SURGERY FOR MEDIASTINAL DISEASES

ZAHOOR AHMAD KHAN, AMIR BILAL, SHAHKAR AHMAD SHAH AND MOHAMMAD ISRAR

Department of Cardiothoracic Surgery,
Postgraduate Medical Institute,
Lady Reading Hospital, Peshawar.

SUMMARY

146 patients of mediastinal pathology were operated upon in cardiothoracic unit, Govt. Lady Reading Hospital Peshawar. Ages ranged from 5 years to 67 years with mean age of 36.3 years. Male to female ratio was 90 to 56 respectively. Ninety nine had diagnostic anterior mediastanotomy, 47 had therapeutic procedures which were (i) antero lateral thoracotomies 17 (ii) median sternotomy 22 (iii) cervical collar incision 5 (iv) cervical collar and sternotomy 3. All patients had x-rays but only 42 had CT scan. The diagnostic group of 99 patients had tuberculosis (24), sarcoidoses (3), lymphoma (55) and carcinomas (17). Histology break up of 47 therapeutic cases was (i) Goitres 8 (ii) Thymomas 29 (iii) Thymic cyst 3 (iv) Dermoid 4 (v) pleuro pericardial cyst 1 (vi) malignant thymomas 2. Mortality was 4.7% i.e. 7 cases out of 146 died. Morbidity was in the form of 7 air leak (4.7%), 9 wound infection (6.16%) and haemorrhage 2(13%).

INTRODUCTION

Mediastinam is an important and complex part of the thorax. This study was conducted with a view that at present day and age, no mediastinal pathology should be treated without tissue diagnosis. In 1893, Bastianelli resected the manubrium and removed a dermoid cyst from anterior mediastinum.[1] In 1897 Milton[2] first working with cadavers and later with goats, devised sternal splitting approach specifically to avoid entering into the pleural cavities.

The mediastinum is divided into superior and inferior compartments. Anteriorly it is bounded by sternum and posteriorly by vertaberal column. An imaginary line starting from manubrium anteriorly and drawn posteriorly to 4th thoracic vertebra divides mediastinum into superior and inferior compartments. The inferior compartment is divided by the pericardium into three compartments. Lying anterior to pericardium is antrior mediastinum and posterior to pericardium is posterior mediastinum. The pericardium and heart forms the middle madiastinum. The lateral boundries of the mediastinum are formed by mediastinal pleura.

MATERIAL AND METHODS

Present study is a retrospective study of 146 cases of mediastinal diseases. All these patients were treated in the unit for either diagnostic or therapeutic procedures. It includes all the patients who were fit for anaesthesia and whom were thought could be operated safely. Those patients who had very severe compresion symptoms specially of the trachea were excluded or postponed till such time that the compresion symptoms improved. All the patients had either mediastinotomy or cervical collar incisions or median sternotomy. In none of the cases, mediastnoscope was used.

RESULTS

All these patients had Full blood count, ESR, LFTs and other relevant blood tests. Chest x-ray was carried out in every case. Since majority of the patients belonged to low socioeconomic class, only 42 cases in our study had CAT Scan done. None of them had MRI done.

Out of 146 cases, 99 had diagnostic anterior mediastonotomy with right to left ratio of 42:57. The histology breakup is as follows.

Tuberculosis 24

Sarcoidoses 3

Lymphomas 55

Carcinomas 17

Forty seven cases had therapeutic procedures. They were approaced by the following incisions.

a. Anterolateral thoracotomy 17

b. median sternotomy 22

c. Cervical collar for retrosternal goitre 05

d. Cervical collar+sternotomy 03

Histology breakup of these therapeutic cases were as follows:

Goitres 8
(17.02%)

Thymomas 29
(61.70%)

Thymic cyst 3
(6.38%)

Dermoid cyst 4
(8.51%)

Pleuro percardial cyst 1
(2.12%)

Malignant thymomas 2
(4.24%)

TABLE – I

MEDIASTINAL TUMOURS AND CYSTS*

	Herlitzka and Gale (1958)	Morrison (1958)	Le Roux (1962)	Boyd and Midell (1968)	Wychulis et al (1971)	Fontenelle et al (1971)	Rubush et al (1973)	Ovrum and Birkeland (1979)	Davis et al (1987)	Total
Neurogenic tumors	35	101	30	11	212	7	36	19	57	508
Thymoma and thymic cysts	14	47	17	2	225	18	51	10	67	469
Lymphomas	12	33		20	107	14	14	9	62	271
Germ cell tumors	26	36	21	22	99	3	14	5	42	268
Enterogenous cysts	26	29	14	15	83	2	8		50	227
Pericardial cysts	17	13	20	6	72	3	10	7	36	184
Miscellaneous	29	30	3	2	118	17	24	6	40	269
Total	159	289	105	96	916	64	157	56	354	2196

* Excluding substernal thyroid, mediastinal granuloma and "primary carcinoma of mediastinum".

Seven patients of these 146 cases died (4.79%)

Morbidity was as follows:

Air leak	7 (4.79%)
Wound infection	9 (6.16%)
Haemorrhage	2 (1.36%)

DISCUSSION

Mediastinum is an important area in the thorax. There are lot of conditions involving the mediastinum. In old days, it was a big challenge to operate on the mediastinum. Milton[2] in 1897, devised the median sternotomy approach. Since then a lot of approaches have been tried. There are numerous conditions involving mediastinum as given in the Table No. I.

