



## COMPUTED TOMOGRAPHIC EVALUATION OF MEDIASTINAL LESIONS – A PROSPECTIVE CLINICAL STUDY

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### Abstract

Computed tomography (CT) has transformed the evaluation of mediastinal lesions, enabling superior tissue characterization and precise anatomical localization. This prospective study of sixty patients assessed the diagnostic yield, compartmental distribution, and histopathological correlation of mediastinal lesions using CT at a tertiary hospital, highlighting patterns unique to the regional population.

### Introduction

Computed tomography, pioneered by Godfrey Hounsfield in 1972, utilizes advanced digital geometry processing to generate three-dimensional images from two-dimensional X-ray slices. The mediastinum, an anatomically complex extrapleural chest space, is divided based on radiological and embryological features into superior and inferior compartments—facilitating differential diagnosis and guiding the assessment of mass lesions. CT provides far superior diagnostic power over traditional chest radiographs, especially in delineating the mediastinal extent of disease and structural origin of masses, with clear implications for clinical management and therapeutic planning.

### Review of Literature

Since its introduction, CT has revolutionized thoracic imaging. Early validation by Baron et al. (1981) revealed CT's ability to accurately detect etiologies of mediastinal widening on chest X-ray. Studies by Gale et al. (1974) and Ribet & Cardot (1994) have illuminated the epidemiology of neurogenic tumours, while research by Takeda et al. (2003) and Feigin et al. (1977) clarified cystic lesion patterns. Rosado-de-Christenson and colleagues established the strong association between thymic pathology and myasthenia gravis, guiding thymic evaluation protocols. Lymphomatous lesions remain a diagnostic challenge, though CT allows effective differentiation and mass effect analysis. Series from the region suggest higher prevalence of tubercular lymphadenopathy compared to Western cohorts, emphasizing the need for context-specific analysis.

### Methods and Observations

Sixty patients with suspected mediastinal masses (either clinically or by chest radiograph) underwent diagnostic CT at General Civil hospital Sector 6 Panchkula . The cohort included males and females

aged 5–90 years. Data collected encompassed demographics, symptoms, physical exam findings, and results from CT scans (both non-contrast and contrast enhanced).

Observational highlights include:

- Distribution: Anterior mediastinum was involved most frequently (38.3%), followed by posterior (16.7%), middle (13.3%), and superior mediastinum (11.7%). Multiple compartments were involved in 20% of cases.
- Nature: Majority of lesions were benign (61.6%), predominating in younger patients (31–40 years), while malignant lesions (38.3%) appeared more in the sixth decade.
- Symptomatology: Cough (53%) and dyspnoea (50%) were predominant, Indicating mass effect on airways.
- Tissue characteristics: CT revealed distinctive contrast enhancement profiles (heterogeneous in 58.3% of cases), variable patterns of calcification, and anatomical relationships impacting adjacent structures.
- Histopathology correlation: Most diagnoses were verified, with tubercular lymphadenopathy, metastatic lymphadenopathy, neural tumours, and vascular abnormalities among the most common findings.

## Results and Summary

- Tubercular lymphadenopathy (15%) was the single most common lesion.
- Anterior mediastinum was the most commonly affected compartment.
- Benign and malignant lesions demonstrated distinct age-related incidence.
- High accuracy of CT for tissue characterization, with 85% histopathological confirmation.
- CT imaging obviated the need for invasive procedures in vascular cases.

## Discussion

This study demonstrates the unique disease distribution in the local population, with higher prevalence of tuberculosis-related lesions compared to Western studies. CT imaging proved invaluable for compartmental location determination, tissue origin assessment, and preprocedural planning.

The difference in male-to-female ratio (1.1:1) may reflect sociological factors—female healthcare access and smoking-related disease exposures. Respiratory symptoms were more common locally, possibly due to aggressive tubercular or neoplastic involvement.

CT's role in guiding treatment is well illustrated: vascular, cystic, neural, and lymphomatous lesions were diagnosed non-invasively, expediting management. Anterior mediastinal masses remain the most frequent, and rim enhancement reliably signalled tubercular lymphadenopathy. Study limitations include moderate sample size and lack of advanced imaging (MRI, PET-CT) correlation.

## Conclusions

CT is the modality of choice for mediastinal lesion evaluation, especially in regions with tuberculosis prevalence. It provides nearly definitive tissue characterization, anatomical mapping, and guides the clinician toward optimal patient management

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