

A Study of Clinical Characteristics of Mediastinal Mass

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ABSTRACT

Background: Mediastinal tumours are uncommon lesions encountered in clinical practice. There has been a significant increase in the incidence of malignant mediastinal tumours over the past four decades. The presentation varies from asymptomatic lesions detected incidentally on imaging to severe life threatening presentations.

Aim and Objectives: The study was conducted to assess the clinical characteristics, types, treatment modalities and outcome of mediastinal masses.

Materials and Methods: In this two year prospective study, a total of 35 cases with or without symptoms of mediastinal mass, confirmed by Computed Tomography (CT) imaging were included. The results were expressed as percentages or proportions.

Results: Maximum numbers of patients (25.71%) were seen

in the 3rd decade and majority (94.3%) was symptomatic at presentation. Malignant lesions (68.57%) were more common than benign (31.43%) and lymphoma was the commonest malignant tumour (50%). Mediastinal widening on chest X-ray was seen in 27 cases (77.14%), pleural effusion and lung mass in 5 cases each (14.29%). On CT imaging and sub-classification, anterior mediastinum was the commonest compartment involved (42.86%).

Conclusion: Mediastinal masses are usually symptomatic at presentation. Majority of the masses were malignant lesions and the symptoms of mediastinal obstruction was significantly higher in malignant lesions and anterior mediastinal masses. Lymphoma was the most frequent primary mediastinal mass and thymoma constituted the commonest benign anterior mediastinal tumour.

Keywords: Computed Tomography (CT), Lymphoma, Mediastinal mass, Thymoma

INTRODUCTION

Mediastinal masses include a wide variety of tumours afflicting people of all ages and remain an interesting diagnostic challenge. They may be congenital or acquired, which can be primary or secondary tumours. Secondary mediastinal tumours are more common than the primary tumours, and most frequently represent lymphatic involvement from primary tumours of lung or infra-diaphragmatic organs such as pancreatic, gastro-oesophageal and testicular cancer. Masses in the anterior mediastinum include thymoma, lymphoma, pheochromocytoma, germ cell tumours and parathyroid lesions. Masses in this area are more likely to be malignant than those in other compartments [1,2].

Mediastinal space is narrow; any mass arising from there will compress the adjacent structures leading to life-threatening emergencies. Symptoms at presentation are seen in 60% of the patients [3]. Symptoms are due to compression or direct invasion of surrounding structures or due to paraneoplastic syndromes. With this in background, the study was conducted to assess the incidence, to evaluate the clinical presentation, treatment modalities as well as outcome of mediastinal masses.

MATERIALS AND METHODS

This was a two year prospective study conducted on 35 patients from

Age range	Malignant tumours (%) n=24	Benign tumours (%) n=11
2 nd decade	2(8.33%)	1(9.09%)
3 rd decade	5(20.83%)	4(36.36%)
4 th decade	3(12.5%)	3(27.27%)
5 th decade	4(16.67%)	3(27.27%)
6 th decade	4(16.67%)	0
7 th decade	6(25%)	0

[Table/Fig-1]: Age distribution of benign and malignant mediastinal tumours

Kasturba Medical College Hospital, Manipal, India. The institutional ethical clearance was taken before undertaking the study. All the patients with confirmed mediastinal mass on CT imaging during the study period were included.

Inclusion criteria: All the patients above the age of 16 years, who were asymptomatic or presented with clinical signs and symptoms of mediastinal compression and who were found to have mediastinal mass on CT imaging.

Exclusion criteria: Patients below 16 years of age.

Methodology: Patients fulfilling the above criteria were enrolled in the study after taking an informed consent. A detailed history with special emphasis on symptoms of mediastinal obstruction like dysphagia, hoarseness, swelling of the face and dyspnoea was taken. All the patients were subjected to detailed examination to look for lymph node enlargement, Horner's syndrome, superior vena-caval obstruction, parasternal dullness, d'Espine's sign, pleural effusion and hepato-splenomegaly.

Chest X-ray, CT thorax, routine hematological, biochemical investigations, and serological test for HIV/ HbsAg were done in all cases. Other investigations included bronchial brushings for cytology, sputum cytology for Acid Fast Bacilli (AFB), pleural fluid analysis and biopsy for histopathological diagnosis. Patients were followed up for a period of 6 months to look for the outcome of various treatment modalities. Data was tabulated and expressed as percentages or proportions.

