours as well as visualise the mediastinal nodes. It is also useful for distinguishing vascular variants or benign processes of mediastinum such as lipomatosis from true pathological conditions.² CT also provides unsurpassed guidance to radiotherapy planning for unrespectable tumour and lung cancer staging. Hence, the present study was conducted with an objective to determine the role of computed tomography in defining the site, nature and extent of chest masses.

MATERIALS AND METHODS

The present study was conducted in the Department of Radiodiagnosis, V.S.S. Medical College, Burla, in

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collaboration with the Department of Chest and TB and Department of Pathology between August 2002 and July 2004. All the patients who had plain radiographic diagnosis of chest mass or suspected chest mass on conventional radiography or a strong clinical suspicion of chest mass on chest radiographs were included for the present study. A total number of 50 patients of various age groups have been studied. Relevant lab investigations and CT with Hitachi 3rd generation with techniques varying as per the need of the specific lesions were performed. The CT diagnosis was made based on the size, morphology, margin, density, calcification and various other characters.

RESULTS

Among the study subjects, 35 were males and 15 were females. Majority of the subjects belonged to the age group of 15-25 years.

Age (Years)	Patients	Percentage
15-25	15	30
26-35	12	24
36-45	3	6
46-55	9	18
56-65	11	22
Total	50	100

Table 1. Distribution of Study Subjects Based on Their Age

Site	Lesions	Percentage
Lung	26	52
Mediastinum	24	48
Pleura	-	-
Chest wall	-	-
Total	50	100

Table 2. Distribution of Study Subjects Based on the Masses in Chest

Among the study subjects, 52% had lung lesions and 48% had mediastinal lesions. No pleural or chest wall mass was found.

Type	Lesions	Percentage
Infective		
Tuberculosis	6	23.07
Hydatid cyst	4	15.38
Aspergilloma	2	15.38
Neoplastic		
Benign	-	-
Primary malignancy	12	46.15
Secondaries	2	7.6
Total	26	100

Table 3. Distribution of Study Subjects Based on Types of Lesions in Lung

As would be seen from the above table 3, 53.75% of the lesions in lung turned out to be malignant, while in 23.07% of lung nodules, tuberculosis was the cause.

Type	Lesions	Percentage
Infective		
Tuberculosis	4	16.67
Hydatid cyst	2	8.33
Neoplastic		
Germ cell tumour	7	29.16
Thymoma	6	25.00
Lymphoma	4	16.67
Neurofibroma	2	8.33
Other		
Epicardial fat	1	4.16
Total	24	100

Table 4. Distribution of Subjects Based on Types of Lesions in Mediastinum

Among the study subjects, majority of them had neoplastic lesion in mediastinum. Around 25% of them had infective lesions.

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 5. Distribution of Type of Lesion Based on CT Features

It was observed that 4 cases had tubercular involvement of mediastinum. One case had densely calcified lesion adjacent to the pericardium. CT scanning showed moderate adjacent pleural and pericardial thickening, which was not seen on conventional radiography and thus a diagnosis of tubercular involvement could be made. All the other cases presented with multiple mediastinal lymphadenopathy.

DISCUSSION

The present study was conducted in the Department of Radiology, V.S.S. Medical College Hospital, Burla. A total of 50 patients with chest masses were evaluated, of which 35 were males and the rest 15 were females.

In the present study, all the subjects were between 15-65 years of age group. The most common age group affected was found to be 15-26 years, in which 15 (30%) patients were found. The least common age group was found to be 36-45 years, in which only 3 (6%) patients were found. The findings were similar like other studies.^{3,4}

It was also found that, all the cases of tuberculosis (except one) and hydatid cysts were seen in below the age of 25 years. These findings were in correlation with studies done by Robertson et al.⁵ All the malignant lesions were seen in above the age of 45 years. This was similar to study conducted by Kuriyama et al.³

Based on the distribution of the masses in the chest, it was found that 52% of the lesions, i.e. 26 cases were found in the lung, and 48% of the cases, i.e. 24 cases were found in the mediastinum. It was also observed that, 46.14% of the lesions turned out to be benign, whereas 53.84% of the lesions were malignant. Similar findings were observed by Zerhouni et al.⁶

Among the infective cases, tuberculosis was observed as causative lesion in 4 cases, but no case of hydatid cyst was found. Among the neoplastic causes, germ cell tumour was found to be the most common cause. Of which, 7 cases were found corresponding to about 29.16% of the mediastinal masses. Similar findings were observed by Glazer et al.⁷

In the present study, it was observed that, CT value of all the benign lesions was found to be less than 100HU and none of the benign lesions showed any calcification. Robertson et al also did not find calcification in any of the benign lesions that they have studied.⁵ But, it was in contradiction with the study of O'Keefe et al who demonstrated presence of calcification in 50% of benign lesions on specimen radiographs.⁸

In the present study, all malignant lung lesions showed lobulated or irregular margins. 78.5% of the malignant lesions were solid and all of them demonstrated non-homogenous texture, because of necrotic material. These lesions showed speculation, lobulation and pleural retraction, which was similar like other studies.^{3,9}

Adjacent pleural thickening was seen in 14.28% of the malignant lesions of the lung and 16.67% cases of benign lesions. However, this criterion of tumour contiguity with the

pleura and the presence of pleural or pericardial thickening does not necessarily indicate pleural/pericardial invasion.¹⁰

In all the cases of germ cell tumour, CT scanning of the lesions showed unsuspected presence of fat and calcium, which was not seen on conventional radiography, thus highlighting the importance of CT examination in such cases. Similar findings were observed in other studies.^{7,11}

CONCLUSION

In the present study, lung lesions constituted 52% of the cases, while mediastinal masses constituted 48% of the cases. 53.84% of the lesions in the lung turned out to be malignant, whereas 46.14% of the lesions were benign. CT is useful in the distinction of pleural from parenchymal disease at an earlier stage and in determining the precise location and extent of pleural masses. Among the benign lesions, lung tuberculosis was the commonest. Among the mediastinal lesions, germ cell tumour was found to be the commonest lesions (29.16%).

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