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# A STUDY ON CLINICAL OUTCOME OF MEDIASTINAL TUMORS – A SINGLE CENTER EXPERIENCE OF 224 CASES IN 9 YEARS

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**ABSTRACT** A wide variety of tumors arise in the Mediastinum affecting people of all ages. Most of these tumors present asymptomatically as incidentallomas picked up on routine radiological investigation but many of them produce specific or nonspecific clinical features. We aim to study the incidence, clinical features, pathological types, surgical modalities and treatment outcome of 224 cases of mediastinal tumors operated consecutively over a period of 9 years in our center. The results were analysed and compared with the data available in the literature.

**KEYWORDS** : Mediastinal tumors, clinical presentation, pahological varities and surgical outcome

## Introduction

A wide variety of tumors arise in the mediastinum affecting people of all ages. Mediastinal tumors may be classified as congenital or acquired and primary or secondary. Primary tumors are less common than secondary. Most of these tumors present asymptomatically as incidentallomas picked up on routine radiological investigation but many of them produce specific or nonspecific symptoms and signs. 60% of patients may present with symptoms due to compression/direct invasion of surrounding structures or due to paraneoplastic syndromes. Since the mediastinum is a narrow space, tumors from there may compress adjacent vascular structures leading to life-threatening emergencies. With this background, we aim to study the incidence, clinical features, pathological types, surgical modalities and treatment outcome of 224 cases of mediastinal tumors operated over a period of 9 years in our center.

## Materials and Methods

Study period: 9 years (from August 2008 to July 2017).

Study design: Prospective study.

Study center: Rajiv Gandhi Government General Hospital, Madras Medical College, Chennai, India. The institutional ethical clearance was obtained before undertaking this study.

Study material: This study was conducted on 224 consecutive adult patients admitted in our center with confirmed mediastinal mass on radiological investigation (Digital chest X-ray, Computed tomography (CT) scan of chest and Magnetic resonance imaging (MRI) scan in certain cases) who were taken up for surgical procedure.

Inclusion criteria: All the patients of >12 years, whether symptomatic or asymptomatic with confirmed mediastinal mass on radiological investigation. Exclusion criteria: All patients ≤12 years and those >12 years, who were either unfit or unwilling for surgery.

Detailed history was taken from all patients regarding symptoms of mediastinal obstruction like dysphagia, dyspnoea, dysphonoea and swelling of face. Special attention was given to look for peripheral Lymphadenopathy (PLA), Horner's syndrome, superior vena-caval obstruction (SVCO), pleural effusion (PE), hepatosplenomegaly (HS), Myasthenia gravis and para-neoplastic syndrome (PNS).

Digital Chest X-ray, plain & contrast enhanced CT Chest and MRI scan chest (In selected cases), routine biochemical, haematological and serological tests were done in all cases. Tumor marker study, sputum for Acid Fast Bacilli (AFB), pleural fluid analysis, bronchial brushings for cytology, peripheral lymph node biopsy and CT guided needle biopsy were done in required cases. The tumors were approached either by median sternotomy or by thoracotomy and through Video-assisted thoracoscopy in a few cases. Surgical procedure ranged between complete curative resection in most cases with partial resection (tumor debulking) in others. A minimum of 6 months follow-up was done to assess the outcome of various treatment modalities. The results were tabulated and analysed.

## Results

The age range in our study on mediastinal tumors was between 13 to 71 years, with a mean age of 43.3 years. Out of the total 224 cases, 158 were males and 66 were females, with a male to female ratio of 2.4:1. Benign tumors account for 116 cases and malignant for 108 cases [Table 1]. Malignant tumors were found to be more common in the 4th & 5th decade.

