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Metastatic B2 Thymoma in a Patient with Myasthenia Gravis Presenting as a Peri-splenic Mass: *A Rare Case Report*

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Abstract: Background: Thymomas are rare epithelial tumors of the thymus. Extra-thoracic metastasis is exceptional and typically involves the liver, bone, or soft tissues. Peri-splenic recurrence is exceedingly rare. **Case presentation:** A 42-year-old female previously treated for thymoma and pleural metastases presented six years later with a peri-splenic mass. CT-guided core biopsy and immunohistochemistry (p40, Pan-CK, TdT, CD3) confirmed metastatic B2 thymoma. **Conclusion:** This case highlights an unusual pattern of abdominal recurrence and underscores the value of immunohistochemistry in differentiating thymoma metastasis from lymphoma.

Keywords: Thymoma; B2 thymoma; Peri-splenic mass; Myasthenia Gravis; Metastasis; Recurrence; Case Report

Background

Thymomas are a heterogeneous group of malignant tumors that arise from the thymus gland. Although rare, they represent the most common primary malignancy in the anterior mediastinum [1]. One-half of the patients present with Myasthenia Gravis (MG), and 15% of MG patients have thymoma [2]. According to the 2021 WHO tumor classification, thymomas are subdivided into five types (A, AB, B1, B2, and B3) based on the proportions and histomorphology of epithelial and lymphoid elements within the tumor [3]. Extra-thoracic metastasis is rare, with an incidence rate of less than 5% [4]. The most common sites of extra-thoracic metastasis are the liver, bones, lymph nodes, and soft tissue. [5–7].

Only a few cases of spleen involvement have been reported. Chen et al. (2016) documented an unusual case with abdominal involvement [8]. Aoki et al. (2018) described a solitary splenic metastasis detected eight years after thymectomy [9]. Wu et al. (2022) also reported a recurrent malignant thymoma with splenic metastasis [10].

To our knowledge, this case is the first reported case from Palestine of a B2-thymoma metastasizing to the spleen, without other lesions, occurring several years after initial diagnosis. This case highlights the important role of immunohistochemistry in differentiating thymoma metastasis from other hematologic or epithelial malignancies, particularly given the rarity of extra-thoracic metastasis.

Case presentation

A 42-year-old female was first diagnosed with thymoma in 2019 after presenting with generalized weakness due to myasthenia gravis. Imaging at that time revealed an anterior mediastinal mass, and she underwent thymectomy at an outside hospital, confirming thymoma on histopathologic examination.

In 2023, the patient developed bilateral pleural metastasis, for which she received neoadjuvant chemotherapy followed by surgical excision and adjuvant radiotherapy. Post-treatment PET-CT at that time showed no evidence of residual disease.

In 2025, the patient presented again with a new peri-splenic mass detected on surveillance imaging without any systemic or hematologic abnormalities. Detailed medication history and laboratory investigations were unavailable, as the case was referred solely for biopsy of the peri-splenic lesion (Fig. 1). No additional metastases were detected on the concurrent whole-body PET-CT, indicating isolated abdominal recurrence at the time of presentation to our center.

Contrast-enhanced CT of the abdomen was performed with 1-mm slice thickness, including both late arterial (45s) and portal venous (75s) phases. The study demonstrated a well-circumscribed, non-enhancing hypodense peri-splenic soft tissue lesion measuring approximately 5.5x2x5cm with a mean attenuation of 65HU. The splenic parenchyma and capsule were intact, with a thin intervening fat plane separating the lesion from the spleen, indicating no direct invasion of the splenic tissue.

A CT-guided biopsy of the mass was performed under local anesthesia, and the procedure was uneventful. Histopathological examination showed cores of tissue fragments infiltrated by loosely cohesive lymphoid cells with only a scant amount of cytoplasm and rounded nuclei. Dispersed in a fibrotic background are small aggregates of larger cells with more abundant cytoplasm (Fig. 2).

