EXPERIENCE OF SURGICAL MANAGEMENT OF MEDIASTINAL MASSES IN A THORACIC SURGICAL UNIT OF A TERTIARY CARE HOSPITAL

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ABSTRACT

Background: The aim of this study was to evaluate the role of surgical treatment and outcome for mediastinal masses.

Methods: The retrospective study was done analyzing clinical record of 520 cases of mediastinal mass that underwent resectional surgery at Thoracic Surgery Department, Lady Reading Hospital, Peshawar from June 2002 to December 2014. Apart from routine investigations all patient had CT thorax done.

Results: Male: female ratio was 336:184. Age ranged from 9 days to 72 years with a median age of 33.6 years. The predominant clinical presentation was chest pain 231 (44%); dyspnea in 142 (27.3%) SVC syndrome in 90 (17%) cases, Dysphagia in 32 (6.1%) and Myasthenia gravis in 25 (4.8%) cases. Surgical approaches were anterolateral Thoracotomy in 34.6% (n=180) cases, posterolateral Thoracotomy in 35% (n=182), Median Sternotomy in 21% (n=110) and cervical incision and partial Sternotomy in 9.2% (n=48) cases. The histological diagnosis of the excised Lesions were Retrosternal goiters in 27% (n=141) cases, Thymoma in 11.9% (n=62), Dermoid cyst 11.9% (n=62), teratodermoid 10.5% (n 55), Entrogenic cyst 9% (n=47) Neurofibroma 9.2% (n=48), Neurogenic cyst 5.1% (n=27), Pleuropericardial cyst 3.2% (n=17), Thymic cyst 6.7% (n=35), Bronchogenic cyst 5% (n=26). Mortality was 3.6% and morbidity was 6.34% i.e. wound infection 17, hemorrhage 7, airleak 6 and hoarsness 3.

Conclusion: Surgery is the management of choice for patients with mediastinal lesions. It allows for establishing histologic diagnosis; alleviating symptoms and prevention of complications; with low operating risks. Mediastinal pathology is best dealt surgically in a properly equipped and staffed cardiothoracic unit.

Key Words: Mediastinal masses; Surgical intervention; Peshawar; Pakistan

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INTRODUCTION

The Mediastinum is the region of the thorax that lies between two pleural cavities. This potential space is bounded by sternum anteriorly and vertebral column posteriorly; extending superiorly to thoracic inlet and inferiorly to diaphragm. Anatomically the Mediastinum can be divided in to three compartments, the anterosuperior, middle and posterior, that represents convenient subdivision because pathology tends to be specific to a particular area of Mediastinum. The mediastinal space is narrow and can not be expended, thus masses in this space will compress adjacent organs and cause life threatening emergency.[1,2]

Most masses grow slowly and thus patient often seeks medical attention as the mass gets large

enough, accompanied by signs and symptoms due to the compression of the mass to adjacent organs. Airway compression and superior vena cava syndrome are life threatening conditions.[3]

Masses in the anterosuperior region are generally Thymoma, sub sternal thyroid, teratodermoid lymphomas. Pericardial and Bronchogenic cyst, enlarged lymph nodded are located in the middle Mediastinum and Neurogenic tumors or esophageal cysts are generally found in the posterior Mediastinum.[4]

Benign masses usually present with pressure symptoms they also present with pressure or constitutional symptoms. Malignant mass may present with pressure or constitutional symptoms. However some tumors may present atypical symptoms. Critical mediastinal masses with propensity to cause respiratory symptoms in children is associated with anterior location of the mass, histologic diagnosis of lymphoma and presence of superior venacaval obstruction. Lymphoma, thymoma and Neurogenic tumors are the commonest tumors of Mediastinum giving rise to symptoms of dyspnea; chest pain, cough or hoarness of voice.[1,5]

Due to internal location of mediastinal masses symptomatology has to be supported by imaging techniques. A standard chest radiograph and CT thorax are imperative prior to any surgical procedure. Further imaging studies such as MR scan is particularly helpful for neurogenic tumors in posterior Mediastinum to determine intraspinal extension[4,5]. Access to Mediastinum is usually through a Thoracotomy or Sternotomy incision but a cervical approach may suffice for some cervicomediastinal lesions. More recently video assisted thoracoscopic resection and robotic technology is being used through minimal access. This is associated with shorter hospitalization because surgical trauma is minimized.[6]

Pathology of posterior mediastinal tumors (PMTS) differs between children and adults. Most of the PMTS in adults are benign lesions; they are mostly malignant in children. Surgery in curative for benign tumor but plays an important role even in treating malignant PMTS in the context of a multimodality treatment.[7]

This study was conducted with the objective to determine indications as well as morbidity and mortality of resectional surgery for mediastinal masses.

