

Histopathological Spectrum of Mediastinal Lesions in a Tertiary Care Centre- a Two Year Retrospective Study

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Abstract

Background: Mediastinal lesions are infrequent with wide histopathological spectrum which poses diagnostic difficulty to pathologists, radiologists and clinicians because of the variations in symptoms, location and accessibility. This observational, hospital-based, single center, retrospective study was aimed to determine the common anatomical location of the lesions within the mediastinum, to study the age and sex distribution of mediastinal masses and to evaluate and to further shed light on histopathological spectrum of non-neoplastic and neoplastic mediastinal masses. **Methods:** Between January 2018 to December 2019, 85 cases of mediastinal masses were taken into consideration. All mediastinal biopsies fixed using 10% neutral buffer formalin, processed by paraffin tissue processing and stained with haematoxylin and eosin which were retrieved from archival data. All slides were studied in detail with respect of age, sex, anatomical location and histopathological morphology. The data was entered; tabulated and statistical analysis was performed by using Statistical Package for the Social Sciences (SPSS 22.0). **Results:** A total of 85 cases of suspected mediastinal masses were taken into consideration. Most of the lesions were located in anterior mediastinum. There was a significant male preponderance. Maximum number of cases occurred in 3rd to 5th decade. Out of 85 cases, 65 cases were neoplastic in nature (76%), 11 were non neoplastic (13%) and 09 remained inconclusive (11%). Benign and malignant cases were 34 and 31 cases each respectively (40% and 37%). **Conclusion:** As per this study, thymoma and lymphoma were found to be the commonest benign and malignant lesions respectively. Granulomatous inflammation was the most common non-neoplastic lesion.

Keywords: Lymphoma, Mediastinal mass, Neoplastic, Non-neoplastic, Thymoma.

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Introduction

The mediastinum is an extremely complex region of the human body [1]. Mediastinal lesions (MLs) are variable, ranging from tumors, cystic lesions, vascular anomalies, lymphadenopathy, mediastinitis, mediastinal fibrosis, to pneumomediastinum. Mediastinal lesions can develop from structures that are normally located in the mediastinum or that pass through the mediastinum during development, as well as from metastases of malignancies that arise elsewhere in the body [2]. MLs span a wide histopathological and radiological spectrum, including any mass, benign or malignant, infectious or reactive, and they could occur throughout lifespan [3]. The most frequent lesions encountered in the mediastinum are thymomas, neurogenic tumors (NTs) and benign cysts, altogether representing 60% of patients with MLs[4]. Age-related differences of tumor biology, host characteristics, or treatment protocol exist in MLs. Histopathological distribution, location, symptomatology and prevalence of malignancy are different between adult and pediatric populations [5]. Age distribution and clinical features, together with their anatomic location from the mediastinum provide important diagnostic information for MLs.

The diagnosis is complex and often requires tissue sampling including percutaneous mediastinal biopsies, computed tomographic (CT) and ultrasonographic (US) guidance, transbronchial needle aspiration (TBNA) [conventional and endobronchial ultrasound (EBUS) guided], which is an effective technique that takes bronchoscopic sampling beyond visible abnormalities, endoscopic ultrasound (EUS)-guided needle aspiration, which enables excellent lymph node evaluation mainly of the lower mediastinum, mediastinoscopy, which is considered the gold standard by which all other methods are evaluated, and finally open surgical biopsy if necessary [6].

In view of this, the current observational, hospital-based, single center, retrospective study was aimed to determine the common anatomical location of the lesions within the mediastinum, to study the age and sex distribution of mediastinal masses and to evaluate and to further shed light on histopathological spectrum of non-neoplastic and neoplastic mediastinal masses.

Method

Cases were obtained from the files of a single institution Vydehi Institute of Medical Sciences and Research Centre, Bangalore, Karnataka. A total of 85 cases with MLs were retrospectively reviewed between January 2018 to December 2019. Clinical data concerning gender distribution, age at presentation, Compartment wise Distribution of Lesions in Mediastinum, Distribution of Non-Neoplastic Lesions, Distribution of Neoplastic Lesions Benign lesions and Distribution of Non-Neoplastic Lesions malignant lesions were retrieved from the medical records. We arbitrarily defined patients (adolescents) as < 20 years of age, and adults as ≥ 20 years of age. The patients were categorized into eight different age groups: (10-20 years), (21-30 years), (31-40 year), (41-50 year), (51-60 year), (61-70 year), and (71-80 year) of age. Written informed consent was previously obtained from each patient and/or guardians according to the guidelines of the Declaration of Helsinki.

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The study protocol was performed in accordance with the principle of the declaration of Helsinki and after approval by the Institutional ethical review board. All mediastinal biopsies fixed using 10% neutral buffer formalin, processed by paraffin tissue processing and stained with haematoxylin and eosin which were retrieved from archival data. Hematoxylin and eosin-stained sections from routinely fixed, paraffin-embedded tissues were examined. Histopathological diagnosis was established according to the morphological and immunohistochemical evaluations. Data obtained were classified into different groups on the bases of histopathological classification of the MLs.

