Minimally Invasive Excision of Cystic Thymomas
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Citation

Abstract
Thymoma is a neoplasm arising from the epithelial cells of the thymus. We report the case of a cystic thymoma in an adolescent male that presented as a mediastinal mass. The mass was resected thoracoscopically and patient was discharged in twenty four hours. He is doing well at 6 months post operatively and will be followed closely.

INTRODUCTION
The thymus has an important role in the differentiation of T lymphocytes. During early life, the thymus is responsible for the development and maturation of cell-mediated immunological functions. Precursor cells migrate to the thymus and differentiate into lymphocytes. Most of these lymphocytes are destroyed but the remainder migrates to tissues to become T-lymphocytes. The thymus reaches its maximum weight at puberty and involutes thereafter. Thymoma is defined as a neoplasm that arises from the epithelial cells of the thymus. Thymomas are composed of a mixture of lymphocytes and epithelial cells in varying proportions, with scattered cystic regions of various sizes seen in 40% of thymomas pathologically (1). Although focal cystic changes in thymomas have been recognized frequently, those that result in almost complete cystic transformation have been rarely reported (2, 3, 4). We report a case of a cystic thymoma in an adolescent male that presented as a mediastinal mass and was resected with Video Assisted Thoracic Surgery (VATS).

CASE REPORT
A 16 year old patient presented to the pediatric clinic with new onset of asthma. He did not have any previous medical history including myasthenia gravis. During work up he was detected to have a mediastinal mass on chest radiograph. This was followed by a CT chest which confirmed the presence of a anterior mediastinal mass. He underwent thoracoscopy through the right pleural cavity. Three trocars were used and the mass was dissected out using an ultrasonic dissector (Fig. 1&2). There was no local invasion of the mass. The patient did well postoperatively and was discharged home in twenty four hours. Pathology was consistent with a cystic thymoma. There was no evidence of capsular invasion or microscopic foci in the mediastinal fat. He will be followed closely but has done extremely well on his six month follow up visit.

Figure 1
Figure 1: Cystic Thymoma
Figure 2
Figure 2: Tumor bed after resection showing relationship to phrenic nerve

DISCUSSION
Thymoma is the commonest primary tumor of the anterior mediastinum, forming 15% of all mediastinal tumors, especially in adults over 40 years. The peak incidence occurs in the 4th to 5th decade without any predilection for either sex. These tumors are rare in children. Most thymomas are discovered incidentally or during an evaluation for myasthenia gravis. 30-59% of patients with thymoma have symptoms suggestive of myasthenia gravis but only 10-25% of patients with MG have a thymoma. The differential diagnosis of thymomas in the anterior mediastinum includes thymic carcinoma, thymic carcinoid, thymic cysts, mediastinal germ cell tumors, mediastinal goiters, mediastinal parathyroid adenomas and mediastinal lymphoma.

CLASSIFICATION & STAGING SYSTEMS
Various staging systems have been devised based on degree of invasiveness. The most common system is the Masaoka et al staging system. Two major classification systems based on microscopic appearance are the system of Rosai and Levine and the other is by Marino and Muller-Hermelink. The Rosai and Levine system classifies tumors based on characteristics of the epithelial cell component (round, spindle, mixed) and the presence or absence of lymphocytic infiltration. The Marino and Muller-Hermelink system divides tumors into cortical (organoid), mixed and medullary types.

CYSTIC CHANGES IN THYMOMA
Cystic changes in thymoma may be the result of two pathogenetic mechanisms: 1) confluence and dilatation of perivascular spaces with creation of large cystic cavities devoid of an epithelial lining or inflammation and 2) cystic dilatation of thymic epithelium and/or Hassall's corpuscles secondary to underlying inflammatory and hyperplastic changes of residual non neoplastic thymic epithelium. Suster and Rosai described specific features establishing a diagnosis of cystic thymoma that included:

a) Solid expanses within the walls of cysts containing a dual cell population of reticuloepithelial cells and small, mature lymphocytes;
b) perivascular spaces and foci of medullary differentiation; and
c) absence of an epithelial lining of the cyst.

DIAGNOSTIC MODALITIES IN CYSTIC THYMOMA
The most helpful and commonly used modality has been CT scanning. CT scan can define the capsule of the cyst, identify the central fluid mass and can demonstrate the relationship to adjacent mediastinal structures. MRI has proved to have an advantage over CT scanning in the identification of vascular involvement of the tumor and in identifying unresectable disease.

SURGICAL TREATMENT
Complete surgical resection is the mainstay of treatment with adjuvant chemotherapy in the higher stages. This is achieved without difficulty in stage 1 & 2(Masaoka) but stage 3&4(Masaoka) provide a greater challenge. Invasiveness is the single most important factor for predicting outcome. Dawson et al noted that invasion as determined by the surgeon must be supplemented by histologic search by pathologist for capsular invasion and any microscopic foci in the mediastinal fat. Yagi et al reported excellent long-term survival with extended resection in patients with stage 3&4(Masaoka) disease. Their overall 5 and 10-year survival rates were 77% and 59% respectively. Nakahara and coworkers have shown that the survival rate in patients with stage 3(Masaoka) disease undergoing complete resection was comparable to that of patients with stage 1& 2(Masaoka) disease.

ADJUVANT RADIATION THERAPY
Radiation therapy is widely accepted as adjuvant therapy in patients with stage 3 or 4 (Masaoka) thymoma. The utility of this treatment in stage 2 is more controversial.
RECURRENT THYMOMA

Thymomas can recur after surgical excision, varying from 11-36% in invasive thymomas and upto 10% in encapsulated thymomas. Blumberg and associates have shown that surgical resection of recurrent thymoma was associated with a 5 year survival rate of 85%, compared with 45% for those not resected. Surgery remains a mainstay of treatment for thymoma, even recurrent disease. The disease free interval from initial resection to recurrence may be as long as 10 years and long for encapsulated thymomas. Therefore lifetime surveillance and follow up is advocated for patients following resection.

MINIMALLY INVASIVE SURGERY

Thoracoscopic thymoma excision was first reported by Landreneau and associates. Since then other surgeons have reported their experience with VATS thymoma excision. The advantage of this technique is that it provides a low morbidity with short hospitalization.

SUMMARY

Thoracoscopic excision of mediastinal masses including cystic thymomas is feasible and associated with low morbidity. Local invasion of thymomas or other mediastinal masses can prove to be technically challenging with minimally invasive approach.

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References

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