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Immunohistochemical staining was performed using the following antibodies:

CD3 (Ventana, clone 2GV6, membranous staining), TdT (Cell Marque, clone 2760, nuclear staining), P40 (Ventana, clone BC28, nuclear staining), Pan-cytokeratin AE1/AE3/PCK26 (Ventana, cytoplasmic staining), CD5 (Ventana, clone SP19, membranous staining), CD117 (Leica, clone EP10, cytoplasmic staining), CD34 (Ventana, clone QBEnd/10, membranous staining), and Ki-67 (Ventana, clone 30-9, nuclear staining).

The lymphoid cells were diffusely positive for CD3 and TdT, confirming a thymocytic origin. The larger neoplastic cells (epithelial component) showed strong nuclear positivity for P40 and cytoplasmic reactivity for Pan-CK, confirming thymic epithelial differentiation. The neoplastic cells were negative for CD117, CD5, and CD34, and the Ki-67 proliferation index was approximately 80% in the lymphoid cells (Figure 3).

According to the WHO 2021 classification of thymic epithelial tumors, the predominance of lymphocytes with readily identifiable polygonal epithelial cells forming a loose network defines Type B2 thymoma. The immunoprofiles and morphologic features excluded important mimickers. T-lymphoblastic lymphoma was excluded by the presence of a biphasic architecture with distinct cytokeratin- and p40-positive epithelial cell nests admixed with TdT-positive immature thymocytes, a feature not seen in lymphoma. Metastatic carcinoma was excluded by the background of immature thymocytes and negativity for broad epithelial markers beyond the thymic nests. Collectively, the findings were diagnostic of metastatic type B2 thymoma.

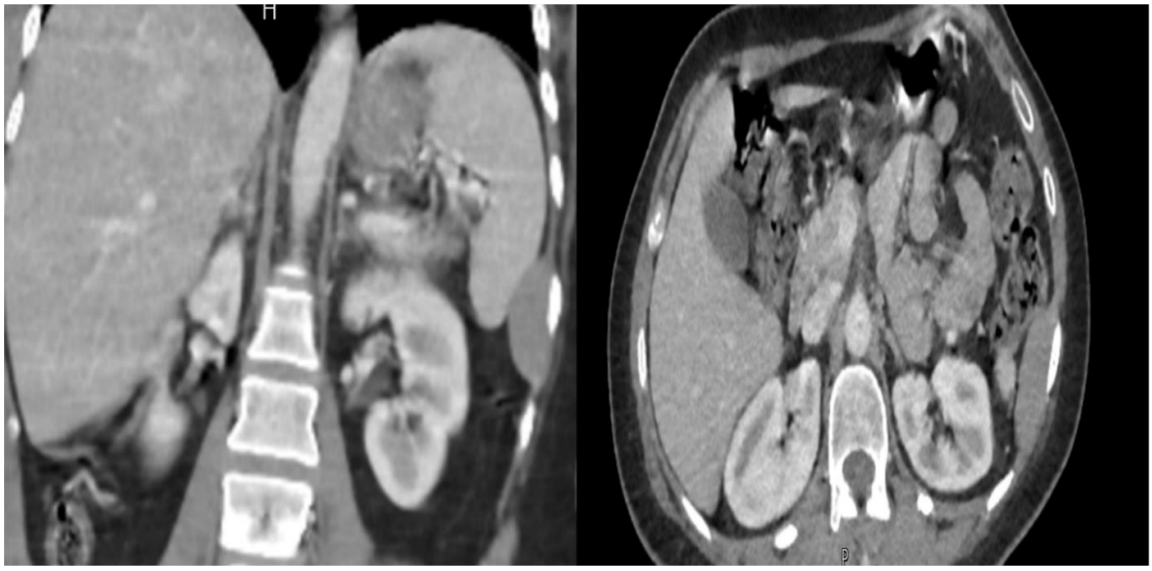

Figure (1): Coronal and axial contrast-enhanced CT scans of the abdomen (portal venous phase, 1-mm slice thickness) showing a well-circumscribed hypodense peri-splenic mass measuring approximately 5.5 × 2 × 5 cm (mean attenuation 65 HU), separated from the spleen by an intact capsule and thin fat plane.

