

**Original research article**

# **Role of CT scan in characterization of mediastinal lesions and its correlation with histopathology report**

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## **Abstract**

**Background:** The mediastinum is a very intricate and fascinating part of the body. Mediastinitis, cysts, vascular abnormalities, lymph node masses, mediastinal fibrosis, and pneumomediastinum are just a few of the many disorders that can seriously impact the mediastinum. The purpose of the current investigation was to determine how a CT scan classified mediastinal lesions and how that information related to the histopathological report.

**Keywords:** CT, mediastinal pathology, contrast resolution; diagnosing mediastinal lesions

## **Introduction**

The mediastinum is a very intricate and fascinating part of the body. A wide range of illnesses, including tumours, cysts, vascular anomalies, lymph node masses, mediastinitis, mediastinal fibrosis, and pneumomediastinum, significantly influence the mediastinum <sup>[1]</sup>. Prior to the development of precise diagnostic tools, mediastinum lesions were either passively watched or treated with radiations. Later, it was believed that early surgery would help with the diagnosis and, if at all possible, would eliminate the mass <sup>[2,3]</sup>.

Conventional radiography is restricted in its sensitivity and capacity to distinguish the degree of mediastinal abnormalities and linkage of lesions to certain mediastinal structures, even if it can detectable abnormalities in many individuals with mediastinal pathology.

A mediastinal mass can be distinguished from normal mediastinal structures by CT, and its density, location, and distinction between vascular and avascular lesions can all be determined <sup>[4]</sup>. On a CT scan, it is easier to see coexisting lung abnormalities and calcification inside the lesions. It is helpful for separating genuine clinical disorders from vascular variations or benign illnesses of the mediastinum, such as lipomatosis. Mediastinal enlargement can have vascular or avascular origins, which can be distinguished by CT scanning <sup>[5]</sup>. Although they can occur in any mediastinal compartment, middle mediastinal regions are the most frequently affected by mediastinal lymph node abnormalities <sup>[6]</sup>.

There has been a decrease in the usage of various diagnostic chest procedures such as mediastinoscopy, tomography, and chest fluoroscopy since the invention of CT. The purpose of the current investigation was to determine how a CT scan classified mediastinal lesions and how that information related to the histopathological report.

## **Material and Methods**

Present study was descriptive, retrospective and prospective study, conducted in department of Radiodiagnosis, KMC, Manipal from Jan 2019 to Jan 2020.

## **Inclusion criteria**

- Patients of any age/gender, suspected to have mediastinal related complaints and referred to the Department of Radiodiagnosis for CT scan.

## **Exclusion criteria**

- Patient not consenting for study.
- Contraindication to contrast enhanced ct.
- Pregnancy, Renal failure, Hemodynamic instability.
- Allergy to intravenous iodinated contrast media.

After Requisition form requesting for CT THORAX (P+C) received, detailed clinical history along with clinical examination findings was recorded. The procedure was explained to the patient in detail and informed, written and valid consent as per the proforma was taken. Patient will be evaluated with the

help of philips brilliance 64-slice ct scanner and various radiologic characteristics of mediastinal lesion such as origin (thymic, neural, lymph nodal or vascular), CT enhancement pattern (homogenous/heterogeneous enhancement, peripheral enhancement or non-enhancing), density (solid, cystic, fatty), margin (well defined/ ill-defined), calcification, necrosis, invasion of surrounding structures were noted.

Data was collected and compiled using Microsoft Excel, analysed using SPSS 23.0 version.

## Results

In our study 88 cases were histologically verified out of which 80 cases showed finding consistent with CT findings, 8 cases showed different findings compared to CT findings. Out of these 8 cases one case was diagnosed as thymoma on CT, and showed features of invasive thymic carcinoma on histopathology. 4 cases which was diagnosed as tubercular lymphadenopathy appeared to be sarcoidosis on histopathology and two cases with CT diagnosis of tubercular lymph node was shown to be metastatic lymph nodes on histopathological examination. From above table, sensitivity of CT is 90.9% for diagnosing of mediastinal lesions which are confirmed by histologically.