MATERIAL & METHODS

A retrospective study was done from June 2002 to Dec 2014 at department of Thoracic surgery, Post Graduate Medical Institute, Lady Reading Hospital, Peshawar. A Total of 520 patients who underwent surgery for resection of mediastinal masses were included in the study. There were 336 male and 184 female patients with a mean age of (33.64). Age range was 9 days -- 70 years.

Retrospective analysis of computerized record was done. Patients of all ages and both sexes, having potentially resectable mediastinal mass with no distant metastasis on clinical and radiological assessment, having acceptable cardiorespiratory reserve were included in the study. While those patients with inoperable tumors on preoperative assessment clinical examination general fitness, C.T thorax and unfit for surgery were excluded from the study. Similarly those patients previously treated with chemotherapy or radiotherapy were excluded. Patients with vascular masses such as aortic aneurysm and those found irresectable during surgical exploration were also excluded.

All patients had apart from routine investigations; CT thorax Double lumen endotracheal tube intubation was used in all patients. The excised mediastinal mass was sent for biopsy to know the histological diagnosis. Retrosternal goiters were routinely approached transcervically though some patients also needed partial Sternotomy for delivery of goiter to the neck. Median sternotomy was done for thymoma cases and teretodermoids in anterior Mediastinum while anterolateral or posterolateral Thoracotomy either on right or left side, were made in other cases according to the side and position of mediastinal mass. Thymic carcinoma was hard like stone adherent with the pericardium, left or right pleura also encircling left brachiocephalic vein. In Thymoma with myasthenia gravis total Thymectomy along with removal of mediastinal fat; and all perithymic fatty tissue was removed

RESULTS

Relevant clinical and Pathological characteristics are shown in Table I and Table 2 As shown 336 (64.6%) were male and 184 (35.3%) were females with a mean age of 33.6 years. The age range was 9 days to 72 years. Out of 520 patients 354 (68%) were between 18-60 years, 135 (26%) more than 60 years while 31 (6%) were below 17 years. Out of symptomatic cases 231(44.4%) had chest pain, 142 (27.3%) dysphnea, 90

(17%) S.V.C syndrome; 32 (6.1%) Dysphagia and 25 (4.8%) had myasthenia gravis.

Operative approaches as depicted in table 3; were anterolateral thoracotomy in 180 (34.6%), posterolateral Thoracotomy 182 (35%), Median Sternotomy in 110 (21%) and cervical incision with partial Sternotomy in 48 (9.2%) cases.

Histopathology of excised lesions were retrosternal goiter in 141 (27%) cases, Thymoma 62 (11.9), dermoid cyst 62 (11.9%), teratodermoid 55 (10.5%), Enterogenic cyst 47 (9%), Neurofibroma 48 (9.2%), Neurogenic cyst 27 (5.1%), Pleuropericardial cyst 17 (3.2%), thymic cyst 35 (6.7) and Bronchogenic cyst in 26 (5%) cases.

Post operative morbidity was 32 (6.3%) table 4; and was mostly represented by wound infection (n=17), haemorrhage (n=7), air leak (n6) and hoarshess (n=3). Post operative mortality was 3.6% (19/520). In these cases death was due to respiratory failure (n=8), myocardial infraction (n=5); diabetic ketoacidosis (n=3) and presumed pulmonary embolism (n=3).

Table 1: Patients Demographic Profile

Variables	n (%)
Gender	
Male	336 (64.6%)
Female	184(35.3%)
Age	
<18 years	31 (6)
18-60 years	354 (68)
> 60 years	135 (26)

Table 2: Clinical Manifestations

Symptoms and Signs	n (%)
Chest Pain	231 (44.4)
Dysphnea	142 (27.3)
SVC Syndrome	90 (17)
Dysphagia	32 (6.1)
Myasthenia Gravis	25 (4.8)

Table 3: Operative Approaches and Histopathology

Variable	n (%)
Approaches	
Anterolateral Thoracotomy	180 (34.6)
Posterolateral Thoracotomy	182 (35)
Median Sternotomy	110 (21)
Cervical incision and partial Sternotomy	48 (9.2)
Histopathology Results	
Retrosternal goiter	141 (27)
Thymoma	62 (11.9)
Dermoid Cyst	62 (11.9)
Teratodermoid	55 (10.5)
Enterogenic Cyst	47 (9)
Neurofibroma	48 (9.2)
Nuerogenic Cyst	27 (5.1)
Pleuropericardial Cyst	17 (3.2)
Thymic Cyst	35 (6.7)
Bronchogenic Cyst	26 (5)

Table 4: Mortality and Morbidity

Variable	n (%)
Mortality	19 (3.6)
Morbidity	
Wound infection	17
Hemorrhage	7
Air leak	6
Hoarness	3