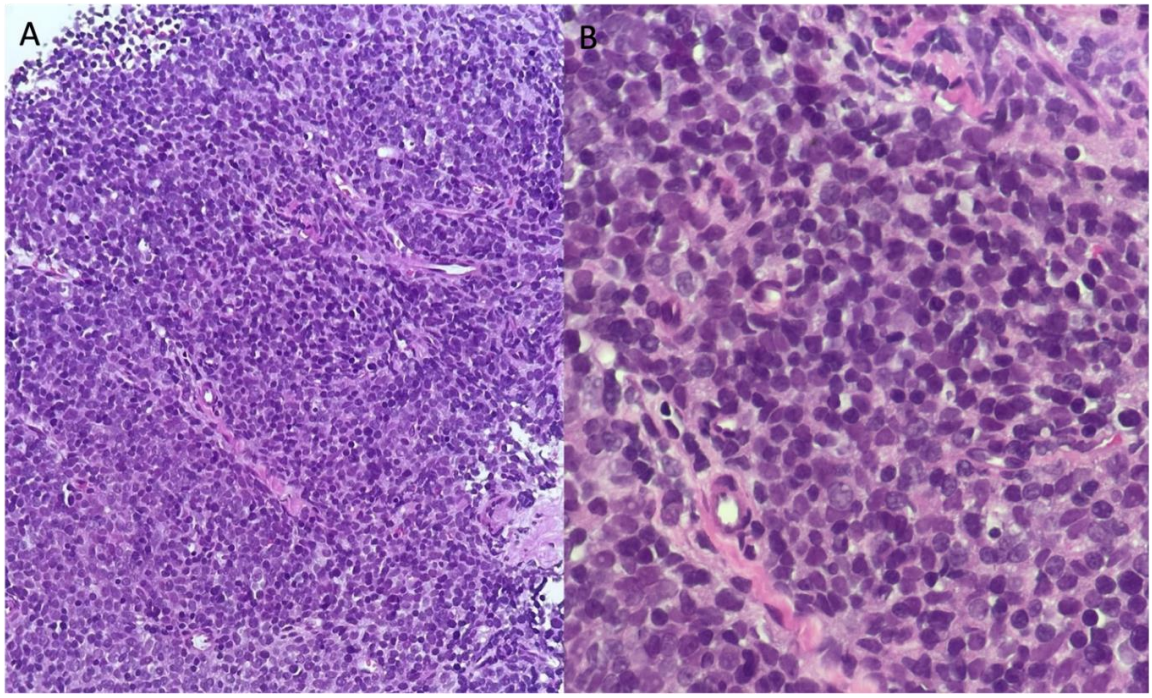

Figure (2): (A) Low-power view (10×, scale bar = 100 µm) showing fibrotic stroma infiltrated by small- to medium-sized lymphoid cells. (B) High-power view (40×, scale bar = 50 µm) demonstrating scattered nests of larger polygonal epithelial cells with more abundant cytoplasm among the lymphoid component, consistent with a biphasic thymic pattern.

