CLINICAL PROFILE OF MEDIASTINAL MASSES

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ABSTRACT

BACKGROUND

Mediastinal masses are relatively uncommon and continue to be an interesting diagnostic and therapeutic challenge to pulmonologists and thoracic surgeons. Mediastinal tumours represent 3% of tumours seen within chest. This study is chosen with an aim to assess the clinical profile of mediastinal masses.

AIM

To study the clinical, radiological, pathological and aetiological profile of mediastinal masses.

MATERIALS AND METHODS

This was a two-year prospective study conducted at Govt. Chest Hospital, Andhra Medical College, Visakhapatnam, Andhra Pradesh; 30 patients were enrolled into study who fulfilled the inclusion criteria. After detailed history and physical examination, the patients were subjected to various necessary investigations to arrive at aetiological diagnosis. Results were analysed as percentages and compared with other studies.

RESULTS

The mean age of presentation was 43.6 years with a male-to-female ratio of 3.16:1. Cough, chest pain and breathlessness were most common presenting symptoms. Pallor was the most common presenting sign; 80% of the cases were anterior mediastinal masses, 13% posterior and 7% were middle mediastinal masses; 70% of the cases were malignant and 30% of cases were benign. The most common aetiology was lymphoma (30% of cases) followed by lung cancer and thymoma. Other less common causes were teratoma, bronchogenic cysts, neurofibroma, mediastinal lipomatosis, synovial sarcoma, intrathoracic aneurysm and metastasis. In 2 cases, aetiology was not known.

CONCLUSION

Mediastinal masses are usually symptomatic at presentation. Malignant lesions were more common and they present with symptoms of mediastinal obstruction. Lymphoma was the most frequent primary mediastinal mass followed by lung cancer and thymoma.

KEYWORDS

Mediastinal Masses, Lymphoma, Thymoma, Teratoma.

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INTRODUCTION

Mediastinal masses are relatively uncommon and continue to be an interesting diagnostic and therapeutic challenge to pulmonologists and thoracic surgeons. Although, they tend to be more common in young and middle aged adults, numerous types of mediastinal tumours and cysts affect people of all age groups.¹ Mediastinal tumours represent 3% of chest wall tumours.² Mediastinum is defined as the thoracic space that lies between the two pleural cavities. It extends from the thoracic inlet cephalad to the superior surface of the diaphragm caudad.

The paravertebral areas (The costovertebral sulci) situated bilaterally are not truly within the mediastinum, but lesions arising within these regions are classically defined in medical literature as mediastinal in origin.² Since mediastinal space is narrow, any mass is likely to compress the adjacent structures leading to life-threatening emergencies, hence any suspicious mediastinal widening with symptoms of compression should be aggressively investigated.

In infants and children, the primary mediastinal masses in order of decreasing frequency are neurogenic tumours, germ cell tumours, enterogenous (Foregut) cysts, lymphomas, angiomas, lymphangiomas, thymic tumours, stem cell tumours, and pleuropericardial cysts. In adults the masses in decreasing order of frequency are thymomas and thymic cysts, neurogenic tumours, germ cell tumours, lymphomas, enterogenous cysts, pleuropericardial cysts. Recent studies indicate a change in the mix of mediastinal lesions in adults. There is a significant increase in the proportion of Lymphoma, whereas the proportion of other lesions has remained the same.

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In adults 65% of lesions arise in anterior mediastinum, 10% in middle mediastinum and 25% in posterior mediastinum.² This distribution is reversed in children.

Initial step in the evaluation of a mediastinal mass is CT thorax, primarily to localise the mass in one of the compartments and secondly for diagnosis of certain lesions like aortic aneurysm, pericardial fat pad, hiatus hernia where no further investigations are necessary. Other investigations like Fine Needle Aspiration Cytology (FNAC), Core Needle Biopsy (CNB) under image guidance, EBUS TBNA, EUS TBNA, IHC studies and biochemical marker studies have made early and accurate diagnosis a possibility in other conditions. The availability of these investigations made the more invasive procedures like mediastinotomy and mediastinoscopy less necessary.

