An Unusual Indolent Presentation of Thymoma with a Large Pericardial Effusion: A Comprehensive Case Report

Tuong Nguyen[1], Duc Nguyen[2], John Ohmer[3], Nghi Tran[4], Anh Tien[5], Mai Do[6], Thai Tang[6], Thuy Le[7], Tu Le[5], Thu Le[6], and Phillip Tran[8]

[1]Pham Ngoc Thach University of Medicine
[2]Hanoi Medical University
[3]Midwestern University Arizona College of Osteopathic Medicine
[4]Weiss Memorial Hospital
[5]Hue University of Medicine and Pharmacy
[6]Nam Can Tho University
[7]Da Nang University of Medical Technology and Pharmacy
[8]Yavapai Regional Medical Center

September 30, 2023

INTRODUCTION

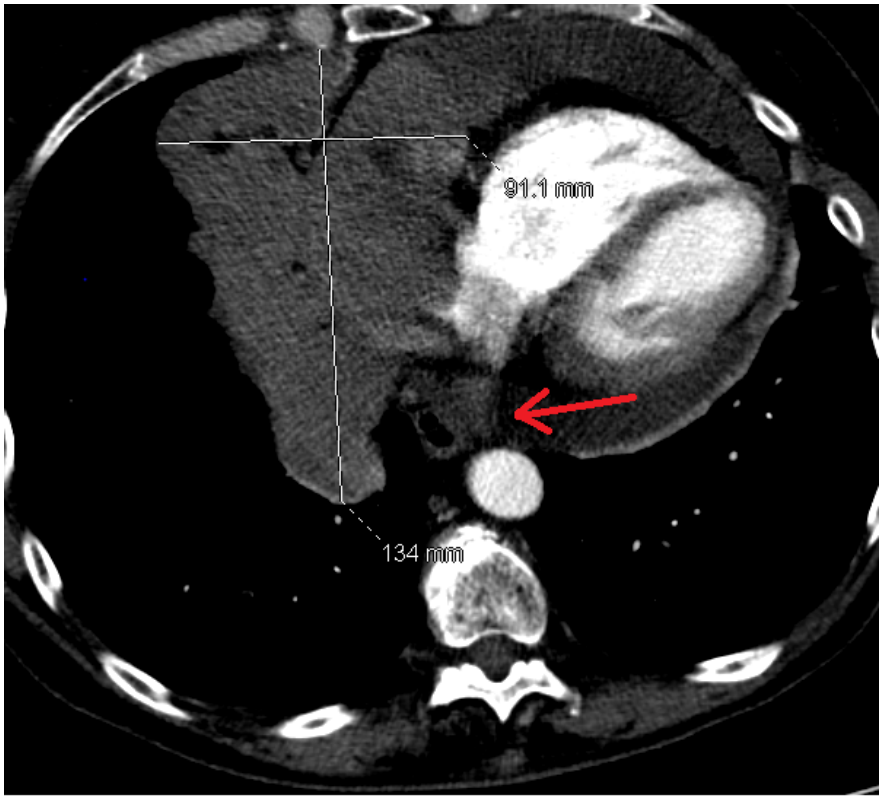
Thymoma, a rare mediastinal tumor, often requires differential diagnosis from other mediastinal masses, necessitating a multidimensional approach combining various imaging modalities and histopathologic analysis.[1] Accurate correlation of these features is pivotal for drawing definitive diagnostic, prognostic, and disease staging conclusions. Moreover, the presence of local invasion complicates complete mass resection, underlining the necessity for a multidisciplinary approach in such scenarios.[2,3]

