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Histopathological study of mediastinal lesion in a medical college-3 years study

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Abstract
Background: It is very important to know about Histological pattern, incidence in relation to age, sex and location of mediastinal lesions for better outcome of patients. This will help the clinicians in both treating the patient and determining the outcome of the disease process.
Material and method: The material for the study was collected from the in patients being admitted in N.H.L. Medical College, V.S. Hospital Ahmedabad affiliated with Gujarat University. Data was collected in pretested proforma.
Results: Total 35 cases of mediastinal lesions were studied. The data according to age incidence, sex incidence, location, nature of the lesion and clinical symptoms was prepared and analyzed. Most common lesion was thymic follicular hyperplasia (26%) followed by Mailgant thymoma (23%). Maximum number of cases were found in 1st & 5th decade (23% in each decade) which were followed by fourth decade. Anterior mediastinum was the commonest to be involved in present study (comprising of 66% of lesions).
Conclusion: Most common lesions are thymic lesion (including benign/malignant thymoma, thymic hyperplasia, Cystic lesion, and neurogenic lesion and Germ cell tumor. Benign lesions were more common (74%) than malignant lesion and have better prognosis.

Keywords: Mediastinal lesions, benign, malignant, prognosis

Introduction
Mediastinum is the portion of the thoracic cavity located between the pleural cavities, extending anteroposterior from the sternum to the spine and sagitally from the thoracic inlet to the diaphragm [1]. The numerous organs and structures it contains make it a veritable Pandora's Box, within which congenital cysts, benign tumors and malignant neoplasms may develop [1]. About half of the patients with mediastinal cysts and tumors are asymptomatic, the lesions being discovered incidentally on chest x-ray films or CT scans done for other reasons. When symptoms develop, they usually result from compression and/or invasion of adjacent structures, and include chest pain, cough, and dyspnea. Development of the superior vena caval syndrome is usually indicative of malignancy, the two most common causes in adults being metastatic lung carcinoma and malignant lymphoma and in children malignant lymphoma and acute leukemia. However, it can also occur with benign conditions such as fibrosing mediastinitis [1].
Core needle and fine needle aspiration of mediastinal masses has been used increasingly and successfully, particularly in lesions of the anterosuperior compartment[1].The location of lesions in the mediastinum, together with their configuration, provides important diagnostic information, but many lesions (both benign and malignant) result in similar radiographic and CT scan appearances. Exploration is therefore mandatory in most instances [1]. Hence histopathological report is required to stamp the perfect diagnosis of mediastinal lesions. The present study involves 35 cases which presented with mediastinal lesions.

Material and Methods
35 cases of mediastinal lesions were studied. Specimens were received in histopathology department, N.H.L. Medical College, V.S. Hospital affiliated with Gujarat University, Ahmedabad. Each case was individually studied and analysed, taking into consideration following features:
1) Clinical history
2) Location within mediastinum
3) Radiological diagnosis

4) Relevant Laboratory parameters
5) Histopathological findings

Data considering age of patient, sex, clinical history consisting of history of cough, chest pain, dyspnea, fever, backache, muscle weakness or whether asymptomatic presentation was noted. Radiological diagnosis was done by X – ray and CT scan findings. Specimens were received in formalin. The gross examination of each specimen included documentation of size, shape, weight, consistency and appearance of cut surface, especially with regard to the presence of hemorrhage, necrosis and cystic spaces etc. All the specimens were preserved in 10% formalin overnight for fixation. For histopathological study, adequate numbers of sections were taken from different sites according to the size of specimen. While in case of small biopsy specimen the whole specimen was processed.

The representative sections were subjected for processing on automatic tissue processor. After processing the section were embedded in paraffin, cut with microtome and stained with Hematoxylin and Eosin stain.

Bony tissues were subjected to decalcification using 5% HNO_3 and subjected to histopathological process. Special staining procedures like ZN stain were done as and when required. Histopathologically the pattern and type of microscopic findings were studied. Cases were reported as benign or malignant lesions with specific subtypes.

Results

35 cases of mediastinal lesions were studied. The data according to age incidence, sex incidence, location, nature of the lesion and clinical symptoms was prepared and analyzed.