This study is chosen with an aim to assess the recent trends in the incidence of various types of mediastinal masses, their clinical presentations, radiological characteristics and aetiopathological profile. It is conducted in the Govt. Chest Hospital, Visakhapatnam, Andhra Pradesh.

MATERIALS AND METHODS

This was a prospective study conducted over a period of two years at Govt. Chest Hospital, Andhra Medical College, Visakhapatnam, Andhra Pradesh; 30 patients were enrolled into the study who were above 12 years of age and who presented with clinical features of mediastinal compression and/or who were found to have mediastinal widening on CXR or mediastinal mass on CT chest imaging. After taking written informed consent, a detailed clinical history and physical examination was done. Routine haematological, biochemical tests, serological tests for HIV/HBS Ag, sputum for AFB staining, CXR P/A and lateral view and contrast enhanced computer tomography of chest were done in all cases. Other investigations like peripheral smear, pleural fluid analysis, cytology, cell block, peripheral lymph node FNAC and excision biopsy and fibre-optic bronchoscopy, FNAC/CNB of masses under ultrasound or CT guidance were done in relevant cases. In some cases Immune Histochemistry (IHC) studies were performed to confirm the diagnosis. Data were analysed as percentages and proportions.

RESULTS

The mean age of the study group was 43.6 years with range being 17-70 years; 50% of the mediastinal masses are identified in the third and fourth decade of life; 76.6% were males and 23.4% were females with a male-female ratio of 3.16:1. Cough was the most common presenting symptom (93.3%) followed by chest pain and breathlessness (83.3%); 13% (4/30) of the patients presented with features of Superior Vena Caval Obstruction (SVC O) and 3.3% (1/30) presented with bulbar palsy and myasthenic symptoms. Pallor was the most common (80%) physical finding observed followed by peripheral lymphadenopathy (50%), clubbing (40%) and facial swelling (13.3%). Among 15 patients with peripheral lymphadenopathy 10 had supraclavicular lymphadenopathy and 5 had axillary and inguinal adenopathy.

80% (24/30) were anterior mediastinal masses, 13% (4/30) were posterior mediastinal masses and 7% (2/30) were middle mediastinal masses (Fig. 1); 36.6% (11/30) of patients had associated pleural effusions, 20% (6/30) had associated pericardial effusions and 26.6% (8/30) had

associated mediastinal adenopathy. Among the laboratory parameters, anaemia was the most common abnormality found and the mean haemoglobin level was 8.1 gms% (4-15 gms%). Lymphocytosis in 4 cases and leukopenia in one case was observed in Non-Hodgkin's Lymphoma (NHL). Peripheral smear was normal in all cases of lymphoma. Among the 11 cases of pleural effusions, one was transudative effusion associated with lymphoma and 10 were exudative effusions. NHL was the most common cause of pleural effusion followed by bronchogenic carcinoma and invasive thymoma.

70% (21/30) of the cases were malignant and 30% (9/30) cases were benign lesion (Fig. 2). In most of the cases, diagnosis was confirmed by ultrasound or CT guided FNAC or biopsy/FNAC from supraclavicular lymph node. IHC markers supported the diagnosis in 4 cases of Lymphoma and in 2 cases of Thymoma. Imaging alone was the modality of investigation which confirmed cases like mature teratoma, aneurysm of ascending aorta and mediastinal lipomatosis; 9 of 30 cases were NHL, 8 of them located in anterior mediastinum. An equal incidence of lung cancer and thymoma (4/30-13.3%) were found, all of which were located in anterior mediastinum. Among four thymoma cases, 3 were malignant and 1 was benign. Out of 4 cases of bronchogenic carcinoma, 3 were small cell variety and one squamous cell variety; 2 cases of neurofibroma and 2 cases of bronchogenic cysts were diagnosed in post-operative specimens by histopathology. One case of metastasis from breast carcinoma and in one case aetiology was not known (Table 1).