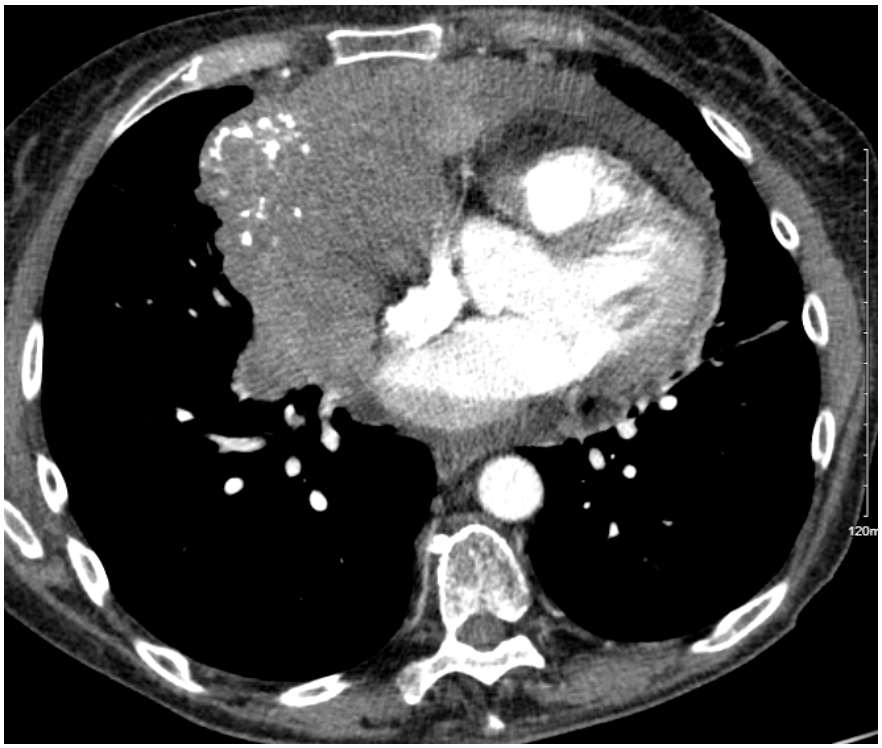
In this case report, we detail the evaluation of a 69-year-old female presenting with recurrent left chest wall pain, subacute decline in functional status, and exertional dyspnea. Imaging disclosed a sizable anterior mediastinal mass encroaching into the pericardium and right pleural space, accompanied by loculated pericardial effusion, which was later confirmed as thymoma upon histopathological examination. This case underscores the potential complexities encountered in the diagnostic journey of thymoma, while also emphasizing the importance of an integrated approach and the challenges imposed by local invasion.

CASE PRESENTATION

A 69-year-old female with an unremarkable past medical history was evaluated due to recent dyspnea on excessive physical activity and declined functional capacity. She had been experiencing recurrent left upper chest pain for five months, unrelated to trauma. She has occasional coughs, but no weight loss or history of tumors was reported. She is hypothyroid and has occasional sweating. The patient has no cardiac murmurs, signs of heart failure, or palpable lymphadenopathy.

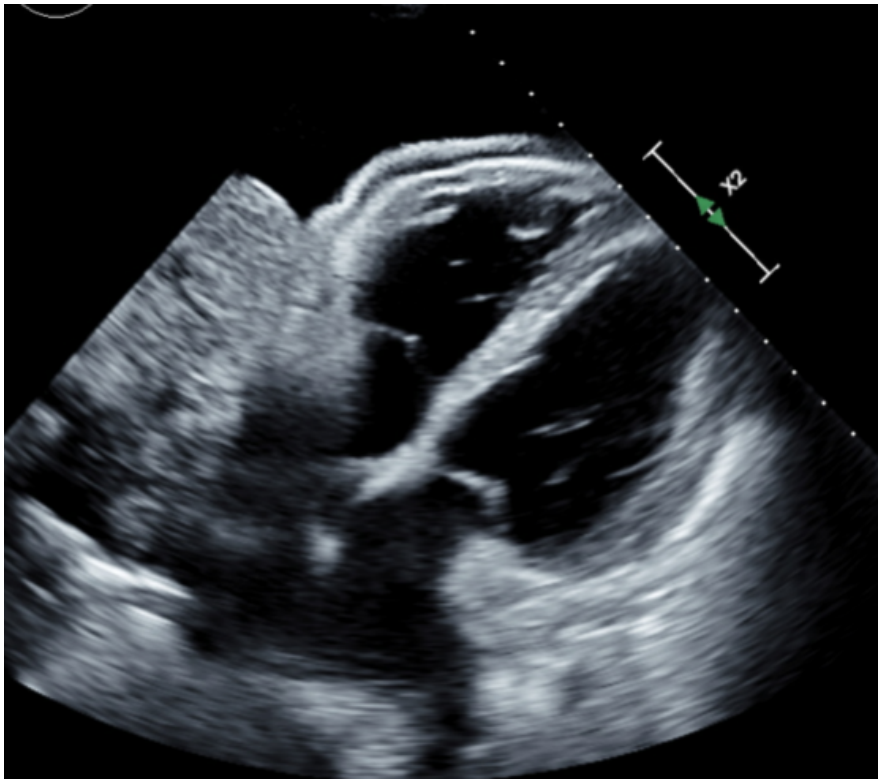
Chest computed tomography (CT) revealed an anterior mediastinal mass measuring 13.4 x 9.1 cm with moderate to large pericardial effusion, a 15 mm subcarinal lymph node was also seen [**Figure 1A**]. The mass contained heterogeneous calcifications with extension into the pericardium and the right pleural space. There was extrinsic compression of the superior vena cava, without significant obstruction [**Figure 1B**]. Echocardiography showed moderate pericardial effusion without signs of tamponade [**Figure 2A and 2B**]. The patient remained hemodynamically stable without evidence of tamponade physiology, jugular venous distension, or pulsus paradoxus, emergent pericardiocentesis was not indicated.