**Table 1**
**Age range of benign and malignant mediastinal tumors with Sex Incidence**

| Age range (in years) | Male | | female | | Benign tumors | | Malignant tumors | |
|---|---|---|---|---|---|---|---|---|
| | NO. | % | No. | % | No. | % | No. | % |
| 13 to 20 | 14 | | 8 | | 22 | | 0 | |
| 21 to 30 | 28 | | 10 | | 34 | | 4 | |
| 31 to 40 | 40 | | 17 | | 13 | | 44 | |
| 41 to 50 | 37 | | 15 | | 14 | | 38 | |
| 51 to 60 | 27 | | 9 | | 16 | | 20 | |
| 61 to 70 | 11 | | 7 | | 16 | | 2 | |
| 71 to 80 | 1 | | 0 | | 1 | | 0 | |
| Total | 15 (70.54%) | | 66 (29.46%) | | 116 (51.79%) | | 108 (48.21%) | |

Clinical features were depicted in Table 2. 81 patients (36.16%) were asymptomatic and 143 patients (63.84%) were symptomatic at presentation. 4 out of 16 cases with SVCO needed emergency radiotherapy for acute dyspnoea [ histologically proven Non-Hodgekin's lymphomas (NHL)]. Myasthenic symptoms presented in 22 cases, out of which thymoma was noted in 8 cases. Horner's syndrome was noted in 4 patients out of which 2 cases were found to be bronchogenic carcinoma and 2 cases were squamous cell carcinoma of lung. 24 cases presented with PLA, fever and cough, out of which 18 cases were turned out to be lymphomas and 6 were tuberculosis. Cushingoid features were noted in 3 cases.

**Table 2**

| Clinical features | | | |
|---|---|---|---|
| **symptoms** | **No. of patients** | **signs** | **No. of patients** |
| cough | 40 | Horner's syndrome | 4 |
| Fever | 12 | Myasthenia signs | 20 |
| Weight loss | 22 | Signs of SVCO | 16 |
| Dyspnoea | 72 | PLA | 24 |
| Dyphagia | 8 | HS | 6 |

Chest x-ray showed mediastinal widening in most cases. CT and MRI chest confirmed the compartment of tumor origin and helped to identify various lesions in the mediastinum as depicted in Table 3 with histopathological reports of biopsied/excised specimens.

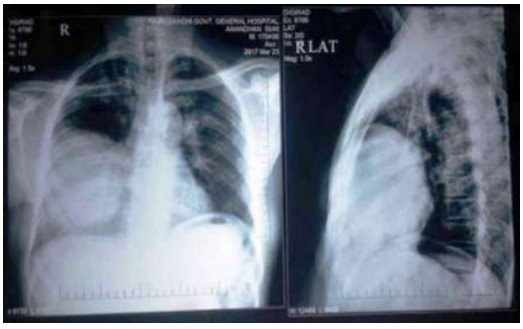


**Figure 1:** Digital chest x-ray showing Anterior Mediastinal mass in a case of Thymoma.

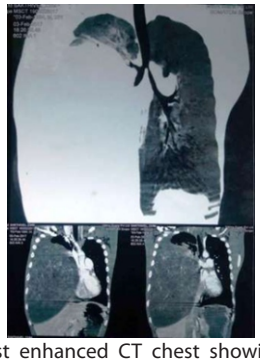

**Figure 2:** Contrast enhanced CT chest showing huge anterior mediastinal mass abutting the entire right hemithorax in a case of immature teratoma (germ cell tumor).

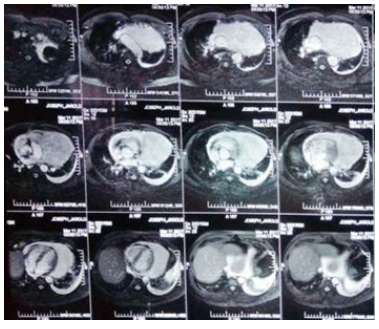

**Figure 3:** MRI scan of chest showing a large heterogenous mass lesion in the anterior mediastinum extending into middle mediastinum with pericardial effusion and mediastinal shift to right turned out to be a case of atypical carcinoid tumor arising from the thymus.

**Table 3**

| Mediastinal compartment → | Anterior | Middle | Posterior | Multiple compartments | Total |
|---|---|---|---|---|---|
| Tumor ↓ | N0. % | No. % | No. % | No. % | No. % |
| Thymoma | 42 | 0 | 0 | 3 | 45 (20.09%) |
| Lymphoma | 31 | 6 | 5 | 39 | 81 (36.16%) |
| Germ cell tumor | 10 | 0 | 0 | 0 | 10 (4.46%) |
| Metastatic Carcinoma | 7 | 0 | 0 | 0 | 7 (3.13%) |
| Neurogenic tumor | 0 | 0 | 62 | 2 | 64 (28.57%) |
| Enterogenous cyst | 0 | 3 | 2 | 2 | 7 (3.13%) |
| TB Lymphadenitis | 0 | 3 | 1 | 2 | 6 (2.68%) |
| Bronchogenic / squamous carcinoma of lung | 2 | 0 | 1 | 1 | 4 (1.79%) |
| Total | 92 (41.07%) | 12 (5.36%) | 71 (31.69%) | 49 (21.88%) | 224 (100%) |

