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Case Report

Giant Mediastinal Teratoma Presenting with Recurrent Pleural Effusion and Respiratory Distress: A Case Report and Literature Review

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Abstract

Mediastinal teratomas are rare germ cell neoplasms with enigmatic histogenesis, harboring tissues from all three embryonic germ layers. While predominantly gonadal in origin, their extragonadal manifestation in the mediastinum is an infrequent yet clinically significant anomaly. Most remain quiescent, detected incidentally, yet expansive lesions may exert profound mass effects, precipitating respiratory distress, dysphagia, and pleural effusions. In rare instances, rupture into the pleural or pericardial cavity can provoke life-threatening sequelae.

We report the case of a 15-year-old female presenting with acute respiratory distress and a prior episode of spontaneous resolution. Imaging unveiled a voluminous anterior mediastinal mass exerting significant compression on adjacent structures, culminating in passive lung collapse. Surgical excision, though intricate due to extensive adhesions, was successfully accomplished. Postoperatively, the patient exhibited persistent partial lung collapse, necessitating intensive pulmonary rehabilitation. Histopathological analysis confirmed a benign cystic mature teratoma.

This case underscores the criticality of early detection and surgical intervention in preventing catastrophic complications. Given their potential for malignant transformation and mass effect-related morbidity, mediastinal teratomas warrant vigilant clinical surveillance.

Keywords: Germ cell tumor, Mediastinal teratoma, Benign mature cystic teratoma.

Introduction

Teratomas are enigmatic germ cell neoplasms, harboring a heterogeneous composition of tissues originating from all three embryonic germ layers—ectoderm, mesoderm, and endoderm. While their primary nidus lies within the gonads, they may manifest in extragonadal sites such as the mediastinum, sacrococcygeal region, and retroperitoneum, where they remain an anomaly in oncological pathology.[1] Among mediastinal neoplasms, teratomas comprise 8 to 25%, with a marked predilection for the anterior compartment.[2] Their classification encompasses mature teratomas, which exhibit well-differentiated histology and an indolent course; immature teratomas, characterized by embryonic or fetal elements with malignant potential; and the exceedingly rare teratomas undergoing malignant transformation, which adopt an aggressive trajectory.[3]

Although many mediastinal teratomas remain quiescent and are incidentally uncovered during imaging, voluminous lesions can exert a substantial mass effect, precipitating respiratory distress, retrosternal pain, dysphagia, and recurrent pleural effusions due to compression of adjacent structures.[4] In exceptional cases, spontaneous rupture into the

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pleural or pericardial cavity may provoke sequelae, including pleural effusion, pericardial effusion, or mediastinitis, necessitating urgent intervention.[5] Hence, early detection and meticulous surgical resection remain paramount in averting life-threatening complications and optimizing clinical outcomes.[6] This report describes a giant mediastinal teratoma in a young girl presenting with respiratory distress and managed successfully with surgical management.

Case Presentation

A 15-year-old female presented with acute respiratory distress and a three-day history of progressive difficulty in breathing. She reported a similar episode two months prior, which resolved spontaneously. There was no history of fever, cough, tuberculosis, diabetes, or asthma. On admission, her vital signs included a pulse rate of 110 beats per minute, respiratory rate of 38 breaths per minute, and blood pressure of 96/70 mmHg.

Physical examination revealed tracheal deviation to the right. The percussion was dull on the affected side. Chest auscultation demonstrated diminished breath sounds over the left hemithorax. Chest X-ray was done and revealed homogeneous opacity on the left side covering the entire hemithorax along with marked mediastinal shifting towards the right side. An emergency thoracocentesis was performed at the district hospital, yielding 800 mL of dark straw-colored pleural fluid. Laboratory analysis of the pleural fluid indicated a transudative nature with neutrophilic predominance (70% neutrophils) and low glucose levels.

