

ORIGINAL ARTICLE

Evaluation of Mediastinal Mass Lesions Using Computed Tomography and Correlation with Histopathological Diagnosis

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ABSTRACT

Introduction: The studies are not limited to xrays only in this modern radiological era. Since xrays have their own limitations, CT study has made things easier and handy. CT is very much useful in detailing the pathologies of mediastinal lesions. The advent of contrast in CT revolutionizes the evaluation of Mediastinal pathologies. CT also helps in studying in characteristics and nature of masses with involvement of adjacent structures. Additional role of CT scan is to take biopsy of mass lesions and then correlate the CT diagnosis with histopathological diagnosis

Material and methods: All the Patients referred in dept of radiodiagnosis, govt medical college and new civil hospital, Surat for clinically suspected mediastinal pathologies and suspected mediastinal lesions on chest X-ray undergone plane or contrast enhanced computed tomography scan (CECT) or both after proper counselling about the procedure and after taking the written consent. Prospective study of all 40 patients done from October 2017 to august 2018 and CT findings were correlated with histopathological diagnosis.

Results: In our study, anterior mediastinum was the most commonly involved compartment, followed by superior mediastinum, posterior mediastinum and middle mediastinum. Lymphoma and thymic lesions are most common lesions in anterior and superior mediastinum. Teratoma and metastatic lymphadenopathy in middle mediastinum and neurogenic tumour like schwannoma in posterior mediastinum. Out of 38 patients who undergone biopsy, histopathology report of 35 patients indicates same diagnosis as indicated by CECT (diagnostic accuracy 87.5%).

Conclusion: From the above results, we conclude that computed tomography definitely has a major role to play in evaluation of a mediastinal mass regarding the compartmental distribution, mass effect and provisional diagnosis which was correlated with histopathological diagnosis.

Keywords: Mediastinal Mass, Computed Tomography, Histopathological Diagnosis

INTRODUCTION

Computed tomography is festinating modality of producing x-rays which was introduced by Godfrey hounsefield in 1972. In this modern radiological era, the studies are not limited to xrays only. Since xrays have their own limitations, CT study has made things easier and handy. Whether it be the study of any part of body, CT indeed is helpful modality.

As far as mediastinum is concerned, diagnosing pathologies not possible by xrays alone. Since it is very complex part of our body, even minor details need to be evaluated for complete and perfect diagnosis, hence CT study either contrast or non contrast study.

This modality has revolutionized in diagnosing mediastinal pathologies by its capability of presenting the precise anatomical details and defining true charac-

terics and nature of lesions. This study basically done to evaluate the role of CT in evaluation mediastinal masses.

CT gives much more details of extent and involvement of disease. This also underlines the close cooperation with the histopathologist and the clinician in diagnosis and management.

Mediastinum is divided into various compartments by variety of methods. Most accepted method being felson's method of mediastinal classification. (anterior, middle, posterior and superior). Most of masses are lies in anterior mediastinum, lymphoma and thymic masses being most common. Sometime biopsy of lesion not possible, so radio or chemotherapy can be started on the basis of radioimaging of mass lesion if histopathological diagnosis can not be made in such circumstances.

MATERIAL AND METHODS

All the Patients referred in dept of radiodiagnosis, govt medical college and new civil hospital, Surat for clinically suspected mediastinal pathologies and suspected mediastinal lesions on chest X-ray undergone plane or contrast enhanced computed tomography scan (CECT) or both after proper counselling about the procedure and after taking the written consent. Prospective study of all 40 patients done from October 2017 to august 2018 and CT findings were correlated with histopathological diagnosis which is made by taking biopsy of lesions (either use guided or CT guided). CT scan was done on siemens somatom 16 slice machine with or without use i.v. contrast (urograffin 76%).

RESULTS

In our study, anterior mediastinum was the most commonly involved compartment, followed by superior mediastinum, posterior mediastinum and middle mediastinum. Lymphoma and thymic lesions are most common lesions in anterior and superior mediastinum. Teratoma and metastatic lymphadenopathy in middle mediastinum and neurogenic tumour like schwannoma in posterior mediastinum. Out of 38 patients who undergone biopsy, histopathology report of 35 patients indicates same diagnosis as indicated by CECT (diagnostic accuracy 87.5%).

On contrast enhancement, out of 40 patients, 4 cases show homogenous pattern, 34 cases show 34 heterogenous, 2 cases show nonenhancing. Out of 40 cases, 28 appear to be malignant and 12 appears to be benign.