RESULTS

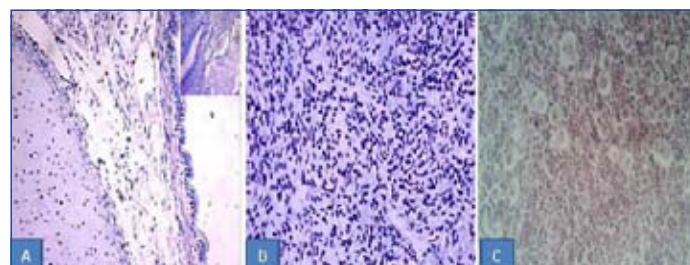
A total of 35 cases of mediastinal mass, confirmed by CT imaging were included in the study. The age range affected by mediastinal tumour was between 17 to 68 years, with the mean age of 45.4 years. [Table/Fig-1]. About 2/3rd of cases (24; 68.57%) were males and 11 cases (31.43%) were females, with a male to female ratio of 2.2:1.

Location	Thymoma	Lymphoma	Bronchogenic carcinoma	Germ cell tumour	TB Mediastinum	Metastatic	Total
Anterior mediastinal mass	6 (40%)	5 (33.33%)	2 (13.33%)	2 (13.33%)	0	0	15 (42.86%)
Middle mediastinal mass	0	1(25%)	0	0	2(50%)	1(25%)	4(11.43%)
Posterior mediastinal mass	0	0	0	0	1(33.33%)	2(66.67%)	3(8.57%)
Multiple compartments	0	6(46.15%)	5 (38.46%)	0	2 (15.38%)	0	13(37.14%)
Total	6	12	7	2	5	3	35

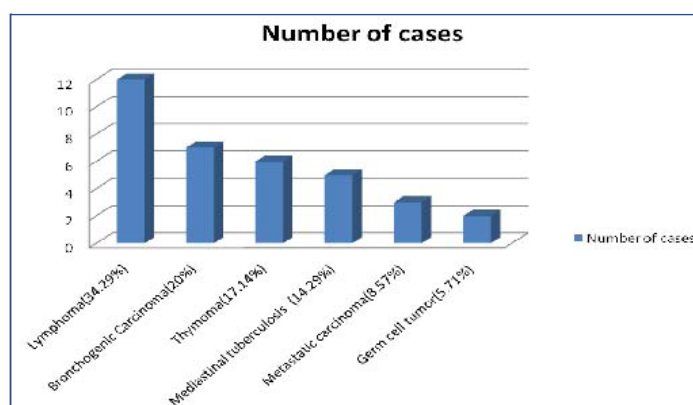
[Table/Fig-2]: Frequency of mediastinal tumours in different age groups



[Table/Fig-3]: (A)-CT showing encapsulated, multi-septated fluid density lesion in the anterior mediastinum measuring about 9.5 x 6.5 cms. (Teratoma) (B)-CT showing lobulated mass lesion measuring 12.5 x 7.5 x 6.6 cms in the anterior and middle mediastinum. (NHL) (C)-CT showing peripherally enhancing conglomerate lymph nodes with central necrosis in the midline and right paramedian region compressing superior vena-cava and encasing trachea. (Mediastinal tuberculosis)



[Table/Fig-4]: (A)- Teratoma: Lesional tissue showing cartilage with respiratory mucosa (H&E stain X100). [Inset: glial tissue with respiratory mucosa]. (B)- Spindle cell Thymoma (type A).Oval to spindle shaped epithelial cells arranged in fascicles (H&E stain X100). (C)- Nodular sclerosis type of Hodgkin's lymphoma. Lacunar type of Reed Sternberg cell seen amidst a background of lymphocytes and plasma cells (H&E stain X100).



[Table/Fig-5]: Types of mediastinal tumours

Cough and weight loss were the commonest symptoms seen in 20 cases (57.14%), followed by dyspnoea (16; 45.71%). Symptoms of mediastinal obstruction were present in 17 cases of which 14 (82.4%) were malignant and three cases (17.6%) were benign. In patients with mediastinal obstruction, 11 masses (64.7%) were located in the anterior mediastinum. Hoarseness of voice was the commonest symptom of mediastinal obstruction accounting for nine cases (52.9%), followed by dysphagia and superior vena-caval obstruction in seven cases each (41.2%). Bronchogenic carcinoma was the commonest cause of hoarseness of voice (44.4%). Myasthenic symptoms were seen in 50% of thymoma cases. Incidental detection of the tumour was found in one case each of thymoma and teratoma.