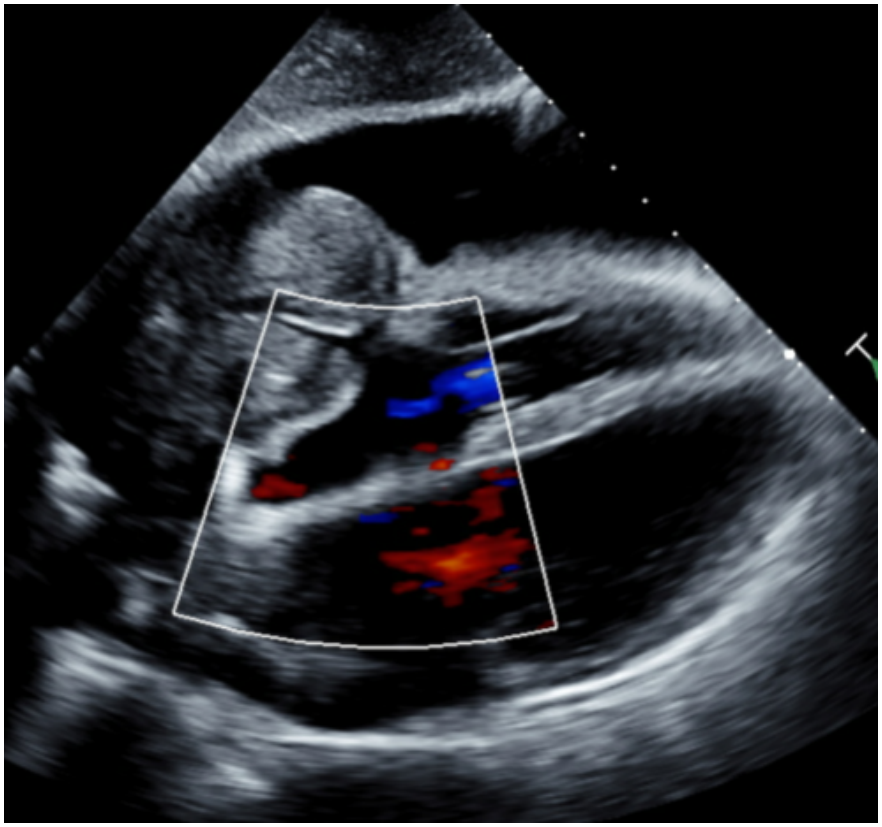




(B)

Figure 1: Chest CT scans showed an anterior mediastinal mass measuring 13.4 x 9.1 cm with moderate to large pericardial effusion**(A)** , a 15 mm subcarinal lymph node was also seen (arrow). There were heterogeneous calcifications with extension into the pericardium and the right pleural space, and extrinsic compression of the superior vena cava can also be seen**(B).**

