ORIGINAL ARTICLE

Role of Surgery in Diagnosis of Medaistinal Masses

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ABSTRACT

Introduction: Mediastinum is a wide space containing a lot of vital structures. Medaistinal masses represent a wide diversity of disease states. The location and composition of a mass is critical to narrowing the differential diagnosis. Distribution of mediastinum in to 3 compartments and presence of masses therein has been documented; however a tissue diagnosis is always essential to initiate the treatment. CT scan is successful in giving a diagnosis in many cases through a biopsy. Still many more require an aggressive measure like surgical intervention.

Material & Methods: From January 2009 to December 2011, 110 cases of Medaistinal mass were referred to our department and in all cases CT guided biopsy was not possible or fruitless. Results: 77 cases had anterior-superior Medaistinal mass, 23 cases had posterior Medaistinal mass and 10 had middle Medaistinal mass. Respiratory symptoms were present in 73 of cases while 37 cases were asymptomatic. Major surgical procedures for obtaining tissue were Medianostomy42, VATS 34, Sternotomy 14, Anterolateral thoracotomy 8 and Posterolateral thoracotomy 12. Major diagnostic outcome were Granulomatous involvement 36, thymic masses and Primary/secondary carcinoma 21 each. No mortality was reported. 95 cases went eventless. Conclusion: We conclude that Surgery is safest and most accurate tool in diagnosis of Medaistinal mass.

Key words: Mediastinum; thymic, Medaistinal mass, Granulomatous.

INTRODUCTION

Mediastinum, the space between the two lungs is a frequent site of various tumors and masses arising from structures with in this area as well as from adjacent tissues. In addition masses arising from organs which traverse through this space may also be encountered with in this region. It is essential that a clinician while diagnosing a Medaistinal mass should establish a clear cut diagnosis which is only possible by a tissue-diagnosis. Localization of a lesion is thought to be important as suggestive of a provisional diagnosis and this led to dividing the mediastinum into different compartments with pseudo-anatomic boundaries. (1)

Because of the fact that occurrence of symptoms due to Medaistinal masses is a late sequence, it is important that the nature of the lesion in this region should be diagnosed promptly to give the patient maximum benefit .Whereas a lot many of these lesions can be diagnosed correctly with the help of CT guided biopsy, many more need a further surgical intervention to get tissue for diagnosis. Although more than two thirds of Medaistinal masses are benign, masses in the anterior compartment are more likely to be malignant. (2) The commonest presenting symptoms of a Medaistinal mass include cough and chest pain. The symptoms can be categorized in 2 groups - Localizing and systemic. Localizing symptoms are secondary to tumor invasion. Common localizing symptoms include respiratory compromise; dysphagia; paralysis of the limbs, diaphragm, and vocal cords; Horner's syndrome; and superior vena cava syndrome (3) Systemic symptoms are typically due to the release of excess hormones, antibodies, or cytokines. The initial workup of a suspected Medaistinal mass requires posteroanterior and lateral chest radiographs. CT scanning is used to further characterize Medaistinal masses and their relationship to surrounding structures as well as to identify cystic, vascular, and soft-tissue structures.(3) In rare circumstances, fluoroscopy, barium swallow, angiograph, CT angiography, and three-dimensional reconstruction may provide additional information. The role of MRI is primarily in ruling out or evaluating a neurogenic tumor.(4) MRI is also valuable to evaluate the extent of vascular invasion or cardiac involvement. Although nuclear scans and biochemical studies can be used to further characterize a lesion, tissue diagnosis is almost always required. If a mass is likely to be benign after initial workup, it can be removed surgically without biopsy. Otherwise, a

diagnostic biopsy specimen can be obtained by transthoracic or transbronchial needle aspiration, mediastinoscopy, anterior Mediastinotomy, or video-assisted thoracic surgery (VATS), depending on the anatomic location and radiographic appearance of the lesion. (5).

Table 1: Differential Diagnosis of a Medaistinal Mass by Anatomic Location

Anterior	Middle	Posterior
Thymoma	Lymphoma	Neurogenic tumor
Teratoma, seminoma	Pericardial cyst	Bronchogenic cyst
Lymphoma	Bronchogenic cyst	Enteric cyst
Carcinoma	Metastatic cyst	Xanthogranuloma
Parathyroid adenoma	Systemic granuloma	Diaphragmatic hernia
Intrathoracic goiter Meningocele		
Lipoma Paravertebral abscess		
Lymphangioma		

MATERIAL AND METHODS

This is a retrospective study including all the cases that were diagnosed as having Medaistinal mass on the clinical and radiological basis. Tissue diagnosis could not be obtained without surgical intervention. A CT guided biopsy either could not be done or remained fruitless in all these cases. From Jan 2009 - Dec 2011, 110 patients were referred to our department with Medaistinal mass. After a battery of investigations they were subjected to various surgical procedures.

