

Observation and extirpation of a giant-size type-B2 thymoma IIb with its histological, macroscopic, and computer tomogram correlate, and literature review

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Abstract

This report describes the interdisciplinary approach and solving algorithm of a DIN 9001:2000 certified tumor board in managing a giant-size type-B2 thymoma IIb in an elderly patient. The process of managing the thymoma with specialists of surgery, internal medicine, radiology, and pathology until finally extirpation and continuous follow-up is described. Respective computerized tomography scans, histology, macro-pathology, and operative pictures of the case are provided as well as an up-to-date literature review.

Introduction

We report an extirpation of a giant-size type-B2-thymoma IIb, according to the modified clinical Masaoka^{1,2} and histological WHO^{3,4} stages. Previously a period of controlled observation by an interdisciplinary and DIN 9001:2000 certified tumor conference team was pursued. Our case report is supported by histological, macroscopic, and computerized tomography (CT) pictures.

Case Report

An 82-year-old woman presented with a cough enduring for weeks and a feeling of thoracic pressure. Anamnestically the patient had no history of severe thoracic illness. On clinical admission, routinely collected laboratory values – including leukocytes – were normal. A chest CT scan with intravenous contrast was performed and depicted a solid tumor of about 10×5×6 cm in the superior anterior mediastinum. The tumor was located in the immediate vicinity of the pericardium above the aortic arch and superior vena cava, with no signs of infiltrative growth. CT-acquired histol-

ogy via Biopince (Amgiotech, Medical Device Technologies Inc., Florida, USA; 10 cm, 18ga) revealed a thymoma as the diagnosis. The post-diagnosis algorithm for adequate treatment of the patient included an interdisciplinary and DIN 9001:2000 certified tumor conference with specialists of surgery, internal medicine, radiology, and pathology. Because the patient's symptoms were ameliorated, and especially given her age, it was decided first to pursue a wait-and-see strategy. Half a year later the patient presented again. A new CT scan revealed an increase in the size of the thymoma to 10×6×10 cm. The continuous growth increasingly affected cardiovascular structures in the mediastinum (Figure 1). The trachea was not deviated and the underlying diaphragm did not appear paralytic. It was decided to extirpate the tumor surgically, taking into account the increased risk of surgical interventions, especially in elderly patients.

The surgical procedure lasted for about 150 min. It included a complete sternotomy and mobilization of the tumor *per continuitatem* from caudal to cranial, and finally extirpation (Figure 2). Grossly, the tumor was adherent to the mediastinal pleura and pericardium without invading these structures. It was fed partly by one branch of the right internal thoracic artery – visible in the CT scan – that had to be occluded surgically. One Redon drain (10 Ch.) was placed dorsal to the sternum and one pleural drain (24 Ch.) was placed on each side as well.

Macroscopically, the biggest part of the delicately encapsulated, knotty, and mainly solid tumor measured 75×70×55 mm. For histo- and macro-pathological post-processing, the thym-

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oma was cut into slices (Figure 3). In general, the cutting area depicted was of a homogenous, brown appearance, with some focal cystic and some hemorrhagic lesions of a maximum of 15 mm. Adjacent extirpated soft tissue measured 120×75×20 mm. Microscopically, the tumor presented a lobular architecture. Multiple polygonal cells with large nuclei and prominent nucleoli could be identified (Figure 4A). Immunohistochemically, a Pan-CK and CK19 expression could be identified (Figure 4B) as well as a concomitant infiltrate of partly CD3-positive lymphocytes (Figure 4C). The