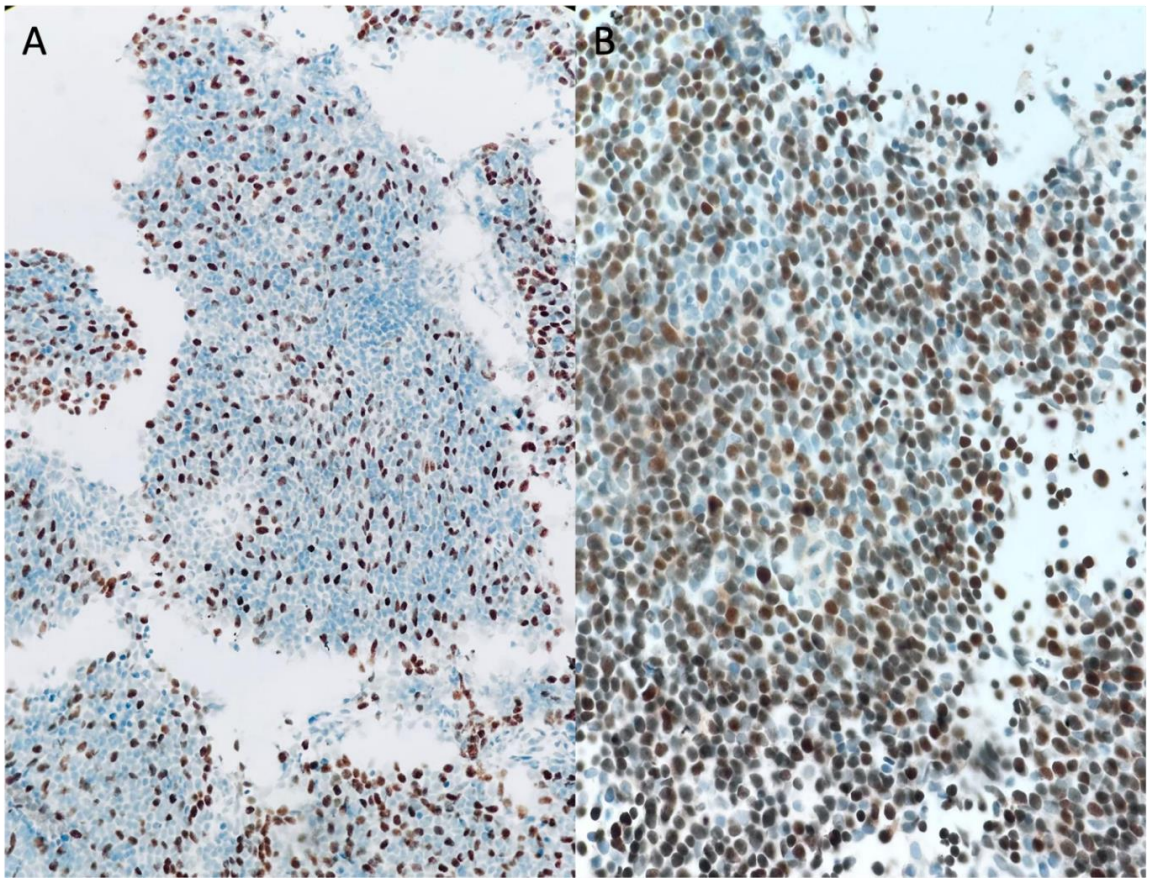

Figure (3): (A) P40 (Ventana, clone BC28, nuclear staining, 10×, scale bar = 100 µm) showing nuclear positivity in epithelial cell islands. (B) TdT (Cell Marque, clone 2760, nuclear staining, 40×, scale bar = 50 µm) highlighting strong nuclear labeling of immature thymocytes surrounding the epithelial component.

Discussion

Thymomas are indolent to intermediate thymic epithelial neoplasms with a recognized potential for local recurrence. Most recurrences are pleural or pericardial implants. Extra-thoracic metastases are uncommon and have been documented in the liver, bone, lymph nodes, and soft tissue more frequently than the splenic/peri-splenic region. In the most comprehensive focused review, Vladislav et al. summarized 35 extra-thoracic thymic metastases, highlighting the liver and soft tissues as the predominant sites, whereas splenic/peri-splenic disease is exceedingly rare. Our case contributes to isolated reports describing splenic or peri-splenic metastasis occurring years post-initial treatment, including the splenic solitary metastasis documented by Aoki et al., the splenic recurrence noted by Wu et al., and the abdominal dissemination reported by Chen et al.

