Scholars Journal of Medical Case Reports
Abbreviated Key Title: Sch J Med Case Rep
ISSN 2347-9507 (Print) | ISSN 2347-6559 (Online)
Journal homepage: https://saspublishers.com

OPEN ACCESS

Cardiothoracic Surgery

Giant Anterior Mediastinal Germ Cell Tumor with Yolk Sac Component Managed with Neoadjuvant Chemotherapy and Surgical Debulking

T. Thangarajoo[1*], Reinukaa P[1], Thomas F[2]

[1]Medical Officer, Department of Cardiothoracic Surgery, Hospital Queen Elizabeth 2, Kota Kinabalu, Sabah, Malaysia
[2]Consultant Cardiothoracic Surgeon, Department of Cardiothoracic Surgery, Hospital Queen Elizabeth 2, Kota Kinabalu, Sabah, Malaysia

DOI: https://doi.org/10.36347/sjmcr.2026.v14i04.030 | **Received:** 24.02.2026 | **Accepted:** 11.04.2026 | **Published:** 18.04.2026

***Corresponding author:** T. Thangarajoo
Medical Officer, Department of Cardiothoracic Surgery, Hospital Queen Elizabeth 2, Kota Kinabalu, Sabah, Malaysia

Abstract **Case Report**

Primary Mediastinal Germ Cell Tumor is a rare extragonadal malignancy, particularly in adolescents. Among these, tumors containing Yolk Sac Tumor components represent an aggressive subtype of Non-seminomatous Germ Cell Tumor. We report a case of a 17-year-old male who initially presented with symptoms suggestive of pneumonia. Further evaluation revealed a large anterior mediastinal mass with vascular involvement. Histopathological examination confirmed a germ cell tumor with yolk sac components. The patient underwent systemic chemotherapy followed by surgical debulking via median sternotomy. Post-treatment imaging demonstrated a favorable partial response with resolution of metastatic findings. This case highlights the importance of early recognition and multimodal management of mediastinal germ cell tumors.

Keywords: Primary mediastinal germ cell tumor, Yolk sac tumor, Extragonadal germ cell tumor, Multimodal treatment, Chemotherapy, Surgical debulking.

INTRODUCTION

Primary mediastinal germ cell tumors are rare tumors arising from misplaced primordial germ cells during embryogenesis. They account for approximately 2–5% of all germ cell tumors and commonly occur in young males. Non-seminomatous variants, including tumors with yolk sac differentiation, are associated with aggressive behavior and poorer prognosis compared with seminomatous tumors. Early diagnosis and multimodal treatment involving chemotherapy and surgical resection are crucial for optimal outcomes.

CASE PRESENTATION

A 17-year-old male with no known medical illness was initially admitted under the medical team for treatment of pneumonia with suspected pulmonary tuberculosis (TB). However, TB workup was negative.

Due to persistent clinical suspicion of an underlying lung pathology, a Contrast-Enhanced Computed Tomography (CECT) Thorax was performed.

Initial Imaging Findings

CECT Thorax revealed:

- A large aggressive mediastinal/ pleuroparenchymal mass measuring 11.9 × 8.7 × 12.0 cm with coarse internal calcifications.
- The mass extended into the upper mediastinum, invading the left brachiocephalic vein and causing likely thrombosis of the left subclavian vein.
- Associated left pleural effusion and pericardial effusion.
- A right middle lobe pulmonary nodule, suspicious for metastasis.
- Right hilar lymphadenopathy, suggestive of nodal metastasis.

A CT-guided biopsy of the mediastinal mass was performed, which revealed a germ cell tumor with yolk sac component.

Treatment

The patient subsequently underwent six cycles of systemic chemotherapy prior to surgery.

Post-Chemotherapy Imaging

A repeat CECT Thorax performed after the fifth chemotherapy cycle demonstrated:

- Interval reduction in tumor size to 9.2 × 8.6 × 9.5 cm.
- Resolution of prior upper mediastinal extension and left brachiocephalic vein involvement.
- Complete resolution of the right middle lobe pulmonary nodule.
- Resolution of right hilar lymphadenopathy.
- Resolution of left pleural effusion.
- Marked reduction in pericardial effusion.