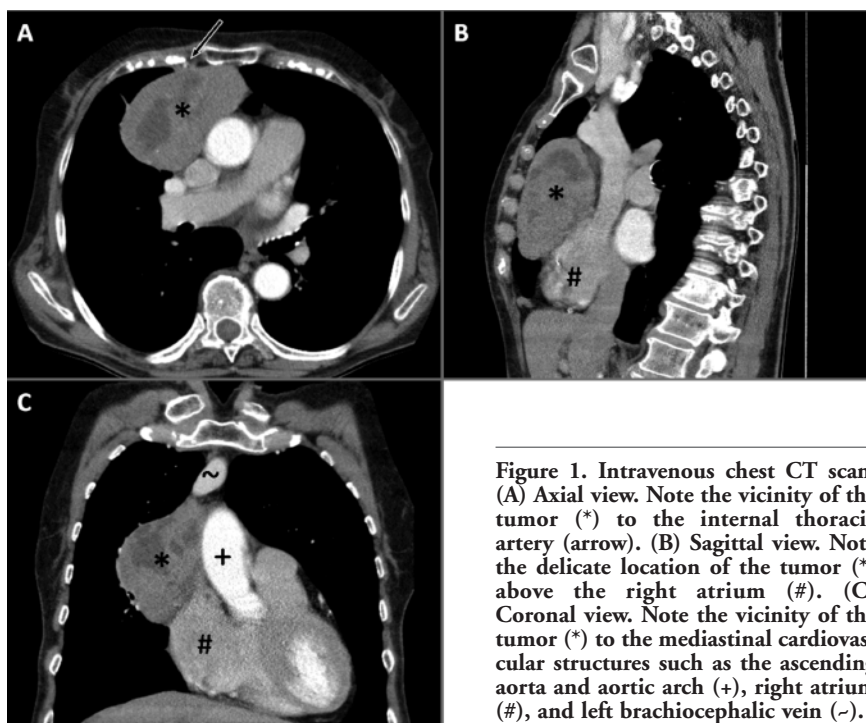


Figure 1. Intravenous chest CT scan. (A) Axial view. Note the vicinity of the tumor (*) to the internal thoracic artery (arrow). (B) Sagittal view. Note the delicate location of the tumor (*) above the right atrium (#). (C) Coronal view. Note the vicinity of the tumor (*) to the mediastinal cardiovascular structures such as the ascending aorta and aortic arch (+), right atrium (#), and left brachiocephalic vein (-).

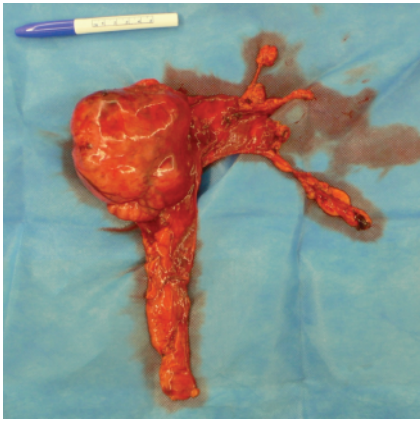


Figure 2. Intraoperative photograph of the recently extirpated thymoma.

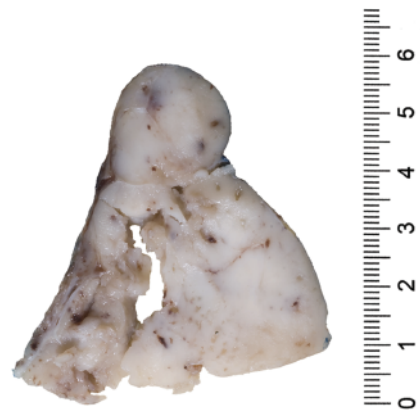


Figure 3. Cross-section preparation photograph of the macro-pathological, post-processed, delicately capsulated, knotty, and mainly solid thymoma.

lymphocytological proliferation rate MIB1 averaged 80% (Figure 4D).

In the final pathological classification, the tumor was staged type-B2 thymoma IIb according to the modified clinical Masaoka^{1,2} and histological WHO^{3,4} stages. As expected, CRP rose post-intervention to a maximum of 11.54 mg/dL (<0.5) on day 4 and decreased thereafter, to 6.67 mg/dL on day 5. The postoperative course was *ceteris paribus* uneventful. The patient was discharged on postoperative day 6. Follow-up studies up to this date have not revealed any recurrence of the tumor and will be continued.

Discussion

Thymomas have a prevalence of 0.1-0.4/100,000.⁵ They account for about 0.2-1.5% of all malignant tumors and for about 50% of all tumors in the upper ventral mediastinum; dis-

