Mediastinal Thymolipoma: An Evaluation of the Clinical and Radiological Features and the Surgical Outcomes in 11 Cases

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ABSTRACT

Background: Thymolipoma is a rare benign tumor of the mediastinum, accounting for 2-9 % of all thymic tumors. Although many case reports have been published in the literature, few studies have analyzed the clinical and radiological features and the surgical outcomes of this tumor.

Aim: To evaluate the clinical and radiological features and the surgical outcomes of the patients with thymolipoma.

Methods: We reviewed the records of pathology department from the beginning of 2005 to the end of 2013.

Results: We identified 11 patients with thymolipoma. There were eight male and three female patients. Their ages ranged from 27 to 72 years, with mean age of 40 years. All patients described pulmonary or extrapulmonary symptoms. Two patients (18.2 %) had myasthenia gravis. Chest X-ray was normal in four patients. Computed tomography of the thorax revealed a mass located in the anterior mediastinum in all patients. It showed fat attenuation in four of 11 patients (36.4 %). Thymectomy was performed in all patients. The surgical approach was thoracotomy in five, sternotomy in four, and video-assisted thoracic surgery in two. Thymolipomas ranged in size from 4 to 33 cm. One patient died two years after surgery. None of remaining patients had evidence of recurrence on follow-up.

Conclusions: Thymolipoma is a rare tumor of the thymus. It may be associated with myasthenia gravis. Surgical resection is the treatment of choice in the patients with thymolipoma. Complete surgical resection is the cure in most patients.

Keywords: Mediastinal tumor, myasthenia gravis, surgery, thymolipoma

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INTRODUCTION

Thymolipoma is an uncommon benign tumor of the thymus consisting of mature adipose tissue and thymic tissue in variable portions (1). The term thymolipoma was first introduced in 1948 by Hall to describe this tumor (2). Up to 2008, less than 200 cases of thymolipoma had been reported in the world literature (3). This tumor occurs more frequently in young adults (4). Many patients are asymptomatic. Others may present with nonspecific symptoms such as chest pain and dyspnea. The tumor is sometimes associated with parathymic disorders such as myasthenia gravis, Graves' disease, hypogammaglobulinemia, aplastic anemia, red cell aplasia, and Hodgkin's disease (1, 3-6). Chest X-ray may be normal or it may show an abnormal radiological appearance such as cardiomegaly, a mediastinal mass or mediastinal widening (3, 6, 7). Surgical resection is the treatment of choice in the patients with thymolipoma (5). Few studies have analyzed the clinical and radiological features and the surgical outcomes of this tumor (4, 5, 7, 8). We present an evaluation of the clinical and radiological features and the surgical outcomes in 11 cases of thymolipoma.

MATERIALS AND METHODS

This retrospective study was conducted at Sureyyapasa Chest Diseases and Thoracic Surgery Training and Research Hospital in Istanbul, Turkey. The study was approved by the scientific committee of our institute. We reviewed pathology laboratory records from the beginning of 2005 to the end of 2013. We identified 11 cases of thymolipoma during this period. The histology of all resected tumor specimens was reexamined by a pathologist experienced in thoracic pathology. The diagnosis of thymolipoma was based on the presence of a mixture of benign thymic tissue and mature adipose tissue in the tumor at microscopic examination.

The clinical files of the patients were analyzed retrospectively. For each patients, the following information was noted: age, sex, smoking habit, symptoms, radiological features, diagnostic investigations, pathological findings, treatment, and outcomes. All patients underwent routine laboratory studies and electrocardiography. Chest X-ray and computed tomography (CT) of the thorax were evaluated in all patients. Two patients were additionally evaluated with magnetic resonance imaging (MRI). 18-Fluoro-deoxyglucose positron emission tomography-computed tomography (FDG PET-CT) scan was performed in three patients. The patients' follow-up was completed as of December 2014. The hospital electronic database was reviewed to obtain follow-up information. Patients were asked about their symptoms and chest-x ray were performed, and if necessary CT of the thorax. The modified Osserman's classification was used to assess the severity of myasthenia gravis throughout the patients' preoperative care and postoperative follow-up (4).

RESULTS

There were eight male and three female patients, indicating a male to female ratio of 2.7:1. Their ages ranged from 27 to 72 years, with mean age of 40 years. Seven patents (63.6 %) were younger than 40 years. All patients described pulmonary and/or extrapulmonary symptoms. The most frequent symptom was chest pain. Two patients (18.2 %) had myasthenia gravis. The severity score of the myasthenia gravis was IIa for one patient. She received high dose corticosteroid therapy and pyridostigmine bromide. She had also Graves' disease. The severity score was I for the other patient. He received only pyridostigmine bromide. Table 1 shows the clinical data of the patients.

