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Original Research Paper

Radiology

ROLE OF COMPUTED TOMOGRAPHY IN EVALUATION OF MEDIASTINAL MASSES

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ABSTRACT Mediastinal masses span a wide histopathological and radiological spectrum, comprising of tumours (benign to extremely malignant), cysts, and lymph node masses. Present study was conducted to assess utility of CT scan in distinguishing between the different types of mediastinal masses, to illustrate diagnostic CT features and its association with histopathology findings.30 cases referred to the radiodiagnosis department with clinically suspected mediastinal masses at Vilasrao Deshmukh Government Medical College and Hospital, Latur were included over a one-year period (Feb 2021-Jan 2022). Majority cases were males (76.7%), with 31-45 years' age group being commonest (33.33%). In our study, anterior mediastinum was the most commonly involved compartment (n=17, 56.7%), followed by posterior mediastinum (n=7, 23.3%) and middle as well as superior mediastiunum (n=3, 13.3%) each.In the study, thymoma (n=5,29.4%) ,Ca. Esophagus(n=2,66.66%), Schwannoma (n=3,42.8%) and Ca Thyroid (n=2,66.66%) were the most common mediastinal masses in the anterior,middle, posterior and superior mediastinal compartments respectively. Majority masses were well-defined (70%), hypodense (86.7%) showing moderate (86.7%) and heterogenous contrast-enhancement (83.3%). All lesions were soft tissue attenuating. However, other attenuations like Calcification (33.3%), Fluid (26.7%) and Fat (10%) were also seen.were also seen.In 93.4% cases, CT diagnosis matched with histopathology. MDCT scan plays a substantial role in the evaluation of mediastinal pathology, regarding diagnosis, distribution pattern and mass effect on adjacent structures.

KEYWORDS : Mediastinal Mass, Computed Tomography

INTRODUCTION

Mediastinum is embyrologically complex, anatomically diverse and yet remarkably compact.It comprises a wide spectrum of tumours seen within the chest and remain an engrossing diagnostic challenge affecting people of all ages.
The aim of this study is to determine the accuracy of the diagnosis of mediastinal masses by Computed Tomography and to correlate its findings with histopathology. This study is based on illustrating the specific diagnostic CT features and its correlation with histopathology findings between the different types of mediastinal masses. The multitude of diseases affecting the mediastinum varies considerably, ranging from tumors (benign to extremely malignant), cysts, vascular anomalies, lymph node masses and mediastinal fibrosis.

Multi-detector computed tomography (MDCT) is useful in the investigation, specification, and demonstration of the stretch of a mediastinal mass. MDCT following administration of intravenous contrast medium with multi-planar reforms (MPR) provides an admirable assessment for defining the precise anatomical details and characterizing the nature, site and extent of the disease. Co-existing lung abnormalities and calcification within the lesions are better appreciated on CT.
The anatomical classification system aids to meticulously confine and characterize mediastinal lesions. Based on MDCT, the mediastinum is diverged as superior and inferior mediastinum. Inferior is further divided into anterior, middle, and posterior compartments. The present study was endured to analyze the MDCT peculiarities in the evaluation of mediastinal masses based on the anatomical classification.

METHODOLOGY

All cases referred to the radiodiagnosis department with clinically suspected mediastinal masses at Vilasrao Deshmukh Government Medical College and Hospital, Latur over a one-year period (Feb 2021-Jan 2022)

Sample Size: 30

Preparation Of Patient

Patients were kept nil orally 4 hrs prior to the CT scan to avoid complications while administrating contrast medium. Risks of contrast administration were explained to the patient and consent was obtained prior to the contrast study. Imaging was done with TOSHIBA equipment (AQUILON CXL 128 SLICE)

Technique

Routine anteroposterior topogram of the thorax was initially taken in all patients in the supine position. An axial section of 1 mm thickness was taken from the level of thoracic inlet to the level of adrenals. Pre-contrast study was followed by post-contrast study, image acquisition was done with intermittent suspended inspiration. For post-contrast study, 80-100ml of dynamic intravenous injection of Iohexol at a dose of 1.6 ml/Kg body weight was given and axial section were taken from thoracic inlet to the level of adrenal gland. Multiplanar reconstructions were made wherever necessary. The pre and post contrast attenuation values, the size, location of the mass, presence of calcification, mass effect on adjoining structures and others associated findings were studied.

RESULTS:

Computed Tomography had a significant role in the assessment of various mediastinal masses which were initially detected on chest radiographs. Maximum numbers of cases were seen in 4th to 6th decade and in males. Most common symptom is Cough.

In our study, involvement is common in anterior mediastinum (n=17, 56.6%) followed by posterior mediastinum (n=7, 23.3%) and middle as well as superior mediastiunum (n=3, 13.3%) each.

Table 1: Superior Mediastinal Lesions

Superior Mediastinum	Number	Percentage
Thymoma	1	33.33
Ca. Thyroid	2	66.66

Table 2: Anterior Mediastinal Lesions

Anterior Mediastinum	No of cases	Percentage
Thymoma	5	29.4
Thymic carcinoma	2	11.7
Lymphoma	4	23.5

Ca. lung with MLN	3	17.6
GCT	1	5.8
Teratoma	2	11.7

In the study, thymoma ,Ca. Esophagus, Schwannoma and Ca Thyroid were the most common mediastinal masses in the anterior,middle, posterior and superiormediastinal compartments respectively. Calcification is noted in 33.3% of cases. Schwannoma, Teratoma and Ca. Thyroid show calcification consistently. All the cases of teratoma show fat attenuation areas.Mass effect upon the adjacent mediastinal structures is observed in 65% of the cases and is predominantly noted upon the mediastinal vessels. All the cases were verified with histopathology and CT accurately predicts the diagnosis in 93.4% of cases.