Table 1: Age and sex wise distribution of the lesions

Age group	Male	Female
0-15	1	1
16-30	2	2
31-45	4	2
46-60	7	3
>61	14	4
Total Cases	28 (70%)	12 (30%)

Table 2: Distribution of superior mediastinal masses

Superior mediastinal masses	Cases (%)
Lymphoma	5 (33)
Thymoma	2 (13)
Thymic carcinoma	2 (13)
Goitre	2 (13)
Teratoma	2 (13)
Lung mass with superior mediastinal lymphadenopathy	1 (06)
Thyroid carcinoma	1 (06)

Table 3: Distribution of Anterior mediastinal mass lesion

Anterior mediastinal mass	Cases (%)
Lymphoma	9 (47)
Thymoma	3 (15)
Teratoma	2 (10)
Thymic carcinoma	2 (10)
Lung mass with mediastinal extension and lymphadenopathy	2 (10)
Other germ cell tumour like seminoma	1 (05)

Table 4: Distribution of middle mediastinal masses

Mediastinal Masses	Cases (%)
Lung mass with middle mediastinal lymphadenopathy	1 (14)
Mediastinal lymphadenopathy from other primary	1 (14)
Bronchogenic cyst	1 (14)
Aortic arch aneurysm	1 (14)
Teratoma	1 (14)
Oesophageal mass extending into middle mediastinum	1 (14)
Neurogenic tumour of posterior mediastinum extending into middle mediastinum	1 (14)

Table 5: Posterior mediastinal masses distribution

	Cases (%)
Schwannoma	3 (33.33)
Neuroblastoma	2 (22.22)
Oesophageal mass	1 (11.11)
Neuroendocrine tumour	1 (11.11)
Ganglioneuroma	1 (11.11)
Posterior mediastinal lymph from distant primary	1 (11.11)

Table 6: Pattern of contrast enhancement

Pattern	Cases (%)
Homogenous	4 (10)
Heterogenous	34 (85)
Nonenhancing	2 (5)

Table 7: CT Diagnosis

Diagnosis	Cases (%)
Lymphoma	10 (25)
Teratoma/Germ cell tumour	5 (12.5)
Thymoma	4 (10)
Thymic Carcinoma	3 (7.5)
Schwannoma	3 (7.5)
Other Neurogenic tumor	3 (7.5)
Lung with metastatic lymphadenopathy	2 (5)
Metastatic lymphnode from distant primary	2 (5)
Goiter with retrosternal extension	2 (5)
Oesophageal mass	2 (5)
Thyroid carcinoma	1 (2.5)
Aortic aneurysm	1 (2.5)
Bronchogenic Cyst	1 (2.5)

Table 8: Histopathology diagnosis

Mediastinal masses	Cases (%)
Hodgkin's lymphoma	6 (15)
Non Hodgkin's lymphoma	4 (10)
Thymoma	4 (10)
Teratoma	4 (10)
Thymic ca.	3 (7.5)
Schwannoma	3 (7.5)
Goitre	2 (5)
Neurofibroma	2 (5)
Metastatic lymphadenopathy from adenocarcinoma of lung	1 (2.5)
Metastatic lymphadenopathy from squamous cell carcinoma of lung	1 (2.5)
Metastatic lymphadenopathy from leiomyosarcoma of uterus	1 (2.5)
Metastatic lymphadenopathy from hepatocellular carcinoma	1 (2.5)
Thyroid carcinoma(papillary)	1 (2.5)
Leiomyoma of oesophagus	1 (2.5)
Adenocarcinoma of oesophagus	1 (2.5)
Ganglioneuroma	1 (2.5)
Neuroendocrine tumour	1 (2.5)
seminoma	1 (2.5)

THYMOMA-Nearly homogenous enhancing lesion with necrotic areas in it and was reported to thymoma and was proved to be the same histopathologically.

LYMPHOMA- Heterogenous enhancing lobulated mass with irregular contour with known enhancing areas of necrosis enhancing arch of aorta noted involving anterior and superior mediastinum. This lesion was reported to be Lymphoma which was proved as Hodgkins lymphoma with classical Reed Sternberg cell.

GERM CELL TUMOR- Large heterogenous enhancing anterior mediastinal mass extending into middle mediastinum with areas of fluid & fat attenuation noted and was reported to be germ cell tumor which came out as teratoma on histopathological correlation.