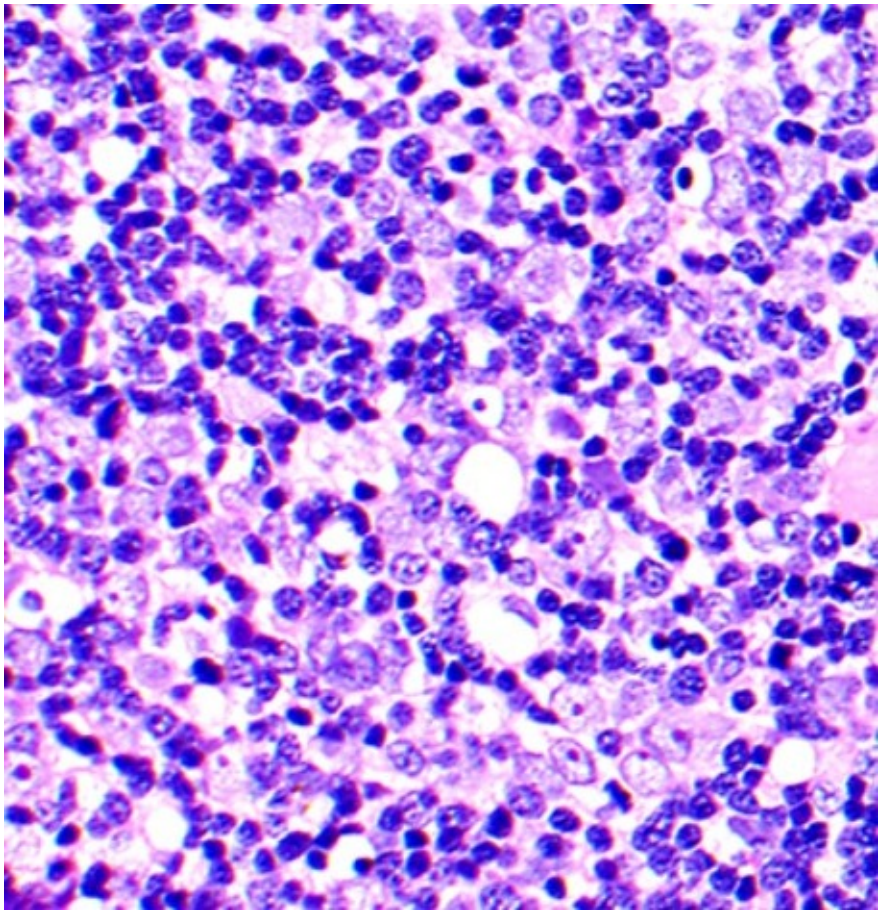


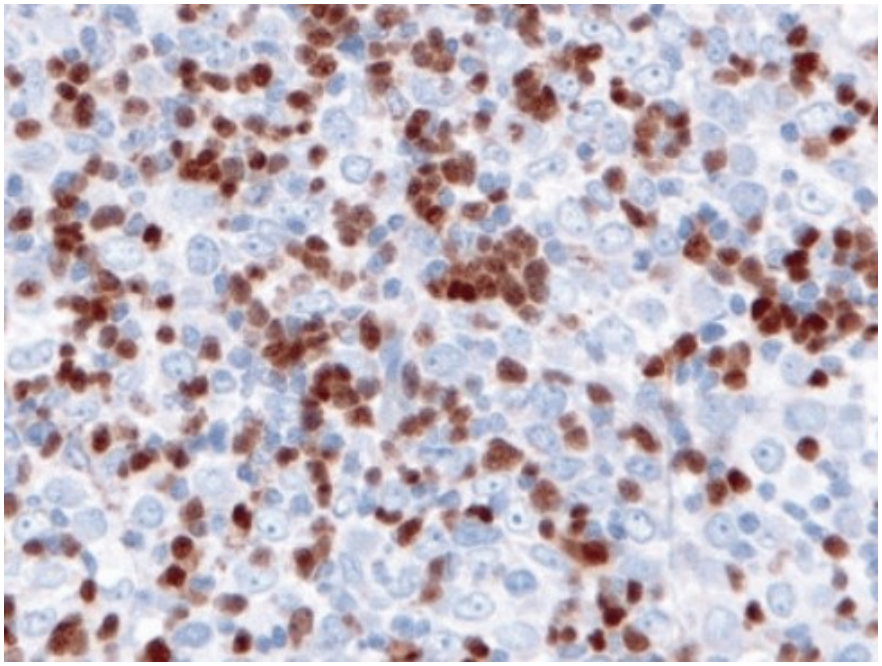


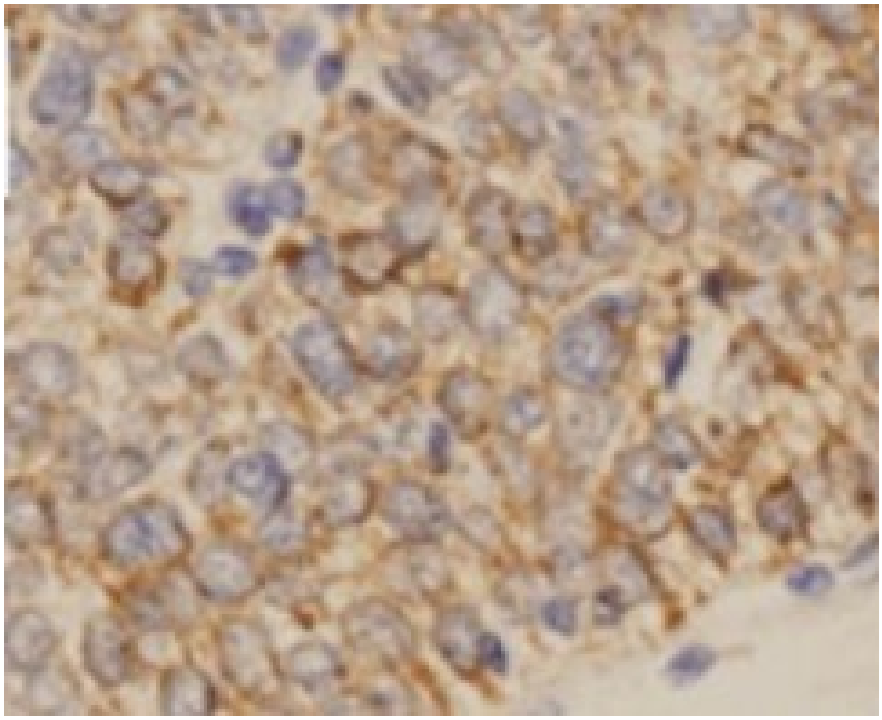
(A) (B)

Figure 2 : Echocardiography showed moderate pericardial effusion without signs of tamponade (A and B)

Due to the concerns of malignancy and risk for tumor dissemination, high-complexity fluoroscopy-guided pericardiocentesis was performed for symptomatic relief and cytological examination. The procedure was successful without complications. The core biopsy tissue contained a neoplasm composed of variably sized lobules/nodules of cells