Out of 224 cases, 123 cases were operated by median sternotomy approach, 94 by thoracotomy and 7 by VATS. Complete curative resection was possible in all the benign and 26 cases of malignant tumors. Only partial resection/ tumor debulking was possible in 82 cases of malignant tumors due to direct invasion into nearby vital structures. All patients with malignant tumors were subjected to adjuvant chemo/Radio Therapy by our oncology department. In 21 cases we tried neoadjuvant/Induction chemotherapy and/or radiotherapy to shrink the size of the tumor in order to make it feasible for complete surgical excision. A minimum of 6 months follow up was given to all the patients. Repeat chest X-ray and CT chest were taken at 3 months, 6 months and 1 year to look for recurrence.

## Discussion

Mediastinal tumors are relatively uncommon and constitute 3% of tumors within the chest. Our study of 224 cases with a mean age of 43.3 years (peak incidence in the 4$^{th}$ & 5$^{th}$ decade) is well comparable with other studies available in the literature [1, 3, 4, 6, 7, 13, 14, 15]. In series of studies by Wongsangiem et.al, Temes R et al, David et.al and Cohen AJ et al, the incidence of malignant tumors ranged between 25 -56%. In our study it was 48.21%.

In the present study, 63.84% were symptomatic at presentation, when compared to study done by Singh et al, (94.7%) [8] and Dubashi et al, (97%) [3] and others as 61-88% [1, 4, 5]. This reflects the fact that most of our patients visit the hospital only for their symptoms rather than for routine radiological examination.

The most common location of mediastinal tumors in our study was the anterior mediastinum (41.07%) which is comparable to other studies [1, 5, 8]. Thymoma was the commonest tumor in the anterior mediastinum [12, 13] followed by lymphoma and germ cell tumors. Neurogenic tumors constitute the most common among posterior mediastinal tumors (31.69%) in comparison with Adegboye et al, (22.9%) and David et al, (26%).

The tumours in the order of frequency of occurrence were lymphoma (36.16%), neurogenic tumors (28.57%), thymoma (20.09%), and germ cell tumors (4.46%). Lymphoma is the most common malignant tumor which is in comparison with the studies done by Vaziri et al., [4] and Adegboye et al., [5]. However, thymoma was the most common lesion in study done by Singh et al., [8] and Dubashi et al., [3]. Only 10% of lymphomas which involve the mediastinum are primary and majority are Hodgkin lymphomas (50-70%) [9, 10, 11,]. Non-Hodgekin's lymphoma (NHL) was more common in our study.

Among the 81 cases of lymphoma, 68 patients underwent adjuvant chemotherapy and showed marked clinical and radiological resolution. 6 patients refused treatment and 7 patients had irregular therapy and lost for follow-up. Death occurred in 7 cases of NHL, 7 cases of metastatic carcinoma and 4 cases of bronchogenic/ squamous carcinoma due to advanced disease and sepsis. 2 patients with thymoma and 3 patients with atypical carcinoid tumor in thymus received radiotherapy and chemotherapy respectively as the tumour was malignant and all of them were asymptomatic on follow up. Among the 10 cases of germ cell tumours, surgery was done for the benign mature teratoma in 8 cases and chemotherapy followed by surgery for 2 cases of malignant non-seminomatous tumour. All those cases were asymptomatic on follow-up and showed no recurrence.

## Conclusion

Malignant mediastinal tumors and huge anterior mediastinal masses were symptomatic at presentation. Lymphoma was the most common primary mediastinal tumor. Thymoma constituted the commonest benign anterior mediastinal tumor. Early

detection, comprehensive and integrated treatment strategy is the ultimate goal. Neoadjuvant/Induction chemo/radiotherapy helps in achieving curative surgical resection in most cases with better outcome.

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