Radiological features are summarized in table 2. Chest X-ray was normal in four patients (36.4 %). Computed tomography of the thorax revealed a mass located in the anterior

mediastinum in all patients. It showed fat attenuation within four of 11 masses (36.4 %). Magnetic resonance imaging scans, obtained in two patients, demonstrated high signal intensity intermixed with areas of intermediate intensity. FDG PET-CT scans obtained in three patients. The maximum standardized uptake values (SUVmax) of the lesions on FDG PET-CT were 2.9, 3.2, and 3.8.

The data of treatment, pathologic tumor size, and outcomes of the patients are given in table 3. All patients underwent a surgical procedure. The surgical approach was thoracotomy in five patients, sternotomy in four patients, and video-assisted thoracoscopic surgery in two patients. The tumor was located in the anterior mediastinum in all cases. Only the thymus was removed in all patients. On macroscopic examination, all masses were encapsuled and soft. The tumors varied in size from 4 cm to 33 cm in greatest dimension, with mean size of 9 cm. Microscopic examination demonstrated a mixture of benign thymic tissue and mature adipose tissue in all tumors. No histological evidence of malignancy was seen in any of the tumors (figure 1). The hospital stay ranged from 3 days to 12 days, on average 6.1 days. Hematoma was developed in one patient on the 1st postoperative day following the thoracotomy and repeated thoracotomy was necessary. Other patient developed sepsis on the second postoperative day following the thoracotomy. He was treated with early aggressive antibiotic therapy and mechanical ventilatory support in an intensive care unit. There were no complications as a result of the resection of the thymolipoma in any other patients. One patient died 2 years after operation due to cardiovascular disease. None of the remaining 10 patients had evidence of recurrence or residual tumor on follow-up. The patient with severity score I experienced a nonimprovement in myasthenia gravis symptoms after thymectomy. The patient with severity score IIa experienced an improvement in myasthenia gravis symptoms after resection of thymolipoma.

DISCUSSION

Thymolipoma is an uncommon benign tumor of the mediastinum. This tumor accounts for 2 to 9 % of all thymus tumors and 1.1 % of all solid mediastinal tumors (6, 9). Its incidence is approximately 0.12 cases per 100.000 inhabitants per year (10). Up to 2008, less than 200 cases of thymolipoma had been reported in the world literature (3). The pathogenesis of this tumor is unclear, but several theories have been proposed. The most widely accepted theory proposes that diffuse thymic hyperplasia is replaced by adipose tissue, the same process that occurs in the normal thymus (9, 11).

Thymolipoma can occur at any age, but is more common in young adults. The majority of thymolipomas are diagnosed in the first four decades of life (7, 8, 12). There is no sex predilection (7, 9, 12). Many patients are symptom-free at the time of diagnosis and the tumors are identified incidentally by chest x-ray or computed tomography of the thorax during a diagnostic workup for other medical problems. Others present with nonspecific symptoms such as chest pain, cough, dyspnea, respiratory tract infections, hemoptysis, dysphagia, hoarseness, tachypnea, cyanosis, and weight loss. Most symptoms are related to the local growth of the tumor and mechanical compression of adjacent mediastinal organs (1, 5, 7-9, 11, 13). Thymolipomas often become large and they can reach a huge size (3, 5, 6, 8, 9). According to our review of the literature, the largest size of thymolipomas that have been reported in the literature is 36 cm and their weight ranges from 31 g to 16 kg (5, 8, 14). These tumors are sometimes associated with parathymic disorders such as myasthenia gravis, Graves' disease, hypogammaglobulinemia, aplastic anemia, red cell aplasia, and Hodgkin's disease (1, 3-6). The incidence of myasthenia gravis associated with thymolipoma is between 2.8 % and 50 % (5). In the present series, all patients were symptomatic. Two patients had myasthenia gravis. One of them had also Graves' disease.

Radiographic features are variable. Chest X-ray may reveal an enlarged cardiac silhouette mimicking cardiomegaly. It may show a mediastinal mass or widening. The tumor may present with normal chest X-ray, as happened in our four cases (6,7,11,12). CT and MRI may helpful in the diagnosis of thymolipoma. CT reveals a mass in the anterior mediastinum. It may demonstrate fat tissue within the tumor, as showed in our four patients (3,7,11). Although the diagnosis of thymolipoma is strongly suggested by CT and MRI, histological examination requires to make an definitive diagnosis or even to differentiate benign from malignant tumors (3,5,11). The differential diagnosis of this tumor includes lipoma, mediastinal lipomatosis, mediastinal cysts, thymoma, thymic hyperplasia, teratoma, aneurysm of aorta, liposarcoma, lymphoma, and thymic carcinoma (9).

The treatment of choice is surgical resection of the tumor, which can be accomplished via sternotomy, thoracotomy or thoracoscopic approach (3, 5, 7, 11, 15). The surgical approach is chosen according to the location and extent of the tumor (3, 5). Complete surgical excision is generally curative (3, 7, 11). The tumor does not recur after surgical resection (5,7). Surgical resection of the tumor may be followed by an improvement of myasthenic symptoms in patients with myasthenia gravis (7). However, myasthenic symptoms may persist in some patients (5). In the present series, the patients showed no evidence of recurrence or residual tumor during the follow-up. While one patient experienced an improvement in myasthenia gravis symptoms after a resection of thymolipoma, myasthenic symptoms persisted in the other patient.