The investigations included radiographs, CT scan thorax with Medaistinal window, Bronchoscopy and other investigations required for surgical fitness.

RESULTS

The tables below give a view of presenting symptoms, site of lesion, diagnostic procedure done, diagnostic outcome, anatomical distribution of different lesions and complications.

Table 2: Presenting Symptoms: n= 110

Symptom	No.	%age
Respiratory Symptoms	73	70.9
Asymptomatic	37	33.6
Chest Pain	11	10
Dysphagia	1	0.9
SVC obstruction	2	1.8
Weight loss	2	1.8
Myasthenia & other	13	11.8

Table 3: Anatomical location n= 110

	No	%age
Antero- superior Mediastinum	77	70.0
Middle Mediastinum	10	9.1
Posterior Mediastinum	23	20.9

Table 4: Surgical Procedure n= 110

Procedure	No	%age
Mediastinotomy	42	38.1
VATS	34	31
Anterolateral Thoracotomy	8	7.2
Sternotomy	14	12.7
Posterolateral Thoracotomy	12	11

Table 5: Diagnostic outcome n=110

Diagnosis	No.	%
Thymic masses	21	19.2
Terratoma	8	7.2
Bronchogenic cysts	2	1.8
Pericardial Cysts	1	0.9
Enteric Cyst	2	1.8
Primary / Sec Carcinoma	21	19.1
Granulomatous involvement	36	32.7
Leiomyoma esophagus	1	0.9
Lymphoma	13	11.9
Neurogenic Tumors	5	4.5

ANATOMICAL DISTRIBUTION

Table 5 (a): Antero-superior mediastinum n= 77

Thymic Masses	21
Terratoma	8
Lymphoma	9
Carcinoma	10
Granulomatous lesion	29

Table 5 (b): Middle mediastinum n= 10

Lymphoma	4
Bronchogenic Cysts	2
Pericardial Cysts	1
Enteric Cysts	2
Leiomyoma Esophagus	1

Table 5 (c): Posterior mediastinum n= 23

carcinoma	11
Granulomatous lesion	7
Neurogenic lesion	5

Table 6: Postop course n=110

Eventless	95
Minor Complications (Increased bleeding/ minor air leak)	10
Serious Complications(Excessive bleeding , major air leak / myasthenia crisis)	05
Mortality	Nil

DISCUSSION

Mediastinum is a large space between the 2 lungs containing many vital structures. It is demarcated by the pleural cavities laterally, the thoracic inlet superiorly, and the diaphragm inferiorly. (5) It is a frequent site of various tumors and masses arising from structures with in this area as well as from adjacent tissues. In addition masses arising from organs which traverse through this space may also be encountered with in this region. The high incidence of malignant lesions in this region warrants an early diagnosis to proceed to treatment. Davis et al observed that rate of malignancy in various compartments of mediastinum in 400 patients is 59%, 29%, and 16%,respectively, of anterior, middle, and posterior Medaistinal masses. (6) The pseudo anatomic compartments of mediastinum have been referred to in various studies. It is thought to be important to establish the location of the lesion in the compartment which can suggest a probable diagnosis. The distribution of mediastinum in to 3 compartments also helps in locating the normal structures in that compartment. The likelihood of malignancy is influenced primarily by the following three factors: mass location; patient age; and the presence or absence of symptoms (5). The need for surgical intervention is well documented to reach at a diagnosis. Surgery is also recommend for lesions that are proven to be non malignant by initial workup (5). A diagnostic biopsy is required to reach at a diagnosis. This process can be accomplished by following means: Transthoracic or transbronchial needle aspiration, mediastinoscopy, anterior Mediastinotomy, or video-assisted thoracic surgery (VATS) depending on the anatomic location and