BRONCHOGENIC CYST- CT sagittal view suggests well defined non enhancing cystic lesion in right lower lobe adjacent to bronchus.

NEUROGENIC TUMOR- Heterogenous enhancing soft tissue lesion with evidence of calcification with few necrotic areas in it noted involving left posterior mediastinum paraspinally. The lesion was suspected to be neurogenic in origin and was proven histopathologically as schwannoma.

DISCUSSION

Computed tomography imaging techniques have contributed significantly to the detection, characterization and staging of mediastinal masses.



Figure 1: Thymoma

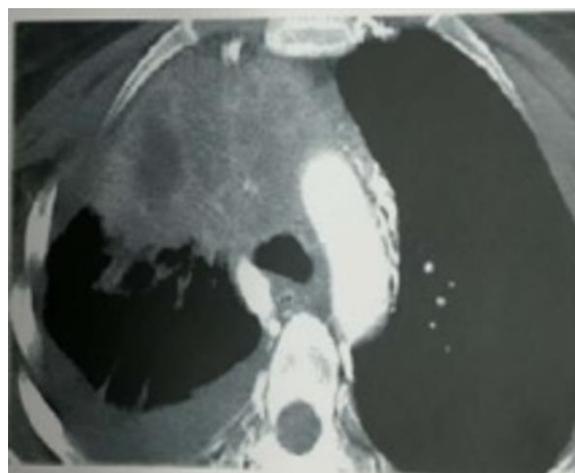


Figure 2: Lymphoma-

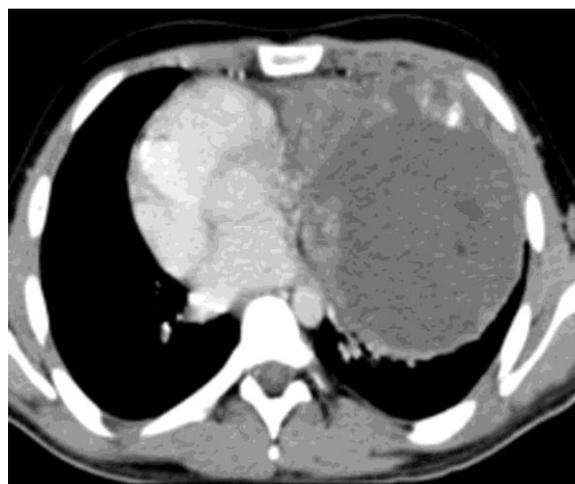


Figure 3: Germ Cell Tumor

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. However the main objective is to determine if the lesion is malignant or benign, as accordingly the further management depends.

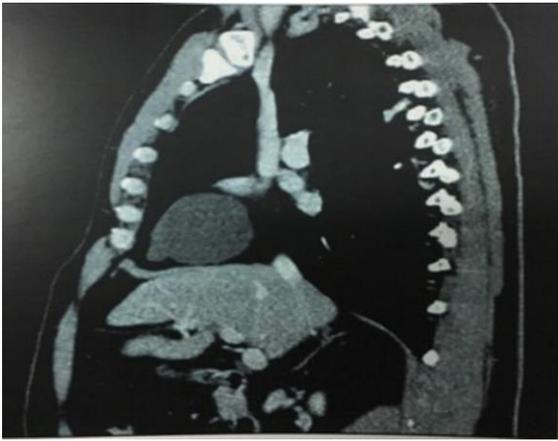


Figure 4: Bronchogenic Cyst

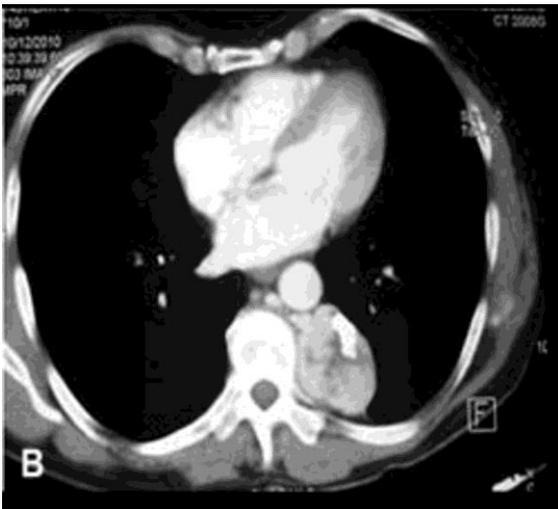


Figure 5: Neurogenic Tumor

In the present study, an attempt has been made to study the characteristics of various mediastinal masses and to correlate the CT findings with the histopathology findings.