Table 1: Distribution of mediastinal lesions according to age (decades) in present study (2013)

	0-10	11-20	21-30	31-40	41-50	51-60	61-70	Total Cases	Percentage of cases (%)
Benign thymoma				1	1	1		3	8
Malignant thymoma			1	3	3		1	8	23
Thymic cyst				1				1	3
Thymic hyperplasia	1	1	1	2	3	1		9	26
Chronic mediastinitis						1		1	3
Ganglioneuroma	1							1	3
Pleuropulmonaryblastoma	1							1	3
Bronchogenic cyst	3		1					4	11
Empyema thoracis							1	1	3
TB Pericarditis					1		1	2	5
TB Lymphadenitis						1		1	3
Schwannoma						1		1	3
Reactive node	1							1	3
Benign cystic teratoma	1							1	3
Total	8	1	3	7	8	5	3	35	100%
Percentage of all lesions distributed age-wise (%)	23	3	8	20	23	15	8	100%	

In the present study most common lesion was thymic follicular hyperplasia (26%) followed by Mailgant thymoma (23%). Maximum number of cases were found in 1st & 5th decade (23% in each decade) which were followed by fourth decade.

Thymomas which are macroscopically encapsulated & microscopically no capsular invasion are included in stage I thymoma. (According to modified Masaoka system 2001) [1] All stage I thymoma corresponds to benign thymoma and all others to malignant thymoma [1].

Results of the present study are compared with following studies

1. Dr. Karki S. *et al*. studied 27 cases of mediastinal lesions in Nepal from April 2009 to November 2010.
2. Mohammad Vaziri *et al*. studied 105 cases of mediastinal masses in Iran from 1999 to 2003.
3. Dr. Chandra Shrivastava *et al*. did a clinicopathological analysis of mediastinal lesions on 106 patients in India from January 1993 to June 2003.
4. Dr. Jitendra Nasit *et al*. studied 50 cases having anterior mediastinal lesions in India from 2006 to 2011.
5. M. Petkar *et al*. studied 39 cases having cystic lesions in mediastinum in Kuwait from 1979 to 2000.
6. Kazuo Nakagawa *et al*. studied 130 cases of thymoma in Japan from 1962 to 2000.

Table 2: Comparision of age incidence

Age group (decades)	Present study (2013) (%) of cases Sample size: 35	Karki S. *et al*. (2011) [23] (%) of cases Sample size:27	Mohammad Vaziri *et al*. (2009) [24] (%) of cases Sample size: 105
First decade	23	7	4
Second decade	3	19	18
Third decade	8	11	27
Fourth decade	20	15	13
Fifth decade	23	19	21
Sixth decade	15	22	7
>60 yrs	8	7	10
Total	100	100	100

Variation of different age groups involved in different studies may be attributable in part to less sample size and hence may not be reflective of true prevalence rates in the community.

In the present study mediastinal lesions were more common in males (54.29%); in males age range was 6 months to 65 years. Females comprised of 45.71% of cases & age range was 16 days to 55 years. Male to female ratio in present study was found to be 1.19:1.

Table 3: Comparision of percentage distribution of lesions according to compartment

	Present study (2013) (%) of cases Sample size: 35			**Chandra Shrivastava *et al*.(2006) [25] (%)of cases Sample size: 106**		
	Ant.	**Mid.**	**Post.**	**Ant.**	**Mid.**	**Post.**
Thymic lesions*	87.1	0	0	54	0	0
Lymphomas	0	0	0	25	92.3	
Germ cell tumors	4.3	0	0	18.4	0	0
Neurogenic tumors	0	0	66.7	1.3	0	88.2
Cysts**	4.3	44.4	0	1.3	0	11.8
Endocrine tumors	0	0	0	0	0	0
Others***	4.3	55.6	33.3	0	7.7	0
Total	100	100	100	100	100	100

*****includes benign and malignant thymomas & thymic hyperplasia

** includes thymic and bronchogenic cysts

*** includes chronic mediastinitis, TB pericarditis, TB lymphadenitis, reactive lymphnode, pleuropulmonaryblastoma, lung abscess with empyema thoracis & mesenchymal tumors

According to present study most common lesion in anterior compartment was thymic lesion comprising of 87.1% of all anterior mediastinal lesions which is comparable with other studies.

Most common lesion in middle mediastinum was bronchogenic cyst comprising of 44.4% of all middle mediastinal lesions which is comparable with the study done by Davis RD *et al.* [26].

In the study done by Davis *et al.* anterosuperior mediastinum was the most commonly involved site of a primary cyst or neoplasm (54%), followed by the posterior mediastinum (26%) and the middle mediastinum (20%) [26].