Contrast-enhanced computed tomography (CECT) of the chest (Figure 1) revealed a heterogeneously enhancing solid-cystic mass measuring 15 × 14 × 18 cm in the left hemithorax, originating from the mediastinum. The lesion contained areas of fat density and multiple foci of calcifications. A significant mass effect was observed, leading to compression and displacement of the heart, arch of the aorta, and great vessels, along with contralateral mediastinal shift. Additionally, the mass was closely related to the left main pulmonary artery and left main bronchus, causing passive collapse of the left lung. These findings were highly suggestive of a mediastinal teratoma.

Laboratory investigations revealed normal serum lactate dehydrogenase (LDH) and beta-human chorionic gonadotropin (β-hCG) levels. Hematological analysis demonstrated leukocytosis.

The patient underwent surgical excision via a posterolateral thoracotomy in the right lateral decubitus position under general anesthesia. A single-lumen endotracheal tube was used with intermittent manual ventilation. Intraoperatively, the mass was large and densely adherent to surrounding structures, including the pericardium and esophagus medially, the subclavian artery superiorly, the descending thoracic aorta laterally, and the diaphragm inferiorly. Despite these adhesions, anatomical planes were preserved, and the mass was successfully excised (Figure 2). Following removal, the left lung remained collapsed, necessitating chest tube

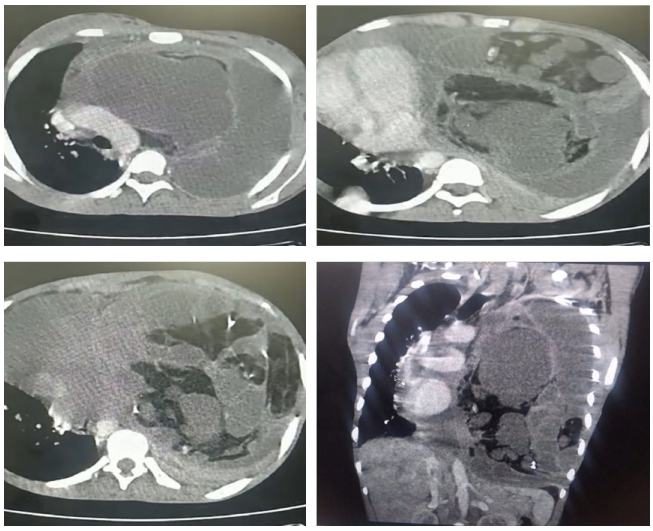

Figure 1: Contrast CT chest: A solid-cystic mediastinal mass with fat density, calcifications, and significant mass effect, causing mediastinal shift and left lung collapse, suggestive of teratoma

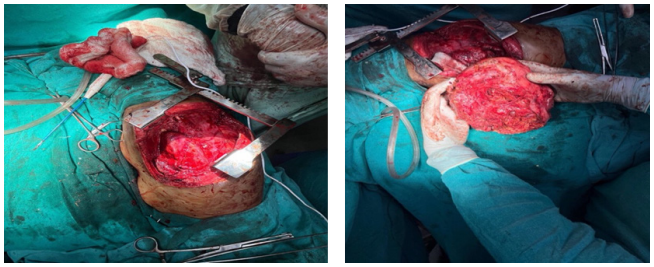

Figure 2: Intraoperative View: Surgical excision of a large mediastinal teratoma, adherent to the pericardium, esophagus, subclavian artery, thoracic aorta, and diaphragm, successfully resected with preserved anatomical planes

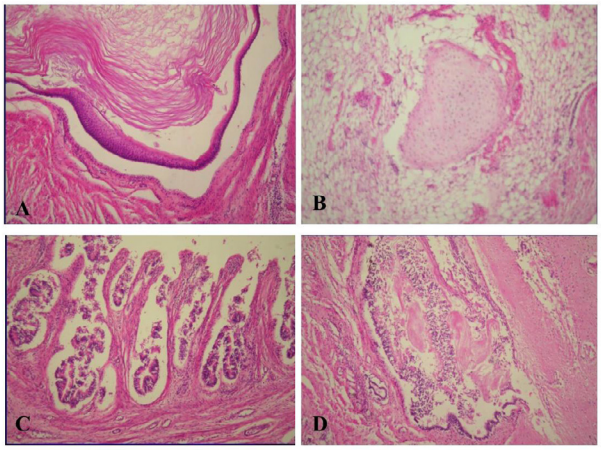

Figure 3: Histopathological images of the mass removed surgically showing A squamous epithelial tissue, B cartilage tissue C and D intestinal glandular tissue with solid cystic areas suggesting benign cystic mature teratoma