Overall findings indicated a good partial response to chemotherapy.

Surgical Management

The patient subsequently underwent median sternotomy with debulking of the anterior mediastinal germ cell tumor.

Intraoperative Findings

A large irregular mass measuring approximately 16 × 15 cm was identified.

- Mass strongly adherent to the left lateral pericardium and left upper lobe of the lung
- Significant chronic compression of the heart
- No extension to:
- chest wall
- left lower lobe
- myocardium

The mass was excised; however, a small residual component remained over the left upper lobe, which was surgically clipped for future oncological identification.

The tumor was removed together with a lateral segment of the pericardium, which was subsequently repaired using bovine pericardial patch reconstruction.

The left phrenic nerve could not be clearly identified intraoperatively, suggesting possible involvement or incorporation into the tumor.

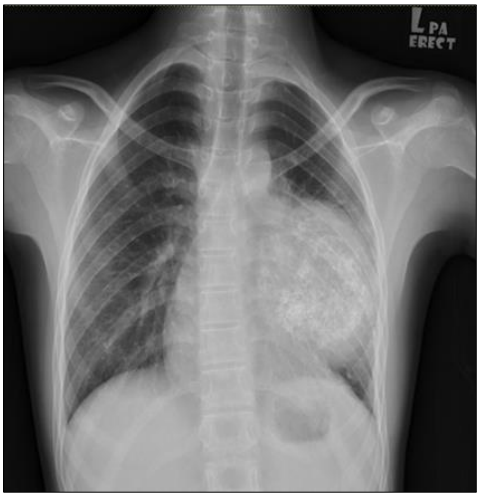

Figure A: Pre-Operative Chest X-RAY

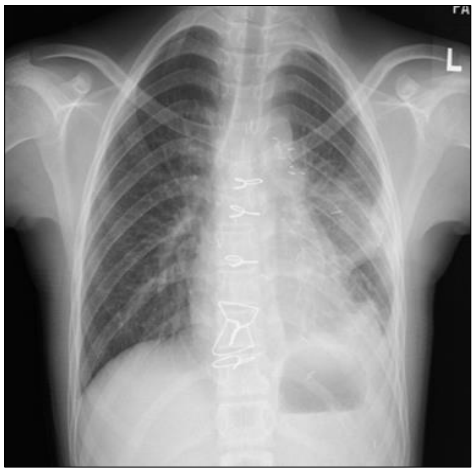

Figure B: Post Surgery Chest XRAY

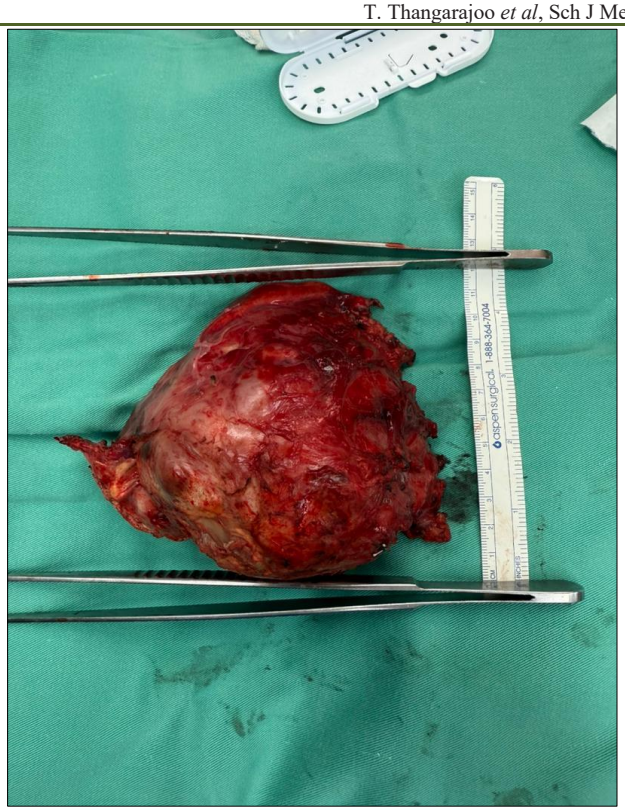

Figure C: Gross View of the Mass

DISCUSSION

Primary Mediastinal Germ Cell Tumor represents a rare form of extragonadal germ cell tumor arising in the anterior mediastinum. These tumors are believed to originate from aberrant migration of primordial germ cells during embryonic development. They account for approximately 2–5% of all germ cell tumors and predominantly affect young males between 20 and 35 years of age.