**Table 1:** Statistical analysis

	Total (Mediastinal lesions)	Gold standard investigation	
		Consistent with CT finding	Not consistent with CT finding
Anterior mediastinum	58	52	6
Middle mediastinum	20	20	0
Posterior mediastinum	22	20	2
Total	100	92	8

## Discussion

Radiographic evaluation of the mediastinum has been widely used for investigating the location and the extent of the mediastinal lesions within the thorax. Clinically, a plain chest radiograph taken in two planes (PA and lateral) provides basic information on the location of a mediastinal lesion. Computed tomography or MRI (or both) will routinely complement the chest radiograph.

According to Sutton<sup>[3]</sup> anterior division lies in front of the anterior pericardium and trachea, the middle division lies within the pericardial cavity but including the trachea, and the posterior division lies behind the posterior pericardium and trachea. According to Felson<sup>[7]</sup> mediastinal compartments are ascertained from the lateral roentgenogram as follows: An imaginary line is drawn upward from the diaphragm long the back of the heart and front of the trachea to the neck. This divides anterior from middle mediastinum. A second imaginary vertical line connects a point on each of the thoracic vertebra 1 cm behind its anterior margin. This divides middle from posterior mediastinum.

In a similar to study Dubashi B *et al.*,<sup>[8]</sup> noted that 97% patients were symptomatic and 3% were asymptomatic. In present study, 92% patients were symptomatic and 8% patients were asymptomatic.

In present study, cough was the most common clinical symptom (50%) followed by Dyspnea and fever (20%), chest pain (15%). In study of 400 consecutive patients with mediastinal masses, Davis *et al.*,<sup>[9]</sup> noted that chest pain was most common symptom (30%), followed by fever (20%). Singh G *et al.*,<sup>[10]</sup> noted affection of males (61.1%) more compare to females (38.9%). Similar findings were noted in present study.

In our study, the majority of the mediastinum lesions were in the anterior mediastinum constituting (58%) followed by posterior (22%) and middle (20%) mediastinal compartment, which is similar to the study conducted by Devis *et al.*,<sup>[9]</sup> in 1987 wherein anterior, middle and posterior mediastinum constituted 54%, 20% and 26% respectively.

In our study on CT total 3 cases (50%) were diagnosed to be thymoma, 33.6% were thymic cyst, 16.6% were thymic hyperplasia. In a study done by Cohen *et al.*,<sup>[11]</sup> on 230 patients with CT diagnosis of thymic mass, thymoma constituted 55.4%, thymic cyst 19.6% and thymic hyperplasia 10.7%.

In our study, tuberculous, metastatic and lymphoma were the pathologies of nodal enlargement and they comprised 67.7%, 30% and 8% respectively of total cases of nodal lesions. In the study by Kumar A *et al.*,<sup>[12]</sup> tubercular lymph nodes constituted 34.3% of total mediastinal nodes, which is similar to our study (35%).

In our study 20 cases showed mediastinal lymph nodal enlargement, 18 had diagnosis consistent with CT findings. However in 2 cases CT and histological diagnosis did not match. 1 case diagnosed on CT as tubercular lymph nodes were found to be Hodgkin's lymphoma. And one case of lymphoma diagnosed on CT was found to be tubercular lymph nodes on histopathology.

CT Scan helps to differentiate mediastinal lesions based on their characteristic appearance like solid, cystic, fat density, calcification and enhancement pattern. Involvement of adjacent structures can be well demonstrated. Pulmonary, bony, hepatic, adrenal metastasis can be seen on CT thorax<sup>[13]</sup>.

CT helps to localize the lesion and can assess the extent of the lesion. It is able to characterize the

characteristics of lesion based their site, nature, enhancement. The additional role of CT in performing CT guided biopsies of lesions cannot be over emphasized.

## Conclusion

CT is indicated when the clinician suspected mediastinal pathology or diagnosed on plain chest radiographs and in patients who have normal chest radiographs yet there is clinical suspicion of mediastinal disease. CT is very useful in imaging the mediastinum because of its excellent contrast resolution; CT is able to identify normal mediastinal structures, vessels CT is highly sensitive imaging modality for diagnosing mediastinal lesions.

**Conflict of Interest:** None to declare.

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