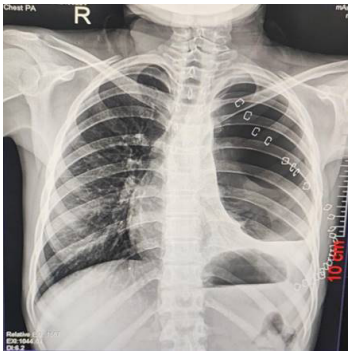

Figure 4: Post operative follow up chest x ray showing collapsed left lung and air fluid levels at left costophrenic angle. Mediastinal still is shifted to right side

placement. The procedure lasted six hours, with stable intraoperative hemodynamic parameters.

Postoperatively, the chest tube drained 1 to 2 litres per day. However, the left lung failed to fully expand and remained partially collapsed. Negative pressure suctioning was attempted but resulted in minimal improvement. The patient was managed with chest physiotherapy and incentive spirometry to promote lung re-expansion.

Histopathological examination of the excised mediastinal mass revealed an irregularly encapsulated lesion with a brown external surface. The cut section exhibited a mixture of solid and cystic areas, with cysts ranging from 1 to 3.5 cm in diameter, filled with clear fluid. Microscopic analysis confirmed the diagnosis of a benign cystic mature teratoma (Figure 3).

The patient remains under regular follow-up (Figure 4) with persistent partial lung collapse. Close monitoring is being conducted to assess the risk of fluid reaccumulation and potential infection. However, her initial respiratory symptoms have significantly improved.

Discussion

Mediastinal teratomas, though a rare entity, occupy a distinctive niche within the spectrum of extragonadal germ cell neoplasms. Their embryological derivation from pluripotent cells endows them with a remarkable histological diversity, often yielding a mosaic of ectodermal, mesodermal, and endodermal elements.[7] While many remain indolent and elude detection until incidentally uncovered on imaging, larger masses may incite significant clinical manifestations through mechanical encroachment upon adjacent thoracic structures.[8] The resultant spectrum of symptomatology ranges from insidious dyspnea and retrosternal discomfort to more ominous presentations such as compressive atelectasis and recurrent pleural effusions, as discussed in the present case.[3] In exceptional cases, spontaneous rupture into the pleural or pericardial cavities precipitates acute inflammatory sequelae, including chemical pleuritis, pericarditis, and even mediastinitis, necessitating emergent intervention.[9]

The differential diagnosis of an anterior mediastinal mass encompasses a formidable array of neoplastic entities, each demanding nuanced clinical and biochemical evaluation. Germ cell tumors, including seminomas and non-seminomatous variants, often betray their presence through elevated serum markers such as β-hCG and AFP.[10] Lymphomas, particularly Hodgkin's and non-Hodgkin's subtypes, frequently exhibit a constellation of symptoms such as pyrexia, nocturnal diaphoresis, and cachexia while thymic neoplasms may manifest with paraneoplastic syndromes such as myasthenia gravis.[11] Neurogenic tumors, by contrast, typically favor a posterior mediastinal domicile, further underscoring the necessity of precise anatomical localization in diagnostic stratagems.[12]

Radiological assessment remains the linchpin of initial evaluation, with contrast-enhanced computed tomography (CECT) serving as the gold standard.[13] The hallmark imaging features of mediastinal teratomas—fatty components, calcifications, and cystic architecture—facilitate their distinction from other mediastinal masses.[14] However, definitive characterization hinges upon histopathological interrogation, particularly in distinguishing benign mature teratomas from their immature or malignant counterparts, which portend a far more aggressive clinical trajectory.[15]