separated by broad fibrous bands. The cellular component is composed of a mixture of abundant small round lymphocytes and variable numbers of epithelial cells with ill-defined cell borders. The epithelial cells have large and round vesicular nuclei with occasional small pinpoint nucleoli. These were highlighted by immunohistochemistry for CK5 and p40. No necrosis or cytologic features of carcinoma were identified. The combined morphology and immunohistochemical test results are indicative of thymoma, subtype WHO B2.



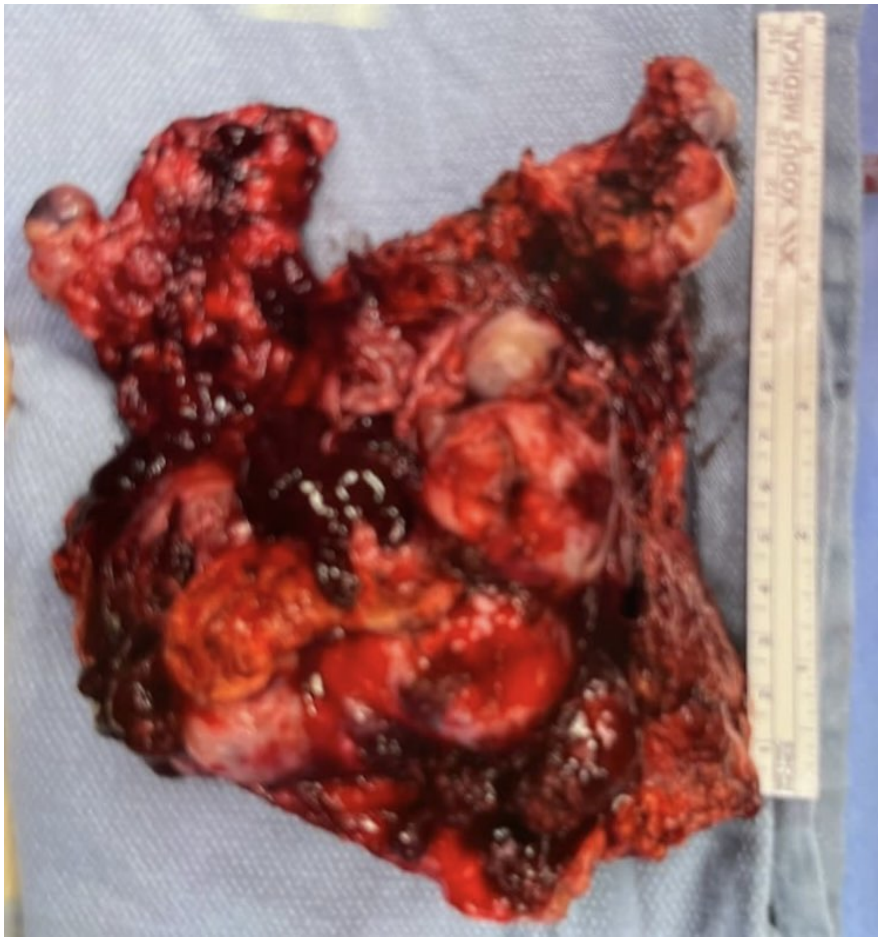




(A) (B) (C)