The incidence and types of the many primary mediastinal tumours and cysts vary with the age of the patients. In infants and children the collected series reveal the leisions in order of decreasing fraquency to be neurogenic tumours, foregut cysts, benign germ cell tumours, lymphomas, angiomas, thymic tumours and pericardial cysts. (Table No. II).

In our series lymphomas constituted 55.55% in the diagnostc group and were the major tumours found in mediastinm.

The retrosternal goitres may be divided into three types.

a. Small substernal extension
b. Partial substernal with major portion of the goitre in thorax.

TABLE – II

INCIDENCE OF MEDIASTINAL TUMORS AND CYSTS IN CHILDREN

	Gross (1953)	Ellis and Du Shane (1956)	Heimburger and Battersby (1965)	Jaubert de Beaujeu et all (1968)	Haller et al (1969)	Grosfeld et al (1971)	Whittaker and Lynn (1973)	Pokorny and Sherman (1974)	Bower and Kiesewetter (1977)	Total
Neurogenic tumors	16	19	9	22	18	35	37	35	41	??
Enterogenous cysts	18	10	10	15	10		12	1	4	??
Germ cell tumors	5	16	5	9	8	5	21	4	5	??
Lymphomas			6		8	13	9	27	12	??
Angiomas and lymphangiomas	6	9	5	1	4	1	6	7	5	??
Stem cell tumors		4		1	10	2			5	??
Thymic tumors and cysts	3			3		4	2	3	1	??
Pleuropericardial cysts				1	1				2	??
Miscellaneous	1		1	2	3	2	11			??
Total	49	58	36	54	62	62	98	90	89	??

Courtesy "General Thoracic Surgery" by Shields.

c. Complete in which whole of the thyroid lies in the thorax.

The incidence in the major series of retrosternal goiters was reported by Wakely & Mulvey[3] in 1940. In that series the small substernal group was 81.9% the partial group was 15.3% and the compete retrosternal extension was 2.7%. The majority of the retrosternal extension of the thyroid in our study belonged to either small retrosernal extension group or partial retrosternal extension. That was the reason for it to be delivered via cervical collar incision alone. Median sternotmy partial or complete was very infrequently used as was also observed by Jhonston.[4] Surgical excision of retrosternal goitre is essential even in the asymptomatic patients as noted by Shaha[5] because of the risk of sudden acute airway obstruction and incidence of malignancy. Mediastinal masses of vascular origin must be differentiated from true mediastinal tumours. They are either arterial or venous in origin and as Kelley and colleagues noted (Table III), may arise from systemic or pulmonary systems. CT scan and radionuclitide flow studies, as noted by Miller and associates,[6] usualy differntiated between them. Neoplastic involvement of mediastinal nodes are quite frequent. Mulle]r and Richardson[7] reported that lymphomas

TABLE – III

MEDIASTINAL MASSES OF VASCULAR ORIGIN

	Systemic Venous System	Pulmonary Arterial System	Pulmonary Venous System	Systemic Arterial System
Anterior mediastinum				Aortic stenosis Aortic aneurysm (ascending aorta)
Middle mediastinum	Aneurysm of superior vena cava Partial anomalous pulmonary venous return to superior vena cava Azygos vein enalrgement	Pulmonary valve stenosis Idiopathic dilatation of pulmonary trunk Congenital absence of pulmonary vave Pulmonary embolism (acute and chronic) Pulmonary arterial hypertension states Anomalous left pulmonary artery	Pulmonary venous varix Pulmonary venous confluence	Aortic stenosis Right aortic arch Aortic aneurysm (transverse aorta) Aneurysm or fistula of coronary artery
Projecting into anteror mediastinum	Aneurysm of the innominate veins Persistent left superior vena cava Hemiazygos vein enlargement	Aneurysm of ductus	Partial anomalous pulmonary venous return to innominate vein Total anomalous pulmonary venous return (supracardiac)	Tortuous innominate artery Cervical aortic arch Coarctation of aorta Aortic aneurysm (transverse arota)
Paravertebral sulcus				Aortic aneurysm (descending aorta)

Adapted from Kelley MJ, et al., Mediastinal masses of vascular origi: A review. J Thorac Cardiovasc Surg 76:559, 1978.

are responsible for 45% of mediastinal masses. Neurogenic tumours in various studies are also common mediatinal tumours. They are not included in this series of cases. The neurogenic tumours are mostly benign. Davidson and associates[8] reported only one malignant neurogenic lesion in 38 patients over the age of 21 years. In children the malignancy ratio of these neurogenic tumours is much higher.

To get the proper diagnosis and then treatment tissue diagnosis is a must. That is why every patients need either diagnostic or therapeutic surgery.

Some of the patients in this group had severe compresion symptoms of the trachea. They are very high risk cases if operated without any preparation, the mortality is very high. Quite a few of them end up on ventilator. The policy adopted by us in this regard is to use preoperative steriods for the edema to get less and then operate on them. This way there are less chances of complications. In short mediastinal pathology should not be treated without histology. They may be either totally excised or biopsied and then treated accordingly.

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