Most common lesion in posterior mediastinum was neurogenic tumors comprising of 66.7% of all posterior mediastinal lesions which is comparable with the study done by Chandra Shrivastava [25].

In case of a tumor or mass growing and involving more than one compartment, predominant anatomical compartment involvement has been taken into account.

Anterior mediastinum was the commonest to be involved in present study (comprising of 66% of lesions) which is comaparable with karki S. *et al*. (2011) [23] (Comprising of 70% of lesions).

Table 4: Comparision of clinical symptoms

Symptoms	**No. of patients (present Study 2013)**	**Present study (2013) (%) of cases Sample size: 35**	**Mohammad Vaziri *et al*.(2009) [24] (%) of cases Sample size: 105**	**Chandra Shrivastava *et al*. (2006) [25] (%) of cases Sample size: 106**
Cough	11	31	40	67
Chest pain	15	43	28	84
Dyspnoea	21	60	41	59
Fever	11	31	14	-
Weight loss	8	23	20	83
Muscle weakness	6	17	-	34

In present study most common clinical symptom was dyspnea (60%) which was followed by another non-specific symptom chest pain (43%). Results are comparable with the study done by Mohammad Vaziri *et al*. [24]

In present study benign lesions were more common (26 cases 74%) than malignant (9 cases 26%) and ratio of beign to malignant lesion was almost 3:1.

In present study, malignant lesions were most common in 4th & 5th decade (33.3% in each decade). Malignant lesions were most common in anterior mediastinum (88%). Most common lesions were thymic lesions (57%) which are comparable with studies done by Chandra Shrivastava *et al* & Karki S. *et al*.

In present study anterior mediastinal lesions were most common in 4th & 5th decade (30% in each decade) which is not comparable with other study because of small sample size. Most common anterior mediastinal lesion was thymic follicular hyperplasia (39.1%) which was followed by malignant thymoma (35%). Results are not comparable with other study because of small sample size.

In present study most common cystic lesion was bronchogenic cyst comprising of 66% lesions.

Table 5: Comparision of incidence of different thymomas

	No of cases (Present study 2013) Sample size: 11	**% of total thymic neoplasms (Present study 2013)**	**% of total thymic neoplasms (Kazuo Nakagawa *et al.* 2003) [29] Sample size: 130**
Type A	0	0	14
Type AB	2	18	43
Type B1	1	9	12
Type B2	4	37	22
Type B3	2	18	9
Type C	2	18	0
Total	11	100	100

In present study most common thymomas was type B2 comprising of 37% of all thymomas. In the study by Kazuo *et al*, AB thymomas showed highest (43%) number and B2 type thymomas were second highest (22%).

Discussion

Total 35 cases of mediastinal lesion were studied and analyzed benign lesions were more common (26 cases 74%**)** than malignant (9 cases 26%) and ratio of benign to malignant lesion was almost 3:1. Males showed higher incidence of mediastinal lesions than females (M: F Ratio was 1.19:1). Anterior mediastinal compartment was most commonly involved (66% of cases). Most common lesion in anterior mediastinum was thymic neoplasm (including benign & malignant they were 48% of all anterior mediastinal lesions). Most common lesion in middle mediastinum was bronchogenic cyst (44% of all middle mediastinal lesions). Most common lesion in posterior mediastinum was neurogenic tumors (67% of all posterior mediastinal lesions). Most common presenting symptom was dyspnoea (in 60% of cases) followed by chest pain (43%). Benign lesions were more common (74%) than malignant lesions. Malignant lesions were most common in 4^{th} & 5^{th} decade (8% of total cases in each decade) & in anterior mediastinum (23% of total cases). Most common benign lesion was thymic follicular hyperplasia (34.7% of all benign lesions). Most common malignant lesion was malignant thymoma (88.8% of all malignant lesions).Most common cystic lesion was bronchogenic cyst (66% of all cystic lesions). Most common type of thymoma was type B2 (37% of all thymomas).

Conclusions

We studied incidence of various lesion**,** incidence in relation to age, sex and location in the mediastinum, histological pattern of various lesions. A CT scan can label anterior mediastinal mass as thymic lesion which can range from benign thymoma to malignant thymoma. A lymphadenopathy reported in CT scan can be either a reactive process or else can be a highly malignant lesion like lymphoma or metastatic lesion, So even with newer modalities like CT scan and MRI, histopathological diagnosis is a must to ultimately diagnose a mediastinal lesion

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