Radiographic appearance of the lesion. A CT guided biopsy has saved many patients from major surgical intervention. But cost and expertise is involved in this procedure to a large extent. Current trend to go for non invasive diagnostic procedures first has increased the involvement of CT scan to a great deal. The yield of this tool is thought to be promising but lack of expertise can significantly reduce the yield. In many cases a CT guided biopsy is not possible due to potential hazard of injuring vital structure. All such cases are referred to surgeons for giving a diagnosis. Sypmtomtology plays an important role in deciding the nature of a lesion. Although most of the patients present with symptoms, asymptomatic patients are also well documented in various studies. Respiratory symptoms were most common in our study (71%) and chest pain was not a frequent presentation (10 %). Beau V. Duwe, et al observed cough in 60% and chest pain in30% patients. The symptoms caused by a Medaistinal mass are mostly related to its site and size. Asymptomatic patients are 33% in our observation. Greater incidence of a Granulomatous lesion in our study explains this difference. The initial workup consists of X-rays and CT scan by most workers. We followed the same. An MRI or any other investigation was done only when required. Same is recommended by Silverman NA et al (3). The commonest masses in Anterior mediastinum as seen by Carp JD et al are thymoma and terratoma.(7) We had similar observation in our study but there was a big number of Granulomatous lesions(29 /77) in our study. This shows the greater incidence of infectious disease like Tuberculosis in our country. Lymphoma and cysts are more frequent in the said study. We also got the same diagnostic outcome after surgery. Posterior mediastinum is known for neurogenic tumors. Neurogenic tumors are less frequent in our study and carcinoma stands at the top in our study. This can be due to the fact that we have included only those cases in this study where a previous diagnosis was not available. The neurogenic tumors that were diagnosed and removed

surgically are not included in this study. Biopsy of anterior Medaistinal masses can be performed by a variety of techniques (8) ranging from fine-needle aspiration biopsy (FNAB) (9) to surgical procedures allowing biopsy as well as resection (10).We used different surgical procedures starting from Mediastinotomy to thoracotomy. The choice of procedure was made on the location of lesion. Hence a Mediastinotomy or VATS was used in anterior Medaistinal lesions while thoracotomy or VATS in posterior lesions. Same procedures are recommended by Beau V. Duwe et al (5). VATS is recommended for the biopsies by most workers due to its limited morbidity and greater yield. We used VATS wherever it was needed. However if VATS is not available in a setup, Mediastinotomy can be adopted safely. We did not encounter any serious complications and this shows that these procedures are safe in most occasions.

CONCLUSIONS

Medaistinal mass is a significant entity in chest diseases which must be diagnosed. A tissue diagnosis is not always possible with CT guided biopsy. Surgery is of great help to solve this clinical dilemma. With minimal morbidity a tissue diagnosis can be achieved in all these cases by surgical intervention. VATS has been added as an additional diagnostic strategy and use of this technique can be helpful in diagnosing these cases where ever it is available

REFERNCES

1. Fraser RS, Pare´ JAP, Fraser RG, et al. The normal chest. In: Fraser RS, Pare JAP, Fraser RG, et al, eds. Synopsis of diseases of the chest. 2nd ed. Philadelphia, PA: WB Saunders, 1994; 1–116
2. Strollo DC, Rosado-de-Christenson ML, Jett JR, et al. Primary mediastinal tumors: Part 1. Tumors of the anterior mediastinum. Chest 1997; 112:511
3. Silverman NA, Sabiston DC Jr. Mediastinal masses. Surg Clin North Am 1980; 60:757–777
4. Grillo HC, Ojemann RG, Scannell JG, et al. Combined approach to “dumbbell” intrathoracic and intraspinal neurogenic tumors. Ann Thorac Surg 1983; 36:402– 407
5. Beau V. Duwe, Daniel H. Sterman and Ali I. Musani Tumors of the Mediastinum ; Chest 2005; 128;2893-2909
6. Davis RD Jr, Newland Oldham H Jr, Sabiston DC Jr. Primary cysts and neoplasms of the mediastinum: recent changes in clinical presentation, methods of diagnosis, management and results. Ann Thoracic Surg 1987; 44:229 –237
7. Crapo JD, Glassroth J, Karlinsky J, et al. Baum’s textbook of pulmonary diseases. Philadelphia, PA: Lippincott Williams& Wilkins, 2004; 883–912
8. Rendina E.A., Venuta F., De Giacomo T., et al. Comparative merits of thoracoscopy, mediastinoscopy and mediastinotomy for mediastinal biopsy. Ann Thorac Surg 1994;57:992-995.
9. Moinuddin S.M., Lee L.H., Montgomery J.H. Mediastinal needle biopsy. AJR Am J Roentgenol 1984;143:531-532.
10. Kern J.A., Deniel T.N., Trible C.G., et al. Thoracoscopic diagnosis and treatment of mediastinal masses. Ann Thorac Surg 1993;56:92-96.