

Type A thymoma surgically resected by minimally invasive thymectomy

Timoma tipo A resecado quirúrgicamente mediante timectomía de mínima invasión

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ABSTRACT

Thymoma is the most common mediastinal tumor and consists of a neoplasm of thymus epithelial cells. The presence of neck masses can cause local compressive symptoms. Surgery is the primary treatment. Recently, minimally invasive approaches assisted by thoracoscopy have been proposed. These approaches are characterized by shorter hospital stays, low morbidity rates, and good cosmetic results. However, it is important to individualize the best type of approach for each patient, highlighting the importance of complete surgical resection in the management of these tumors.

Keywords: mediastinum, minimally invasive surgical procedures, thoracic neoplasms, thoracic surgical procedures, thoracoscopy, thymoma.

Abbreviations:

CT = computerized tomography

LVSF = left ventricular systolic function

RCBPM = Registry of Population-Based Cancer in Mexico

WHO = World Health Organization

Mediastinal masses situated in the anterior compartment are the most prevalent.¹ According to the literature, approximately 54% of mediastinal

RESUMEN

El timoma es el tumor mediastínico más común y consiste en una neoplasia de las células epiteliales del timo. Provoca síntomas compresivos locales como efecto de una masa en el cuello. La cirugía es el tratamiento principal. Recientemente, se han propuesto abordajes mínimamente invasivos asistidos por toracoscopia. Estos abordajes se caracterizan por estancias hospitalarias más cortas, bajas tasas de morbilidad y buenos resultados estéticos. Sin embargo, es importante individualizar el mejor tipo de abordaje para cada paciente, destacando la importancia de la resección quirúrgica completa en el manejo de estos tumores.

Palabras clave: mediastino, procedimientos quirúrgicos mínimamente invasivos, neoplasias torácicas, procedimientos quirúrgicos torácicos, toracoscopia, timoma.

tumors in adults arise in the anterior mediastinum, whereas 20% occur in the middle mediastinum and 26% in the posterior mediastinum.² These masses originate from either mediastinal structures or structures that traverse the mediastinum during embryological development, as well as from metastatic deposits of primary neoplasms located elsewhere. Thymoma is the most prevalent mediastinal tumor, representing a neoplasm that originates from the

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epithelial cells of the thymus.³ This condition predominantly affects adults, with a peak incidence occurring between the ages of 55 and 65.⁴

In our country, according to historical data from the Registry of Population-Based Cancer in Mexico (RCBPM), between 2010 and 2016, 757 cases of thymus neoplasms were reported; of these, 63.5% corresponded to thymomas and 36.5% to thymic carcinomas. Furthermore, it is observed that thymoma is more frequent in women, with a ratio of 1.6 women for every affected man.⁵

The clinical manifestations of thymoma include cough, dyspnea, and chest pain, often accompanied by local compressive symptoms such as a neck mass or superior vena cava syndrome. Notably, over 40% of patients with thymoma develop paraneoplastic syndromes, with myasthenia gravis being a prominent example.⁶

The association between thymomas and autoimmune disorders is well established. The underlying mechanism for thymoma-related autoimmunity is thought to involve tumor-induced damage that compromises the thymus's ability to maintain self-tolerance, thereby increasing the likelihood of autoimmune disease development.⁷

According to the 2021 World Health Organization (WHO) classification of thymus and mediastinum tumors,⁸ thymomas are classified into:

1. Type A and AB. Considered neoplasms with low malignant potential and low probability of recurrence.
2. Type B1 and B2. Considered to have moderate malignant potential and moderate probability of recurrence.
3. Type B3. Considered of high malignant potential and high probability of recurrence.
4. Type C. These correspond to thymic carcinomas and are neoplasms with a high probability of metastatic dissemination.

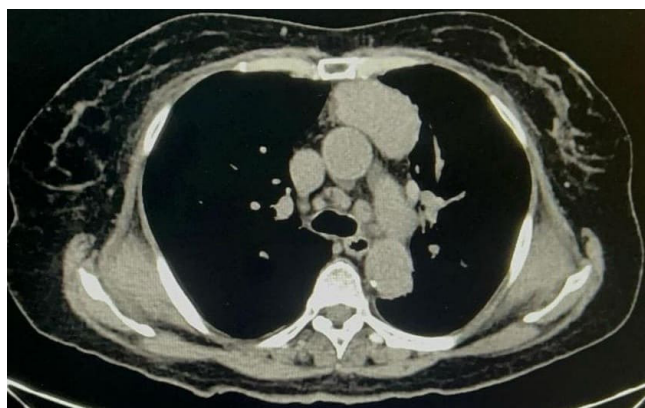


Figure 1: Axial computed tomography scan showing a mediastinal mass above the pulmonary artery.



Figure 2: Coronal computed tomography scan showing a mediastinal mass above the heart.

CASE DESCRIPTION

This is a 75-year-old female patient who was admitted at our institution on January 10th, 2025. Her current condition began a week before her admission with dysphagia, moderate dyspnea, dry cough that rapidly progressed to productive, fever and malaise. A computerized tomography (CT) scan showed a mass with well-defined borders in the anterior mediastinum measuring approximately 54 × 59 × 34 mm (*Fig. 1*) (*Fig. 2*).