Figure 3 : Mixture of small lymphocytes and clusters of epithelial tumor cells (A), along with immunohistochemistry positivities for CK5 (B) and p40 (C). These features correlate with thymoma, subtype WHO B2.

Subsequent to the stabilization of the patient's cardiac condition, meticulous consideration was accorded to the surgical approach to address the thymoma. Given the extensive and aggressive nature of the tumor, evidenced by the imaging results, surgical removal was deemed imperative to mitigate any further compromise to the patient's health. A comprehensive multidisciplinary review, incorporating oncologic, surgical, and medical perspectives, concurred on the primacy of surgical intervention. The patient underwent a successful surgical resection of the thymoma. Postoperative course was uneventful and the patient was discharged.



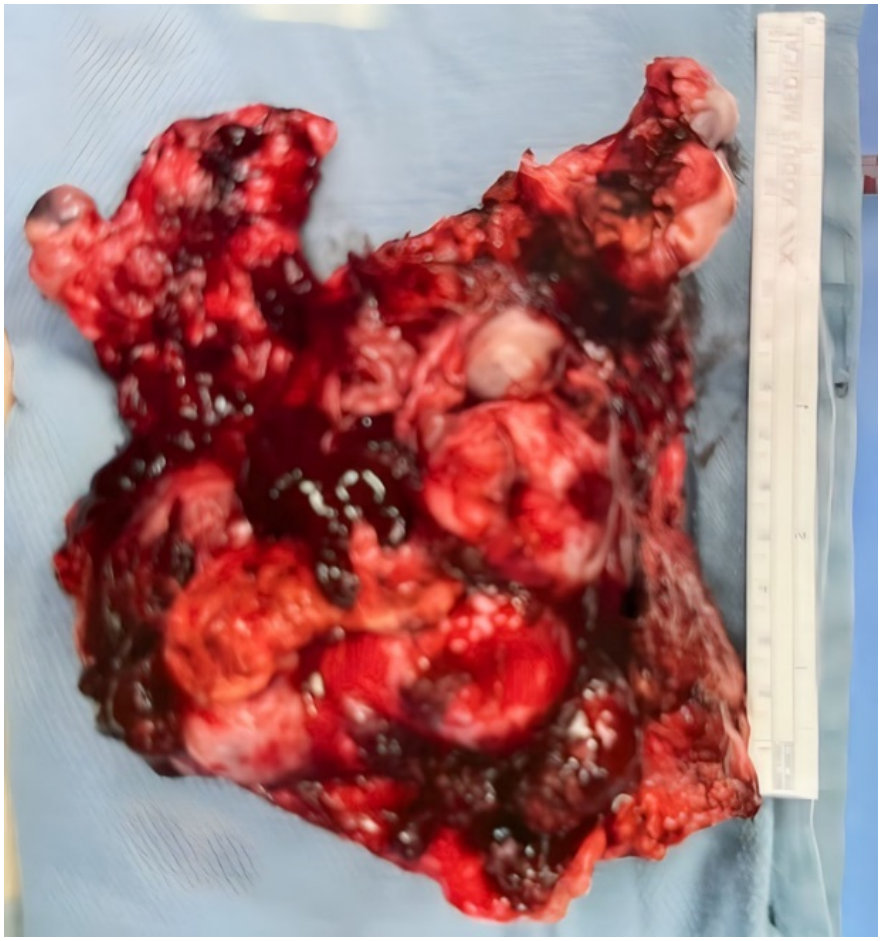


Figure 4 . Gross pathology of the tumor. Resection of a well-circumscribed, multiple lobulated mass with a smooth, irregular outer surface, indicative of its mediastinal origin. The cut section reveals tan-yellowish parenchyma interspersed with fibrous bands and focal calcifications, showcasing the morphological intricacies and diverse cellular components characteristic of thymomas.