Statistical analysis

The data was entered; tabulated and statistical analysis was performed by using Statistical Package for the Social Sciences (SPSS 22.0). Data had been summarized as mean for numerical variables and count and percentages for categorical variables.

Results

During a period of twenty four months from January 2018 to December 2019, 85 patients were enrolled in our study. Maximum of the study participants were male (65%), whereas remaining 35% were females. Maximum of the study participants belonged to the age range of 51-60 years (26%), whereas, only 1 participant belonged to 71-80 age range.

Table 1: Distribution of sex among the study patients

Sex	No of cases	% of cases
Male	55	65%
Female	30	35%
Total	85	100%

Gender-specific distribution of MLs has been shown in above Table 1. The male gender was found to be predominant in our study group. Around 65% and 35% of cases belonged to males and females respectively.

Table 2: Distribution of age of lesions among the study patients

Age	No of lesions	% of cases
71-80	01	01%
61-70	10	12%
51-60	22	26%
41-50	16	19%
31-40	15	18%
21-30	12	14%
10-20	09	10%
Total	85	100%

Age-specific distribution of MLs has been shown in above Table 2. A total of 85 cases ranged from 10 to 80 years. The 85 study patients included 9 cases of (10-20 years) age group. The 76 adult patients included 12, 15, 16, 22, 10 and 01 case from the groups of 21-30, 31-40, 41-50, 51-60, 61-70 and 71-80 of age, respectively.

Table 3: Compartment wise Distribution of Lesions in Mediastinum

Compartment	No of cases	% of cases
Anterior	56	66%
Middle	04	5%
Posterior	10	11.5%
Superior	5	6%
Unknown	10	11.5%
Total	85	100%

In the current study, the number of cases fell into four known compartments named as anterior compartment, middle compartment, posterior compartment and superior compartment. In our study, we recorded maximum cases in the anterior compartment (n=56, 66%). The least recorded cases were noted in middle compartment (n=4, 5%), Table 3.

Table 4: Distribution of Non-Neoplastic Lesions

Diagnosis established	No of cases (11/85 cases)	% of cases: 13%
Granulomatous inflammation	4	05%
Reactive lymphadenitis	4	05%
Thymic cyst	1	1%
Chronic non specific inflammation	1	1%
Sinus histiocytosis –lymphnode	1	1%

Non-Neoplastic Lesions-specific distribution of diagnosis of MLs has been shown in above Table 4. Out of 85 cases, diagnosis was established in only 11 cases (13%). Each of four cases was diagnosed with Granulomatous inflammation and Reactive lymphadenitis. Whereas, one each case of Thymic cyst, Chronic non specific inflammation and Sinus histiocytosis –lymphnode was diagnosed in the present study.

Table 5: Distribution of Neoplastic Benign lesions

Diagnosis established	No of cases (34/85)	% of cases: 40%
Thymic lesions	20	23%
Schwannoma	6	8%
Goitre	3	4%
Mature cystic teratoma	2	2%
Benign cystic lesion	1	1%
Ganglioneuroma	1	1%
Lymphangioma	1	1%
Total	34	

Neoplastic Benign lesions-specific distribution of diagnosis of MLs has been shown in above Table 5. Out of 85 cases, diagnosis was established in only 34 cases (40%). Maximum cases (23%) were diagnosed with Thymic lesions, which was followed by 8%, 4% and 2% of Schwannoma,

Goitre and Mature cystic teratoma diagnosis, respectively. Whereas, one each case of Benign cystic lesion, Ganglioneuroma and Lymphangioma was diagnosed in the present study.

Table 6: Distribution of Neoplastic malignant lesions

Diagnosis established	No of cases (31/85)	% of cases: 36%
Lymphomas	6	7%
Papillary thyroid carcinoma	2	2%
Thymic carcinoma	1	1%
Malignant spindle cell tumor	2	2%
Malignant carcinomatous deposit	8	10%
Unclassified malignancy	8	10%
Poorly differentiated carcinoma	2	2%
Suspicious for malignancy	2	2%
Total	31	

Neoplastic malignant lesions-specific distribution of diagnosis of MLs has been shown in above Table 6. Out of 85 cases, diagnosis was established in only 31 cases (36%). Maximum cases (10%) were diagnosed with Malignant Carcinomatous deposits and Unclassified malignancy, which was followed by Lymphomas (7%).