In conclusion, thymolipoma is a rare tumor of the thymus. It may be associated with myasthenia gravis. Surgical resection is the treatment of choice in the patients with thymolipoma. Complete surgical resection is curative in most patients.

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Table 1: The clinical data of the patients

Case	Age (years)	Gender	Smoking	Symptoms	M.gravis	Osserman score
1	27	Female	Yes	Cough	No	
2	34	Male	No	Cough, chest pain	No	
3	43	Male	Yes	Chest pain	No	
4	35	Female	No	Dyspnea, weakness, Graves' disease	Yes	IIa
5	30	Female	No	Dyspnea	No	
6	71	Male	No	Chest pain	No	
7	20	Male	No	Chest pain	No	
8	72	Male	No	Dyspnea	No	
9	23	Male	No	Cough, chest pain, dyspnea	No	
10	29	Male	No	Chest pain	No	
11	56	Male	Yes	Ocular findings	Yes	I

Table 2: Radiological features of the patients

	CT Features				
Case		Location	Site	Border	Fat on CT
1	Widening	Anterior mediastinum	Middle	Smooth	Yes
2	Widening	Anterior mediastinum	Middle	Smooth	No
3	Widening	Anterior mediastinum	Middle	Smooth	Yes
4	Normal	Anterior mediastinum	Left	Smooth	No
5	Normal	Anterior mediastinum	Middle	Smooth	No
6	Widening	Anterior mediastinum	Left	Lobulated	No
7	Widening	Anterior mediastinum	Middle	Smooth	No
8	Widening	Anterior mediastinum	Right	Smooth	Yes
9	Mass	Anterior mediastinum	Left	Smooth	Yes
10	Normal	Anterior mediastinum	Middle	Lobulated	No
11	Normal	Anterior mediastinum	Middle	Smooth	No

Table 3: The data of treatment, pathologic tumor size, and outcomes of the patients

Case	Surgical approach	Operation	Hospital stay (day)	Complication	Tumor size (cm)	Follow-up (months)	Prognosis
1	Sternotomy	Thymectomy	3	No	9	44	Alive
2	Thoracotomy	Thymectomy	7	No	4.5	17	Alive
3	Thoracotomy	Thymectomy	11	No	4.5	84	Alive
4	Sternotomy	Thymectomy	5	No	9	108	Alive
5	VATS*	Thymectomy	4	No	6	15	Alive
6	Thoracotomy	Thymectomy	4	No	10	98	Alive
7	Sternotomy	Thymectomy	5	No	4	104	Alive
8	Thoracotomy	Thymectomy	12	Sepsis	8	24	Died
9	Thoracotomy	Thymectomy	11	Hematoma	33	74	Alive
10	Sternotomy	Thymectomy	3	No	4	78	Alive
11	VATS	Thymectomy	3	No	7	23	Alive

*VATS: Video-assisted thoracoscopic surgery

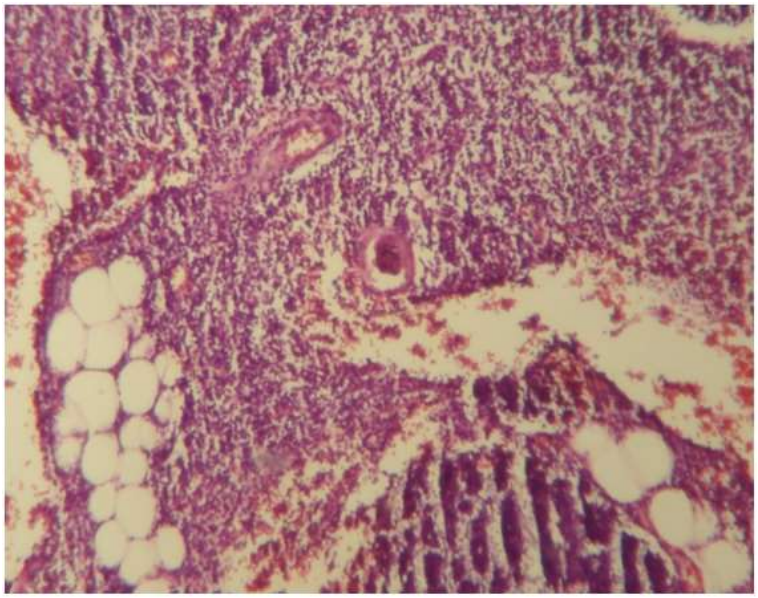

Figure: Microscopic appearance. The tumor shows thymic tissue containing a Hassall's corpuscule admixed with adipose tissue.