Sl. No.	Case	Number (%)
1	Non-Hodgkin's Lymphoma	9(30%)
2	Lung Cancer	4(13.3%)
3	Thymoma	4(13.3%)
4	Teratoma	3(10%)

5	Retrosternal Thyroid Carcinoma	1(3.3%)
6	Mediastinal Lipomatosis	1(3.3%)
7	Synovial Sarcoma	1(3.3%)
8	Intrathoracic Aneurysm	1(3.3%)
9	Metastasis	1(3.3%)
10	Bronchogenic Cyst	2(6.6%)
11	Unknown Aetiology	1(3.3%)
12	Neurofibroma	2(6.6%)

Table 1: Aetiology of Various Mediastinal Masses

DISCUSSION

Mediastinum is the site of variety of lesions, ranging from inflammatory to neoplastic, benign to malignant and primary to metastatic lesions, many of which present as mediastinal masses. The mix of mediastinal lesions has been changing in the past five decades. Proportions of thymoma and lymphoma are on the rise and proportions of other lesions like congenital cysts or germ cell tumours have remained more or less stable. The present study involves 30 cases of mediastinal masses confirmed by radio imaging and their clinical, radiological and aetiological characteristics were analysed.

The mean age of the present study group was 43.66 ± 7.3 years with a range of 17-70 years; 50% of cases were present in the 3rd and 5th decades of life. In a study by Akshatha Rao Aroor et al³, the mean age of the study group was 45.4 years and most of them were in third and fourth decades, which were similar to our finding. Whereas in other studies by M. Vaziri et al⁴ and Karkis et al⁵, the mean age was 34 years with a range of 4 months - 80 years. This was in contrast to our study and this might be because of difference in age group of the study population. In the present study, majority were males who constituted 76.6% and females were 23.4% with a male-to-female ratio of 3.26:1. This finding was similar to other studies by Akshatha Rao Aroor et al³ and M. Vaziri et al⁴.

In the present study, all the cases were symptomatic and cough was the commonest symptom (20/30-93.3%), followed by dyspnoea (83.3%) and chest pain (83.3%). Symptoms of mediastinal obstruction were present in 66.6% of patients and dysphagia was commonest (10-33.3%), followed by hoarseness of voice (20%) and SVC O (13%). Myasthenia symptoms were seen in 25% of thymoma cases. These observations were similar to findings in other studies by Akshatha Rao Aroor et al³, Singh et al study⁶ and Dubashi et al⁷, except that myasthenic symptoms were seen in 50% of cases in Akshatha Rao Aroor et al³ study. Whereas in other studies by M. Vaziri et al⁴, Devis et al⁸, Cohen AJ et al⁹ and Adegboye et al¹⁰, 12-40% of the cases were asymptomatic which were identified incidentally on routine chest radiograph and only 60-78% of cases were symptomatic and their presentation was similar to the present study. This difference in observations could be due to the fact that many of the patients in present study visited the hospital for their symptoms rather than for routine evaluation. As majority of our cases were malignant, it reflects the fact that malignant tumours are more symptomatic than benign tumours.

The most common clinical signs in the present study were pallor (80%), peripheral lymphadenopathy (50%), clubbing of fingers and toes (40%), pedal oedema (33.3%) and facial swelling (13.3%), which was similar to other studies. In the present study 80% of the cases were located in anterior mediastinum, 13% cases located in posterior mediastinum and 7% cases located in middle mediastinum which was

similar to a study by Vaziri et al.⁴ In studies by Akshatha Rao et al³ and Strollo et al¹⁰ anterior mediastinal tumours were more common, but with slight variations in percentages.