Mediastinal germ cell tumors are broadly classified into seminomatous and non-seminomatous tumors. Non-seminomatous variants, including those with Yolk Sac Tumor differentiation, are associated with a more aggressive clinical course and poorer prognosis.

Patients commonly present with symptoms related to compression of mediastinal structures, including chest pain, dyspnea, cough, and superior vena cava obstruction. In some cases, as in our patient, the initial presentation may mimic respiratory infections such as Pneumonia or Tuberculosis, which may delay diagnosis.

Serum tumor markers are essential in the evaluation of germ cell tumors. Alpha-fetoprotein (AFP) is typically elevated in tumors with yolk sac components, whereas Beta-Human Chorionic Gonadotropin (β-hCG) may be normal or elevated depending on tumor histology. In this case, β-hCG was within normal limits.

Radiological evaluation with Contrast-Enhanced Computed Tomography plays a crucial role in identifying tumor extent, vascular invasion, and metastatic disease. Our patient demonstrated a large mediastinal mass with invasion of the left brachiocephalic vein and associated pleural and pericardial effusions.

Current management guidelines recommend platinum-based chemotherapy followed by surgical resection of residual disease for non-seminomatous mediastinal germ cell tumors. Neoadjuvant chemotherapy frequently results in significant tumor reduction, improving surgical resectability.

In the present case, the patient showed a good partial response following chemotherapy, with resolution of suspected metastatic lesions and reduction in tumor size prior to surgery. Surgical debulking via median sternotomy allowed removal of the majority of the tumor, although a small residual component remained adherent to the left upper lobe.

Surgical management of these tumors can be technically challenging due to frequent involvement of surrounding mediastinal structures such as the pericardium, lung, and major vessels. In our patient, partial pericardial resection and reconstruction using bovine pericardium were required.

This case highlights the importance of multidisciplinary management involving oncologists,

thoracic surgeons, radiologists, and pathologists in treating mediastinal germ cell tumors.

Key Learning Points

1. Primary mediastinal germ cell tumors are rare but should be considered in young males presenting with large anterior mediastinal masses.
2. Tumors with yolk sac components are aggressive and require prompt multimodal treatment.
3. Neoadjuvant chemotherapy can significantly reduce tumor burden and improve surgical outcomes.
4. Complete surgical resection may be challenging due to invasion of mediastinal structures.
5. Multidisciplinary management is essential for optimal patient outcomes.

REFERENCES

- Bokemeyer C, Nichols CR, Droz JP, et al. Extragonadal germ cell tumors of the mediastinum and retroperitoneum. J Clin Oncol. 2002;20(7):1864-1873.
- DeVita VT, Lawrence TS, Rosenberg SA. Cancer: Principles and Practice of Oncology. 11th ed. Philadelphia: Wolters Kluwer; 2019.
- Kesler KA, Rieger KM, Hammoud ZT, et al. A 25-year single institution experience with surgery for primary mediastinal nonseminomatous germ cell tumors. Ann Thorac Surg. 1999;67:849-856
- Nichols CR. Mediastinal germ cell tumors. Chest. 1991;99(2):472-479.
- Sturgeon CM, Duffy MJ, Stenman UH, et al. Tumor markers in testicular cancer. Clin Chem. 2008;54(12):e11-e79.
- Tomiyama N, Honda O, Tsubamoto M, et al. Diagnostic imaging of anterior mediastinal tumors. Eur J Radiol. 2009;69(2):280-288.
- Travis WD, Brambilla E, Burke AP, Marx A, Nicholson AG. WHO Classification of Tumours of the Lung, Pleura, Thymus and Heart. Lyon: IARC; 2015.