DISCUSSION

Thymoma, a rare malignancy, accounts for 20%-25% of mediastinal tumors and exhibits a diverse range of clinical manifestations and an elusive etiology.[4,5] The initial presentation of our patient was characterized by recurrent chest pain over five months, followed by a more subacute presentation with exertional dyspnea and decline in functional status. Although many cases of thymoma are asymptomatic, the indolent course, and pericardial involvement observed in this case is atypical and highlights the need for a high index of suspicion in patients presenting with persistent or recurrent symptoms.[1] Riedel et al. previously reported several cases of indolent thymoma, corroborating our observation that thymoma can exhibit a largely indolent growth pattern.[6]

In this case, the decision to opt for a high-complexity fluoroscopy-guided pericardiocentesis was influenced by several key factors, each carrying significant implications for clinical practice. The patient's initial presentation included a series of concerning symptoms, most notably exertional dyspnea and a significant decline in functional status, necessitating immediate symptomatic relief. In addition, the CT scan revealed an anterior mediastinal mass accompanied by a moderate to large pericardial effusion, yet without any indicators of significant obstruction or tamponade physiology, thereby allowing for a planned, rather than urgent, ap-

proach. Thus, fluoroscopy-guided pericardiocentesis, being a minimally invasive procedure, was the modality of choice serving a dual purpose: it facilitated symptom relief by enabling the removal of pericardial effusion and concurrently allowed for the examination of the fluid for malignant cells.[7,8] However, prior studies have showed that cancer cells can migrate to the pericardial fluid and performing pericardiocentesis might pose risk for dissemination.[9,10] Therefore, there existed substantial concerns regarding malignancy and the potential risk of tumor dissemination. In fluoroscopy-guided pericardiocentesis, the utilization of fluoroscopy ensured precision in needle placement, minimizing the risk of complications such as cardiac tamponade or puncture of surrounding structure, in addition to reducing the risk of malignant cells migration.

The histological classification of thymomas predominantly relies on tumor cytomorphology. However, the World Health Organization (WHO) classification has undergone several modifications over time, leading to a more nuanced understanding of specific tumor types.[11] In this patient, the core biopsy tissue analysis confirmed a thymoma, subtype WHO B2, characterized by a mixture of small round lymphocytes and epithelial cells with ill-defined cell borders, separated by broad fibrous bands and highlighted by immunohistochemical staining for CK5 and p40. The absence of necrosis or cytologic features of carcinoma suggested a lower risk of aggressive behavior. The chosen subtype (WHO B2), while being more aggressive than B1 subtype, is not linked with high invasiveness or aggressive migration, reaffirming the suitability of the chosen approach.[11] However, the literature scarcely addresses the indolent course of the B2 subtype, making this case potentially indicative of broader implications that warrant further exploration and research.[12]

Within the expansive arsenal for managing thymoma, surgical resection is a cornerstone, especially for localized entities. The indolent nature and subacute presentation of our case allowed for a non-urgent, thoughtful approach to intervention. This aligns with the case reported by Azuma et al., where a giant tumor necessitated immediate surgical intervention.[13] In Azuma's case, the patient showed various clinical symptoms and was also diagnosed with WHO B2 thymoma. Despite being the same subtype, our patient's gross pathology of the tumor showed a more aggressive and expansive pattern, which further testified to the surgical approach. In addition, our patient showed a concurrent pericardial effusion, which necessitated an in-depth exploration. However, it's worth noting that B2 subtype thymoma has a high recurrence rate at 18.6% for the particular subtype and up to 50% for Masaoka stage.[14] This implies necessity for vigilant postoperative surveillance and comprehensive long-term management plan.

Comparing this case with similar instances documented in the literature highlights some distinct characteristics. For example, Bakhriansyah J. et al. detailed a case of a patient with advanced thymoma complicated by purulent pericarditis.[15] Similar to our approach, Bakhriansyah J. et al. also chose fluoroscopy-guided pericardiocentesis, reinforcing the safety and effectiveness of this method. However, our case manifested a more indolent course and a semi-emergent situation, contrasting with the more acute presentation in the case reported by Bakhriansyah J. et al. This difference underscores the variability in the clinical presentation of thymomas and highlights the necessity for individualized, case-by-case decision-making in managing these patients. Khan et al. reported a case with cardiac tamponade, which they chose to open an emergent pericardial window for pericardial drainage.[16] This difference in approach between the case reported by Khan et al. and our own highlights the importance of considering the overall health status of the patient and the specific characteristics of the tumor when selecting an appropriate treatment strategy. In the case reported by Khan et al., the presence of cardiac tamponade, a life-threatening emergency, necessitated immediate intervention to drain the pericardial effusion, thereby justifying the choice for an emergent pericardial window. In contrast, our patient presented with a more subacute course, without signs of significant obstruction or tamponade physiology, allowing us to opt for a less invasive, yet equally effective, fluoroscopy-guided pericardiocentesis. This not only provided immediate symptomatic relief but also enabled us to obtain a sample for cytological examination, thereby aiding in the diagnosis and subsequent treatment planning.