On general physical examination, 19 cases (54.29%) had significant generalized lymphadenopathy. All patients with Non-Hodgkin's Lymphoma (NHL) had cervical and axillary lymphadenopathy and 80% of cases with Hodgkin's Lymphoma (HL) had cervical lymphadenopathy. Waldeyer's ring involvement was seen in one patient with NHL. Among seven cases with supraclavicular lymphadenopathy, four had bronchogenic carcinoma and another three had metastatic carcinoma. Respiratory system examination findings were normal in nine cases (25.7%). Among cases with positive findings, parasternal dullness was the commonest finding

(16 cases, 61.54%), and six cases had positive d'Espine's sign. Abdominal examination revealed hepatomegaly in seven cases and splenomegaly in two cases.

Laboratory investigations suggested raised ESR of >100 mm/1st hour in 13 cases (37.14%). Chest X-ray showed mediastinal widening in 27 cases (77.14%) and two cases among them were asymptomatic; pleural effusion and lung mass was seen in five cases (14.29%) each. Mediastinal lymphadenopathy was noted in 27 cases on CT, among which twelve cases (44.44%) were lymphoma, five cases (18.52%) were Mediastinal Tuberculosis (TB), seven cases were bronchogenic carcinoma (25.93%) and three cases (11.11%) were poorly differentiated metastatic carcinoma. Various lesions on CT in mediastinum are depicted in [Table/Fig-2 and 3].

The specimen for histopathological diagnosis [Table/Fig-4] included mediastinal mass in 15 cases (42.85%), lymph node in 12 cases (34.29%), lung mass in five cases (14.3%), chest-wall mass in three cases (8.57%); and also pleural fluid and bronchial brushings in two cases (5.71%) each. About 2/3rd of cases were malignant (24; 68.57%) and benign tumours accounted for eleven cases (31.43%) [Table/Fig-5]. Among 12 cases of lymphoma, 7 were Hodgkin lymphoma (HL) and 5 cases were Non-Hodgkin Lymphoma (NHL). HL was more common in 3rd decade (4; 57.1%) and nodular sclerosis was the commonest histological subtype. Histologically, four NHL cases were diffuse large cell B type lymphoma and one case was lymphoblastic lymphoma. Among six cases of thymoma, five were benign. Germ cell tumours were seen in two cases and both were in the anterior mediastinum, of which one was benign mature teratoma and the other was malignant non-seminomatous tumour. Among seven cases of Bronchogenic carcinoma, four (57.14%) were adenocarcinoma, two (28.57%) were squamous cell carcinoma and one (14.29%) was small cell lung carcinoma.

DISCUSSION

Mediastinal tumours are uncommon and represent 3% of tumours seen within the chest. In our study, 35 cases of mediastinal mass confirmed by CT imaging were evaluated. Most of them were in the 3rd and 5th decade, with a mean age of 45.4 years and there was male predominance. This is in comparison with other studies as well

[2,4,5]. Malignant mediastinal tumours were more common than benign accounting for 68.57% of cases which is similar to study by Vaziri et al., (60%) [4]. In various series of study on mediastinal masses, incidence of malignant lesions ranged from 25-49% [6-8]. However, benign lesions were more common in study conducted by Adegbeye et al., (57%) [5] and Davis et al., (58%) [2]. This would reflect the increasing incidence of malignancy over the years. Other explanation for higher proportion of malignant cases would be the exclusion of pediatric age group and inclusion of secondary tumours in our study.

In the present study, 94.3% of the subjects were symptomatic at presentation, which is in comparison with study done by Singh et al., (94.7%) [9] and Dubashi et al., (97%) [3]. Several other studies reported the range of symptomatic presentation as 61-88% [2,4,5]. Higher incidences of asymptomatic cases were found in study by Vaziri et al., (12%) [4], Adegbeye et al., (22.9%) [5] and Davis et al., (38%) [2]. This observation may be due to the fact that many of our patients visit the hospital for their symptoms rather than for routine evaluation. As majority of our cases were malignant, this may reflect the fact that malignant tumours are more symptomatic than benign tumours [2,5].