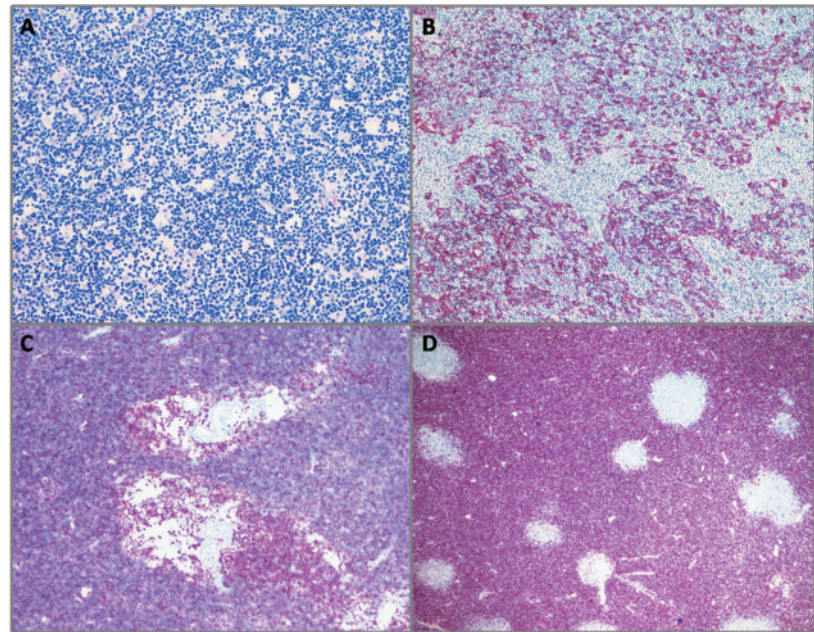


Figure 4. (A) Neoplastic epithelial cells of the thymoma in a lymphocytic background (Giemsa stain; 200X magnification). (B) Immunohistochemical expression of cytokeratin 19 highlights the neoplastic epithelial component (CK19; 100X magnification). (C) Perivascular accumulation of mature CD3-positive T-lymphocytes (CD3; 100x magnification). (D) High proliferative activity, sparing areas of accumulated mature T-lymphocytes (MIB1; 50X magnification).

tribution between sexes is about equal, and the majority of patients are aged between 40 and 60 years.⁶ Thymomas are epithelial tumors generally considered to have an indolent and slow growth pattern, but should be regarded as malignant nonetheless because of the potential for local invasion and, less often, systemic metastases.

One third of thymomas is detected casually in body imaging, one third of patients presents with local symptoms, and one third is diagnosed within myasthenia gravis evaluation.⁶ The latter seems especially noteworthy as other paraneoplastic autoimmune diseases occur only occasionally; for example, with small cell lung cancers or gynecological tumors, whereas myasthenia gravis is associated with thymomas in at least 30% of patients.⁷ Ectopic cervical thymomas are a rare and diagnostically challenging entity that frequently is misdiagnosed on fine needle aspiration cytology and frozen sections.⁸

The most commonly used classification of thymomas was initially introduced by Masaoka *et al.*¹ in 1981, and describes four stages of thymoma with special reference to the clinical stage. The most recent modifications were published in 2003³ and included more histological data. Generally, recurrences after complete surgical resection are rare but have been described in the literature.⁹⁻¹¹ Spontaneous tumor regression of invasive thymoma¹² as well

as of thymoma-associated immunodeficiency have been described as well.¹³

The effect of radiation therapy is discussed controversially. It is generally agreed that patients with a Masaoka III stage and higher benefit from radiation therapy. Chen *et al.* state that adjuvant radiotherapy after complete tumor resection for patients with stage II thymoma neither reduced recurrence rates significantly, nor improved survival rates.¹⁴ Several prognostic factors for thymic tumors, including the Masaoka stage, WHO histology, complete resection, great vessel invasion, and size of thymoma have been identified.¹⁵ In a recent publication, Wright *et al.* demonstrated that thymoma size is an independent risk factor and tumors measuring >8 cm were found to be recurrent in 29%,¹⁶ further justifying continuous follow-up studies of the patient presented. Tumor size of >11 cm as well as the histological type-B3 thymoma¹⁴ have also been described as significant independent prognostic variables.¹⁷ Concerning prognostic indicators after surgery for thymoma, Okereke *et al.* recently stated that long-term disease-specific survival can be expected not only after surgery for early-stage thymoma but also after surgery for advanced disease, including patients with pleural metastases but limited, however, by patients who undergo surgery for stage IV-A disease, who do have reduced disease-free survival.¹⁸ If the tumor is indeed malignant, the

risk of lymph node metastasis generally is estimated to be 1.8% and does not seem to impact on overall survival rate.¹⁹

Twenty-year survival rates of type II thymomas, according to the Masaoka staging system, are reported to be 91%.²⁰ Thymomas of the presented giant size are extremely rare. It is noteworthy that the delicate size and location of the tumor and the age of our patient necessitated deliberate surgical intervention.

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