CONCLUSION

This case illustrates the importance of recognizing the potentially indolent course that thymoma, specifically subtype B2, can exhibit. The patient's unique presentation and gradual progression of symptoms allowed for a meticulous and well-considered approach to her treatment, ultimately leading to the decision of surgical

intervention. Recurrence rate for thymoma is high, implying a necessity for a tailored treatment approach and postoperative surveillance strategy. In addition, our case highlighted the effectiveness of fluoroscopy guided pericardiocentesis as a safe and effective procedure for both symptom relief and cytological examination in patients with thymoma.

REFERENCES

1. Detterbeck, F. C. & Zeeshan, A. Thymoma: current diagnosis and treatment. *Chin. Med. J. (Engl.)* **126** , 2186–2191 (2013).

2. Utsumi, T. *et al.* Stage III thymoma: relationship of local invasion to recurrence. *J. Thorac. Cardiovasc. Surg.***136** , 1481–1485 (2008).

3. Wright, C. D. Management of thymomas. *Crit. Rev. Oncol. Hematol.* **65** , 109–120 (2008).

4. Engels, E. A. Epidemiology of Thymoma and Associated Malignancies.*J. Thorac. Oncol.* **5** , S260–S265 (2010).

5. De Jong, W. K. *et al.* Thymic epithelial tumours: A population-based study of the incidence, diagnostic procedures and therapy. *Eur. J. Cancer* **44** , 123–130 (2008).

6. Riedel, R. F. & Burfeind, W. R. Thymoma: Benign Appearance, Malignant Potential. *The Oncologist* **11** , 887–894 (2006).

7. Alp, I. *et al.* Safety Pericardiocentesis with Fluoroscopy Following Cardiac Surgery. *Ann. Thorac. Cardiovasc. Surg. Off. J. Assoc. Thorac. Cardiovasc. Surg. Asia* **25** , 158–163 (2019).

8. Iliescu, C., Khair, T., Marmagkiolis, K., Iliescu, G. & Durand, J. B. Echocardiography and Fluoroscopy-Guided Pericardiocentesis for Cancer Patients With Cardiac Tamponade and Thrombocytopenia. *J. Am. Coll. Cardiol.* **68** , 771–773 (2016).

9. Celerrnajer, D. S., Boyer, M. J., Bailey, B. P. & Tattersall, M. H. N. Pericardiocentesis for symptomatic malignant pericardial effusion: a study of 36 patients. *Med. J. Aust.* **154** , 19–22 (1991).

10. Dragoescu, E. A. & Liu, L. Pericardial fluid cytology: An analysis of 128 specimens over a 6-year period: Pericardial Fluid Cytology/Dragoescu and Liu. *Cancer Cytopathol.* **121** , 242–251 (2013).

11. Marx, A. *et al.* The 2021 WHO Classification of Tumors of the Thymus and Mediastinum: What Is New in Thymic Epithelial, Germ Cell, and Mesenchymal Tumors? *J. Thorac. Oncol.* **17** , 200–213 (2022).

12. Song, Z., Jin, X. & Zhang, Y. Treatment and prognosis of type B2 thymoma. *World J. Surg. Oncol.* **12** , 291 (2014).

13. Azuma, Y. *et al.* Giant thymoma successfully resected via median sternotomy and anterolateral thoracotomy: a case report. *J. Cardiothorac. Surg.* **13** , 26 (2018).

14. Bae, M. K. *et al.* Predictors of recurrence after thymoma resection. *Yonsei Med. J.* **54** , 875–882 (2013).

15. Bakhriansyah, J. *et al.* Purulent pericarditis in advanced thymoma: A case report. *Radiol. Case Rep.* **17** , 3996–4000 (2022).

16. Khan, A., Jain, A. G., FaisalUddin, M., Khetpal, N. & D'Souza, J. Cardiac Tamponade in the Setting of a Thymoma. *Cureus***11** , e4952 (2019).