Accurate diagnosis is important for the management of mediastinal masses. In the present study, USG/CT guided FNAC as well as CNB of anterior mediastinal masses and FOB with TBNA and IHC markers could diagnose 9 cases of NHL, 4 cases of bronchogenic carcinoma, 4 cases of thymoma, 1 case of retrosternal thyroid, 1 case of synovial sarcoma and metastasis in 1 case. Post-operative tissue biopsy confirmed the diagnosis as neurofibroma and bronchogenic cyst 2 each. No further investigations were done in 5 cases (Mediastinal lipomatosis, intrathoracic aneurysm of aorta and 3 cases of teratoma) since CT alone was sufficient in the diagnosis.

In the present study, 70% (21) cases were malignant and 30% (9) of cases were benign tumours which was similar to other studies by Akshatha Rao et al³ and Vaziri et al⁴, whereas in other studies by Adegboye et al¹¹ and Davis et al⁸ benign lesions were more common which might be because of inclusion of paediatric population in their study groups. Among malignant cases NHL was most common and this was similar to other studies by Akshatha Rao et al³ and Vaziri et al⁴ and Shrivastav et al.¹² In other studies like Cohen et al⁹, Davis et al⁸, Singh et al⁶ and Dubashi et al⁷ thymomas were most commonly followed by lymphomas and bronchogenic carcinomas. In Nasit et al¹³ study, the most common tumour was metastatic carcinoma (38%) followed by NHL.

In the present study, among 9 cases of NHL 4 cases were diffuse large cell B type lymphoma and 2 cases were lymphoblastic lymphoma and 3 cases were other NHL sub types, which was similar to a study by Akshatha Rao et al.³ In the present study, among the 4 cases of thymomas 3 cases were malignant and 1 case was benign. This was in contrast to the study by Akshatha Rao et al³, in which among 6 cases of thymoma 5 were benign and 1 case was malignant. In the present study, among 4 cases of bronchogenic carcinoma 3 cases were small cell type and 1 case was squamous cell type. In Akshatha Rao et al³ study, among 7 cases of bronchogenic carcinoma 4 were adenocarcinoma, 2 were squamous cell carcinoma and 1 small cell type.

In the present study, germ cell tumours were seen in 3 cases, of which 2 were benign mature teratoma and 1 was immature teratoma. In Akshatha Rao et al³ study, Germ cell tumours were seen in 2 cases and both were in the anterior mediastinum, of which 1 was benign mature teratoma and the other was malignant non-seminomatous tumour. In the present study, 2 cases of bronchogenic cysts were identified. One was located in middle mediastinum and another case in posterior mediastinum. In the present study, 2 cases of neurofibroma (6.6%) were identified and both were located in posterior mediastinum.

The present study highlights the importance of CT thorax in the initial workup of mediastinal masses, not only for localization but also for characterization of masses. Since most of the mediastinal lesions occur in anterior mediastinum and which can be sampled by FNAC or CNB under USG/CT guidance and so more invasive procedures like mediastinoscopy, mediastinotomy and thoracoscopy can be avoided. This when supported by IHC studies, the differentiation between thymoma and lymphoma becomes easier. Lesions like bronchogenic cyst and neurofibroma were

suspected by CT imaging, but surgical excision proved to be both diagnostic and therapeutic.

LIMITATIONS

1. Relatively small sample size was the main limitation.
2. Advanced investigations like EBUS-TBNA/EUS-TBNA could not be done because of lack of facilities.
3. After diagnostic evaluation, clinical course and treatment outcomes were not studied.

CONCLUSION

Mediastinal masses are usually symptomatic at presentation. Majority of the masses were malignant lesions and the symptoms of mediastinal obstruction were significantly higher in malignant lesions, especially in anterior mediastinal masses. Lymphoma was the most frequent primary mediastinal mass and teratoma constituted the commonest benign anterior mediastinal tumour. Early diagnosis by techniques like CT-guided FNAC/biopsy with IHC studies has greatly enhanced the accuracy of the preoperative diagnosis.

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