Our study comprises a total of 40 patients from inpatient department and is conducted for a period of 2 years in the department of Radiodiagnosis, GMCS & New civil hospital, surat.

In our study anterior mediastinum was most commonly involve compartment as it is involved in 19 cases out of total 40 cases (47.5%). Out of it pure anterior mediastinal involvement noted in 10 cases (25%) and combined anterior & superior mediastinum noted in 8 cases (20%) and combined anterior & middle mediastinum involved in 1 case (2.5%).

Lymphoma is most common anterior mediastinum lesion with pure anterior mediastinal involvement noted in 5 cases (12.5%) and combined anterior & superior mediastinum noted involvement noted in 4 cases (10%). overall most common lesion involving anterior mediastinum is lymphoma as 9 out of all 40 cases (22.5%).

Second most common is Superior mediastinum which involved in 15 cases out of 40 cases (37.5%). Out of it pure superior mediastinal involvement noted in 7 cases (17.5%) and combined anterior & superior mediastinum involved in 8 cases (20%).

Lymphoma is most common lesion noted involving superior mediastinum as it is involved in 5 cases out of all 40 cases (12.5%). Pure superior mediastinal involvement in lymphoma noted in one case (2.5%) and combined anterior & superior mediastinum involvement noted in 4 cases (25%).

Most common mediastinum mass lesion that involved superior mediastinum purely are thyroid based (n=3) out of which 2 are goiter (benign entity) and one is thyroid carcinoma.

Posterior mediastinum noted involved in 10 cases out of 40 cases (25%). Purely posterior mediastinal involvement in 9 cases (22.5%) and combined middle & posterior mediastinal involved in 1 case (2.5%).

Most common posterior mediastinal mass are neurogenic tumors (n=6, 15%) out of which most common is schwannoma (n=3, 7.5%). Second most common is neurofibroma (n=2, 5%).

Middle mediastinum involved in 6 cases out of all 40 cases (15%) out of which pure middle mediastinal involvement noted in 4 cases (10%) and combined anterior & middle mediastinal involved in 1 case (2.5%) and combined posterior & middle mediastinal involvement in 1 case (2.5%).

In our study, the cases which were referred to department of Radio diagnosis suspecting Mediastinal masses were evaluated with Computed Tomography. The cases were analyzed in the following manner as discussed below:

In our study of 40 cases, cough was the most common clinical symptom constituting 28.5 % followed by dyspnea 27.1%, chest pain 22.8% and fever 4.4%.

In our study, isolated compartmental involvement is common in Anterior mediastinum (n=10, 25%) followed by posterior (n=9, 22.5%) superior (n=7, 17.5%) and middle mediastinum (n=4, 10%). However the anterior mediastinal is most commonly involved in trans-compartmental lesions (n=8, 20% and n=1, 2.5%). Therefore anterior mediastinum (n=19, 47.5%) was collectively the most common compartment involved, followed by superior mediastinum (n=15, 37.5%), posterior mediastinum (n=10, 25%) and middle mediastinum (n=6, 15%)

In our study, Lymph nodal masses formed majority of the cases with 35% and Lymphoma (71.4%) being most common lymph nodal mass. Thymus lesions form 17.5% of the cases and Thymoma being most common thymic mass. Neural tumors forms 15% of

the cases and Schwannoma being most common neural tumor.

CONCLUSION

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

In our study, isolated compartmental involvement is common in anterior mediastinum (n=10, 25%) followed by posterior (n=9, 22.5%) superior (n=7, 17.5%) and middle mediastinum (n=4, 10%). However the anterior mediastinal is most commonly involved in trans-compartmental lesions (n=8, 20% and n=1, 2.5%). Therefore anterior mediastinum (n=19, 47.5%) was collectively the most common compartment involved, followed by superior mediastinum (n=15, 37.5%), posterior mediastinum (n=10, 25%) and middle mediastinum (n=6, 15%).

All the cases were verified with histopathology and CT accurately predicts the diagnosis in 87.5% of cases.

So we conclude that computed tomography definitely has a major role to play in the evaluation of a mediastinal mass regarding the compartmental distribution, mass effect upon adjacent structure and provisional diagnosis.

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