Table 3: Middle Mediastinal Lesions

Middle Mediastinum	Number	Percentage
Ca. Oesophagus	2	66.66
Teratoma	1	33.33

Table 4: Posterior Mediastinal Lesions

	Number	Percentage
Schwannoma	3	42.8
Neuroendocrine Tumor	1	14.3
Ca of Oesophagus	1	14.3
Ganglionic	1	14.3

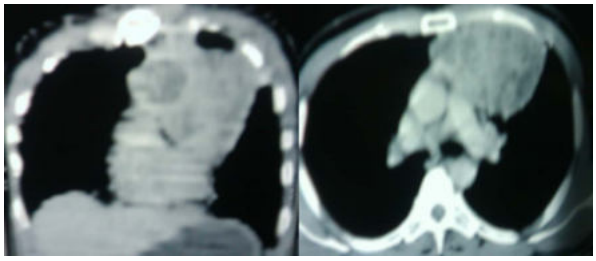

Figure 1: Thymoma:CT scan of thorax of different patients shows, lobulated, soft tissue attenuating mass appearing hypodense on non- contrast study . On post contrast study it shows heterogenous contrast enhancement.

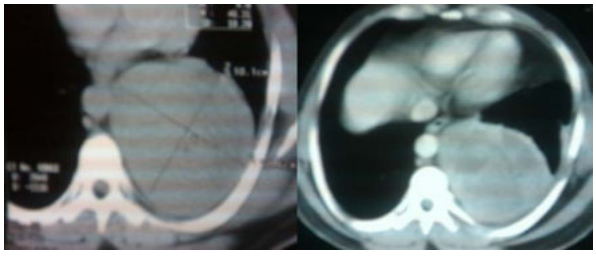

Figure 2: Schwanomma: Axial Non- contrast Ct scan shows an well defined, hypodense lesion in posterior mediastinum. Which on post-contrast study shows heterogenous contrast enhancement.

DISCUSSION:

The mediastinum is the extrapleural space amid the two pleural spaces within the thorax. It spreads out anteriorly from the sternum to the vertebral column posteriorly. The thoracic inlet forms the upper limit, and the diaphragm forms the lower limit.This study followed the CT based anatomical classification for mediastinum into superior,anterior, middle, and posterior compartments involving various anatomical structures in those compartments.Computed tomography imaging techniques have contributed significantly to the detection, characterization and staging of mediastinal masses. The initial detection of mediastinal masses can be achieved mainly by chest radiograph (Frontal and Lateral views) and once found, they can be localized, further characterized and staged by CT. In the present study, an attempt has been made to study the characteristics of various mediastinal masses.

In our study, anterior mediastinum was the most commonly involved compartment (n=17, 56.7%), followed by posterior mediastinum (n=7, 23.3%),middle and superior mediastiunum (n=3, 13.3%) each.In the study, thymoma (n=5,29.4%) ,Ca. Esophagus(n=2,66.66%), Schwannoma (n=3,42.8%) and Ca Thyroid (n=2,66.66%) were the most common mediastinal masses in the anterior,middle, posterior and superior mediastinal compartments respectively.

In our study of 30 cases, cough was the most common clinical symptom constituting 80% followed by dyspnea 53.3%, chest pain 23.3% and fever 16.6%.According to the Davis *et al.* study in 400 consecutive patients with mediastinal masses, chest pain constituted the most common symptom i.e. 30%, followed by fever 20%. Felson in 1978 in a series of 550 cases reported, there is no predilection for the masses to occur in the anterior mediastinum. But he reported more number of cases being seen in the anterior mediastinum followed by posterior and middle mediastinum. In our study, anterior mediastinum is most commonly involved in compartmental lesions (n=17,56.7%) followed by posterior mediastinum (n=7, 23.3%) and middle as well as superior mediastiunum (n=3,23.3%) each.

Our study is similar to the study conducted by Strollo et a1 in 1997 wherein anterior mediastinum constituted 50% of the masses. In our study, Thymoma (20%) being most common mediastinal mass. Neural tumors forms 20% of the cases and Schwannoma(10%) being most common neural tumor. In the similar studies conducted by Cohen *et al.* and

Davis *et al.* found thymic lesions as common mediastinal lesions. In a study by Chen *et al.* on 34 patients with CT diagnosis of thymic mass, thymoma constituted 91%, thymic cyst 2.9%. Whereas in our study, of the 8 patients with thymic mass, thymoma constituted 75% and thymic carcinoma constitute 25%. In our study majority of the masses are well defined (n=21, 70%), Hypodense (n=26, 86.7%) and show moderate (n=26, 86.7%) and Heterogenous contrast enhancement (n=25, 83.3%). All the lesions were soft tissue attenuating. However, other attenuations like Calcification (33.3%), Fluid (26.7%) and Fat (10%) were also seen. Mass effect on adjacent structures is seen in 70% cases.

CONCLUSION:

So we hereby conclude that CT is helpful in diagnostic information to facilitate the distinction of disease processes and tumors involving the mediastinum. In a specific clinical setting, variables such as attenuation, calcification, contrast enhancement, relationship to adjoining mediastinal structures, and related intrathoracic findings can be suggestive of a selected diagnosis.

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