Furthermore, the lung fields exhibited multiple *ground glass* lesions, prompting admission with a diagnosis of mediastinal mass under investigation and pneumonia. A pneumonia panel was conducted, which yielded positive results for *Mycoplasma pneumoniae*. An echocardiogram, comprising M-mode, two-dimensional, and pulsed wave Doppler imaging, revealed concentric left ventricular hypertrophy with preserved left ventricular systolic function (LVSF). Subsequently, a CT-guided biopsy of the mediastinal mass was performed, which confirmed a type A thymoma. An anti-acetylcholine receptor antibody study was also conducted, with negative results, effectively ruling out myasthenia gravis. Finally, on January 20th 2025 the patient was scheduled for a minimally invasive thymectomy procedure.

The surgical procedure was initiated with a video-assisted approach, utilizing three trocars placed in a diamond configuration along the anterior and mid-axillary line. The camera was inserted through the medial port, and dissection of the mediastinum was initiated, revealing a post-biopsy

puncture hematoma. Upon opening the mediastinum, a highly vascularized and firm mediastinal mass was encountered, which proved challenging to mobilize. Distal dissection was performed, and a bilobed tumor was identified, extending to the contralateral hemithorax with multiple feeding vessels. Given the complexity of the tumor's anatomy, direct assistance via mini-sternotomy was undertaken to facilitate visualization and mobilization of the mass. Subsequently, the surgical specimen, measuring approximately 10×7 cm and characterized by a bilobed, heart-shaped configuration, was mobilized and extracted along with perilesional lymph nodes (*Fig. 3*).

COMMENT

Surgical resection is widely regarded as the most effective treatment modality for thymomas, irrespective of their histological classification.⁶ Nevertheless, the optimal approach to thymectomy remains a topic of debate. A surgical technique is deemed effective if it can achieve complete resection of the thymus, thereby ensuring thorough removal of the gland.

Recently, minimally invasive approaches, including thoracoscopic and robotic-assisted techniques, have been proposed as viable alternatives. These approaches are distinguished by shorter hospital stays, low morbidity rates, favorable cosmetic outcomes, and remission rates comparable to those achieved with traditional open approaches.⁹ However, transcervical-transsternal thymectomy, which involves an invasive approach via median sternotomy, enables the resection of a larger amount of ectopic thymic tissue, including perithymic, mediastinal, and cervical fat.¹⁰

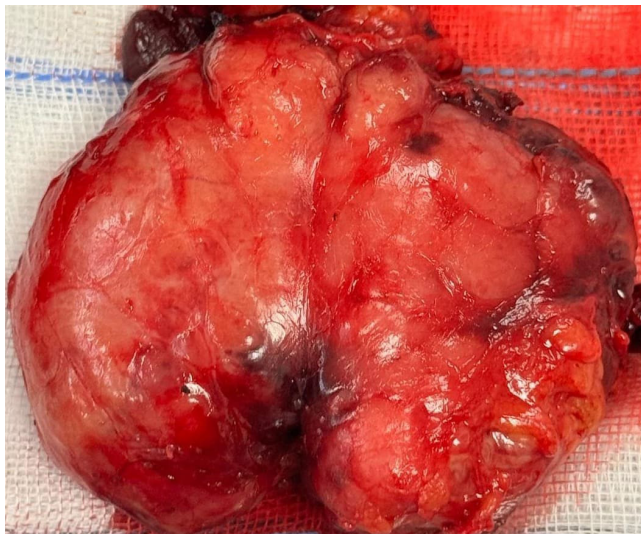


Figure 3: Surgical specimen measuring approximately 10×7 cm in length, bilobed.

However, it is important to note that several factors that influence the clinical outcome post-thymectomy, in addition to the presence of ectopic thymic tissue, must be considered. These factors include the histopathological characteristics of the thymoma, as well as its aggressiveness and whether it is found with infiltration into other adjacent tissues or if there are complications such as the development of myasthenia gravis¹¹ or compression of mediastinal structures due to mass effect such as pulmonary stenosis¹² or cardiac tamponade.¹³ However, it is important to note that the complications do not usually occur in patients with type A thymomas since these are usually well-defined tumors with a histological architecture composed of well-organized oval or spindle-shaped epithelial cells with a better prognosis. In contrast, type B or AB thymomas present a mixed cellular pattern with abundant presence of lymphocytes, which results in a moderate to high malignant potential as well as a high recurrence rate.¹⁴

CONCLUSIONS

Minimally invasive thymectomy is a cutting-edge technique that offers a valuable alternative to traditional thymectomy via median sternotomy. However, it is crucial to emphasize the importance of radical thymectomy, which enables the removal of not only the thymus but also the surrounding adipose and ectopic tissue that may contribute to the recurrence of symptoms. Furthermore, when selecting an appropriate surgical approach, it is essential to consider specific tumor characteristics, such as size. A thymoma larger than 5 cm that infiltrates the capsule or surrounding structures is a key exclusion criterion for a minimally invasive approach.^{15,16}

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