Mechanism of spread: The possible routes for a peri-splenic lesion include: (1) hematogenous spread with implantation on the peri-splenic serosa (consistent with the spleen's intact capsule in our case), (2) lymphatic spread via the diaphragmatic/thoracic duct, and, less likely, (3) transcelomic spread from prior pleural disease traversing the diaphragm. The CT findings of an intact splenic capsule without evidence of splenic parenchymal invasion, along with the presence of an intervening fat plane, favor serosal/peri-splenic implantation rather than true splenic metastasis in this patient.

Prognostic implications: Extra-thoracic metastasis corresponds to advanced stage (e.g., Masaoka-Koga IVb) and has been associated with an increased risk of late recurrence, a finding that is well recognized in thymomas. Although it carries a better prognosis than B3 and thymic carcinoma, B2 thymoma is associated with a higher frequency of advanced stage at presentation and for recurrences compared with types A/AB. The interval pattern in our patient (2019 primary → 2023 pleural metastases → 2025 peri-splenic recurrence) corresponds with the protracted natural history and the necessity for long-term monitoring even after complete responses on PET-CT.

Diagnostic pitfalls and the role of immunohistochemistry: A peri-splenic lesion with a histomorphology rich in immature T-cells can simulate T-lymphoblastic lymphoma. In our case, the biphasic architecture with Pan-CK/p40 positive epithelial islands and TdT/CD3 positive immature thymocytes supported metastatic B2 thymoma over lymphoma (which lacks epithelial component/cytokeratin differentiation). This pattern underscores a practical diagnostic algorithm: In any TdT-rich small round blue cell lesion outside the mediastinum, actively search for an epithelial component and confirm with cytokeratin and p40 to exclude a metastatic thymoma.

Clinical relevance: It is important to recognize peri-splenic metastatic thymoma because it changes the stage, prognosis, and follow-up plan. Given the rarity, each case is handled differently. For diagnosis, an image-guided biopsy may be done; for isolated lesions, surgical excision may be considered; and for metastatic disease, systemic therapy may be used, including chemotherapy and radiotherapy. A CT-guided core biopsy confirmed our patient's lesion.

The patient was sent to our center mostly for diagnostic evaluation and a CT-guided biopsy. After histopathologic confirmation of metastatic B2 thymoma, the patient was referred back to her oncology team for additional management. As of 2025, when the manuscript was written, follow-up imaging showed a new lung mass, indicating disease recurrence. This highlights the persistent indolent yet recurrent nature of thymoma and the necessity for prolonged monitoring even following initial remission.

Conclusion

Metastatic thymoma is a rare finding, with extra-thoracic dissemination being an uncommon occurrence. Abdominal metastasis, particularly to the peri-splenic region, is exceptionally rare, making our case a significant addition to the literature. This highlights the importance of considering metastatic thymoma in the differential diagnosis of unexplained abdominal mass, especially with a history of thymoma or myasthenia gravis. Given the diagnostic challenges posed by thymoma metastases, histopathological examination complemented by immunohistochemical staining is essential for accurate identification. Further research is warranted to better understand the metastatic patterns and optimize management strategies for these rare presentations.

List of abbreviations

World Health Organization = WHO

Figure Legends

Figure 1 = Radiographs of the abdominal peri-splenic mass.

Figure 2 = Hematoxylin and Eosin histopathological examination of the lesion

Figure 3 = Immunohistochemical staining pattern of the lesion

Disclosure statement

- **Ethics approval and consent to participate:** The university IRB has given approval to conduct and publish the manuscript
- **Consent for publication:** No written consent to publish was obtained from the patient. However, verbal consent was obtained. IRB was also obtained
- **Availability of data and materials:** The datasets used and/or analyzed during the current study are available from the corresponding author upon reasonable request.
- **Competing interests:** The authors declare that they have no competing interests
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- **Authors' contributions:** M.S: Wrote the manuscript and performed the histological examination. L.D: Performed the radiological examination. M.K: Performed the CT-guided biopsy. Z.Z: Was a major contributor to writing the manuscript. M.S: Was a major contributor to writing the manuscript. N.Q: Was a major contributor to writing the manuscript. All authors read and approved the final manuscript.
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