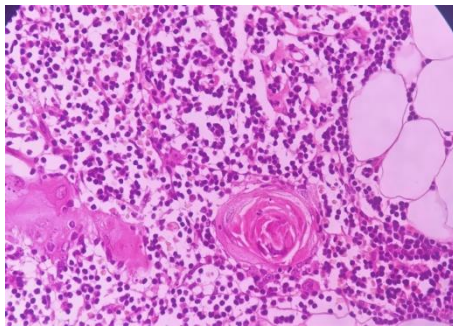


Fig 1: Figure showing Thymofibrolipoma (H&E, 10X) in one of the patients

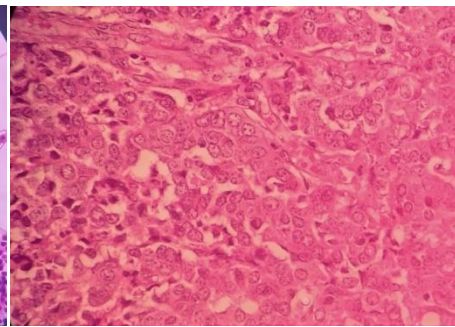


Fig 2: Figure showing Thymic carcinoma (H&E, 10X).

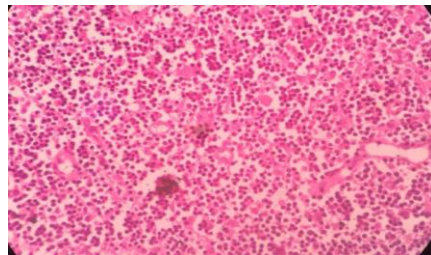


Fig 3: Figure showing Non Hodgkin's Lymphoma(H&E, 10X).

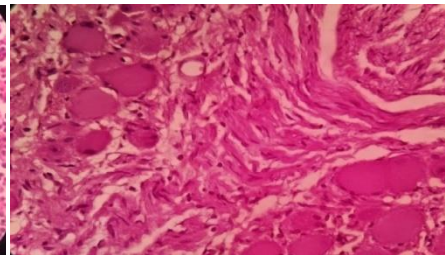


Fig 4: Figure showing Ganglioneuroma (H&E, 40X).

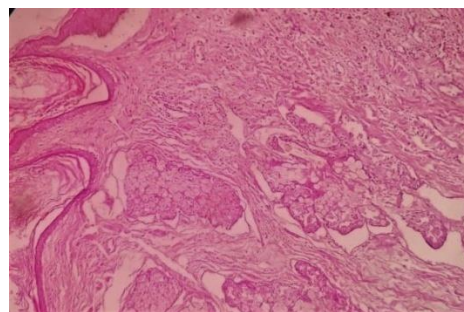


Fig 5: Figure showing Mature cystic teratoma (H&E, 10X).

Discussion

In this study, we retrospectively reviewed 85 patients with MLs in a single Indian institution. Adult cases were around 90% more than teenage cases. There were no pediatric cases. As reported previously, [7] the MLs showed male gender predominance. This considerably high incidence of males is likely related to the high proportion of

NTs, lymphoid lesions, mesenchymal tumors and GCTs, which preferentially occur in males. We enrolled 85 patients; other similar studies such as Devi et al, Karki and Chalise, Aroor et al, and Dixit et al enrolled 20, 27, 35, and 144 patients, respectively, and the last one was carried out over 8 years. The majority of our patients were men, and this was in agreement with Devi et al, Karki and Chalise, Aroor et

al, and Dixit et al [8-11]. In Karki and Chalise [9], most of the cases were localized in the anterior mediastinum. In Dixit et al [11] in 95 (68.3%) cases, the anterior mediastinum was affected, in 23 (16.5%) cases, the middle mediastinum was affected in 11 (2.5%) cases and the posterior mediastinum was affected in 10 (7.1%) cases, two or more than two compartments of the mediastinum were simultaneously affected, whereas in our current analysis, mediastinal lymphadenopathies were the primary lesions, especially at subcarinal sites, followed by anterior mediastinal masses in 25 cases and middle mediastinal masses in 13 cases [12, 13]. Primary thymic neoplasms, and lymphomas were the most common tumours in mediastinum, nearly 50% of all mediastinal masses were anterior mediastinal tumours, which included thymic cysts, thymomas, a case of thymic lipoma, teratoma, thymic hyperplasia. Colloid goiter of thyroid each and lymphomas. In the middle compartment lesions, we encountered were mostly lymph nodal metastatic deposits, whereas in the posterior mediastinum neurogenic tumours were more common [14]. Mediastinal lesions are rare entities and data regarding their clinical and pathological features are limited. Further studies with larger sample size are required to enrich our knowledge regarding the enigmatic mediastinal masses.

Conclusion

Our study demonstrated that age spectrum influenced the histopathological distribution and the clinical presentation in MLs in Indian series of patients. Such differences should be considered in the differential diagnosis and therapeutic approach for adult and pediatric patients with MLs. Furthermore, our study was comparable to the literature in terms of MLs frequencies.

Ethical approval

The study was approved by the Institutional Ethics Committee

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