DISCUSSION

Mediastinum is the site of variety of lesions ranging from inflammatory to neoplastic, benign to malignant. The location and composition of a mass is vital for deferential diagnosis. As may as 25-40% of these lesions are malignant. Majority of tumors are seen in anterior Mediastinum. The knowledge of the nature of mediastinal masses is very important for making correct diagnosis. The most common causes of anterior mediastinal mass include thymoma, teratoma, thyroide disease and lymphoma. Masses of the middle Mediastinum are typically congenital cysts including foregut and pericardial cyst while those that arise in the posterior mediastinum; are often Neurogenic tumors.[8,9]

In our study more than 2/3 of the tumors were in the anterior mediastinum, followed by less than 20% in posterior mediastinum as observed by others.[7,8]

Majority of our patients were symptomatic at presentation about 70% presented with varying symptoms of cough chest pain and dyspnea (Table 2), leaving only 30% as incidental findings. Event that asymptomatic group is still very significant and it might constitute a good reason for routine screening of patients in 2nd and 3rd decade of life. Most presenting symptoms during the diagnosis were associated with malignant lesion. Based on location in the thorax cavity, about 50% of subjects with anterosuperior mass were symptomatic at presentation. The presence of a mass in anterosuperior Mediastinum is more likely to cause symptoms due to compression or invasion of the mass to the adjacent airway that may lead to airway obstruction. Tumor may invade spinal column. This may lead to compression of the spinal card.[10]

CT scan of the thorax reveals the most common location of Mediastinal mass to be in the anterosuperior compartment. We obtained CT thorax in all our cases for diagnostic work up and assessment of respectability.

Various surgical approaches are used to excise mediastinal masses (Table 3). Anterior mediastinal masses are usually approached via median Sternotomy or anterolateral Thoracotomy. Middle mediastinal masses can be resected either through anterolateral Thoracotomy or anterior Mediastinotomy while posterolateral Thoracotomy is utilized for resection of posterior mediastinal masses. Thoracic surgeons must be familiar with available approaches for posterior mediastinal tumors in order to choose the approach that will contribute to better prognosis and better quality of life. Mediastinal tumor may reach large size before becoming symptomatic[11]. Complete surgical excision including adjacent invading organs, mainly by open technique should be used for these patients as there is survival benefit. Complete excision was obtained in all our patients with benign lesions. Malignant lesions were usually partially resectible while in extensive growth of the tumor which involved surrounding vital structures it was decided not to be proceed with excision of tumor.[5,12]

Mediastinal goiters are frequently diagnosed particularly in elderly population. Surgery for mediastinal goiters should always be considered because of the risk of tracheal compression and low morbidity of surgery. Most mediastinal goiters are benign and can be removed through a cervical approach. Sternotomy should only be performed in cases of previous cervical Thyroidectomy, invasive carcinoma or ectopic thyroid[13]. In our series we had 141(27%) cases of Retrosternal goiter removed through cervical approach with or without sternal split depending upon the size of goiter.

Surgical resection of the thymus is performed in cases of myasthenia gravis with or without thymoma. Independently; Manoly etal[14] demonstrated in the early twentieth century that symptoms improvement among those with myasthenia gravis could be accomplished with Thymectomy causing an increase in this procedure world wide. We had in our study 62(11.9%) cases of thymoma about half of them had myasthenia gravis.

Germ cell tumors occur predominantly within the anterior Mediastinum and frequently present as a very large mass with local compression. Benign teratomas

are exclusively treated with surgical excision with excellent outcome.[15,16] In our series 55 (10.5%) cases of teratodermoid underwent surgical excision.

Although video-thoracoscopic surgical access to the Mediastinum decrease morbidity and hospital length of stay when compared with traditional open approaches, drawbacks still exist.[17,18] The Mediastinum is a narrow space in the thorax that contains many vital structures at risk during surgery. Therefore the 2 dimensional view afforded by video-thoracoscope during surgical approach to Mediastinum is less than optimal. As a result of these shortcomings new technology was developed that employed the use of robotic assistance. The benefits of the robotic system are; a high definition, 3 dimensional view; filtering hand tremors from surgeons and articulated endotwisted instrument. Despite these advantages, thoracic surgeon are slow to adopt robotic assistance, typically citing the costs associated with robotic assisted surgery.[19,20,21] We performed open Thoracotomy and surgical excision in all over the cases. The advantages of VATS surgery are many but we do not have full facility of VATS and trained staff at our center. We intend to develop this facility and train our staff in this regard in future.

CONCLUSION

Surgical management of mediastinal mass by thoracic surgeon gives good result, with good long term survival benefit. Pulmonologist, cardiothoracic anesthetist role is also vital for good outcome.

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