Chest X-ray showed mediastinal widening in only 27 (77.14%) cases, the remainder had either other abnormalities (17.14%) or normal X-ray (2; 5.71%). As compared to Chest X-ray, CT scan is more accurate in detecting the mediastinal tumour. On CT imaging, the commonest location of mediastinal mass in our study was the anterior mediastinum (42.86%), and the results are comparable with other studies as well [2,5,9]. Thymoma (40%) was the commonest tumour in the anterior mediastinum, followed by lymphoma (33.3%). Middle mediastinal involvement was seen in 11.43% cases, which is comparable with other studies [5,9]. However, the incidence of tumour in the posterior mediastinum (8.57%) was much less in comparison with other studies by Adegbeye et al., (22.9%) [5] and Davis et al., (26%) [2]. This could be due to the lack of neurogenic tumours in our study. Multiple compartments involvement by malignant lesions is more commonly encountered due to local spread of tumour.

The tumours in the order of frequency of occurrence were lymphoma, bronchogenic carcinoma, thymoma, mediastinal tuberculosis, metastatic carcinoma and germ cell tumours. Lymphoma was the commonest mediastinal tumour (12; 34.28%), which is in comparison with the studies done by Vaziri et al., [4] and Adegbeye et al., [5]. However, thymoma was the most common lesion in study done by Singh et al., [9] and Dubashi et al., [3]. Only 10% of lymphomas which involve the mediastinum are primary and majority are Hodgkin lymphomas (50-70%) [10]. Accordingly in our study, HL and NHL were seen in 58.33% and 41.67% respectively. However, this is in contrary to the study done by Adegbeye et al., [5], where NHL was more common. This may be due to the inclusion of pediatric cases in their study. As per the literature, nodular sclerosing type was the commonest type of HL [11] and diffuse large cell B type was the most common among NHL [12]. Thymic tumours usually present with myasthenic symptoms and mediastinal obstruction [13-15]. Germ cell tumours least commonly affect the mediastinum, and are more common in the anterior mediastinum [2,5].

Mediastinal tuberculosis was seen in five cases in our study, isolated involvement of the mediastinum was seen in three cases (60%). All the cases were females, among which two were HIV positive. All were started on anti-tubercular treatment and showed good clinical improvement; though radiological resolution was seen in three patients among them. Isolated involvement of the mediastinum by tuberculosis is very rare in adults [16]. There have been very few case reports of adult mediastinal tuberculosis in the literature [17, 18]. It was reported that the mediastinal lymph nodes, being the most frequently affected nodes, comprise only 5% of tuberculosis

lymphadenitis cases [19]. The strikingly increased number (14.28%) of mediastinal tuberculosis in our study may be due to the fact that the disease is common in under developed and developing countries. Immunocompromised states like HIV infection is associated with increased frequency of mycobacterial infection, in general and lymph node in particular [20].

Among twelve cases of lymphoma, eight were treated with chemotherapy and two patients refused treatment. Those who received treatment showed marked clinical and radiological resolution. Death occurred in two cases of NHL due to advanced disease and sepsis. All cases of bronchogenic carcinoma were treated with chemotherapy or radiotherapy, of which only two showed significant clinical improvements and death occurred in two cases. Cases of thymoma in this series underwent surgery and one patient received radiotherapy as the tumour was malignant and all of them were asymptomatic on follow up. Among two cases of germ cell tumours, surgery was done for the benign mature teratoma and chemotherapy followed by surgery was the treatment modality for the malignant non-seminomatous tumour. Both the cases were asymptomatic on follow-up and showed no recurrence. All cases of metastatic carcinoma expired due to advanced disease.

CONCLUSION

Symptomatic presentations of mediastinal masses were more common in malignant lesions and anterior mediastinal masses. Though thymoma constituted the commonest benign anterior mediastinal tumour, lymphoma was the most frequent primary mediastinal mass. Early diagnosis by newer diagnostic techniques has greatly enhanced the accuracy of the preoperative diagnosis, and assessment of factors known to be associated with mortality should be identified in the comprehensive and integrated management of patients with mediastinal mass.

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