Surgical extirpation constitutes the cornerstone of management, conferring both diagnostic certainty and curative potential.[16] Complete resection of mature teratomas is often tantamount to definitive resolution, whereas immature teratomas necessitate vigilant postoperative surveillance due to their proclivity for malignant evolution.[17] In cases where the tumor exhibits intimate adherence to critical mediastinal structures—such as the pericardium, great vessels, and bronchopulmonary apparatus—the surgical endeavor assumes a heightened degree of intricacy, demanding meticulous dissection and intraoperative vigilance.[18] The persistence of postoperative lung collapse, despite aggressive pulmonary physiotherapy and suction-assisted expansion techniques, underscores the potential for enduring functional compromise, warranting prolonged respiratory rehabilitation and longitudinal follow-up.[19]

This case underscores the formidable challenges posed by voluminous mediastinal teratomas, particularly in the context of acute respiratory decompensation. While emergent thoracocentesis provided transient respite, definitive resolution was predicated upon en bloc resection of the lesion.[20] The protracted postoperative course, characterized by sustained pleural drainage and incomplete pulmonary re-expansion, accentuates the necessity for a multidisciplinary paradigm encompassing thoracic surgery, pulmonology, and rehabilitative medicine.[21] Given the latent risk of malignant transformation, long-term surveillance remains imperative, reinforcing the doctrine that early recognition and timely surgical intervention are paramount in averting morbidity and optimizing patient outcomes.[22]

Conclusion

Mediastinal teratomas should be considered in the differential diagnosis of anterior mediastinal masses, particularly in young patients with recurrent pleural effusion and respiratory symptoms. Early imaging and complete surgical excision are critical for preventing complications and ensuring a favorable prognosis. Given the potential for malignant transformation, long-term follow-up may be necessary in certain cases.

References

1. Bingol-Kologlu M, Senocak ME, Tanyel FC, et al. Teratomas in childhood: A 32-year experience from a single center. Pediatr Surg Int. 2020;36(5):743-749.
2. Dome JS, Perlman EJ, Graf N. Germ cell tumors in children and adolescents. N Engl J Med. 2014;371(12):1155-62.
3. Takeda S, Miyoshi S, Ohta M, et al. Primary germ cell tumors in the mediastinum: Evaluation of prognostic factors. J Thorac Oncol. 2018;13(3):401-09.
4. Weissferdt A, Moran CA. Mediastinal germ cell tumors: A review and update on histopathologic diagnosis and differential diagnoses. Adv Anat Pathol. 2017;24(4):151-62.
5. Garg PK, Sharma J, Pandey D, et al. Germ cell tumors of the mediastinum. J Thorac Dis. 2019;11(Suppl 2):S141-54.
6. Motzer RJ, Agarwal N, Beard C, et al. NCCN guidelines for testicular and extragonadal germ cell tumors. J Natl Compr Canc Netw. 2021;19(3):264-78.
7. Rosado-de-Christenson ML, Templeton PA, Moran CA. Mediastinal germ cell tumors: radiologic and pathologic correlation. Radiographics. 1992;12(5):1013-30.
8. McKenney JK, Heerema-McKenney A, Rouse RV. Extragonadal germ cell tumors: a review with emphasis on pathologic features, clinical prognostic variables, and differential diagnostic considerations. Adv Anat Pathol. 2007;14(2):69-92.
9. Nichols CR. Mediastinal germ cell tumors: clinical features and biologic correlates. Chest. 1991;99(2):472-79.
10. Dieckmann KP, Skakkebaek NE. Gonadal and extragonadal germ cell tumors in adolescents and adults: a review on pathogenesis, diagnosis and treatment. Mol Cell Endocrinol. 2018; 477:74-83.
11. Travis WD, Brambilla E, Burke AP, Marx A, Nicholson AG. WHO classification of tumors of the lung, pleura, thymus and heart. 4th ed. Lyon: IARC Press; 2015.
12. Davis RD, Oldham HN, Sabiston DC. Primary cysts and tumors of the mediastinum: recent changes in clinical presentation, methods of diagnosis, management, and results. Ann Thorac Surg. 1987;44(3):229-37.
13. Weber AL, Bird KT, Janower ML, McAlister WH. Cystic masses of the mediastinum. Radiology. 1978;126(1):101-08.
14. Cohen AJ, Thompson L, Edwards FH, Bellamy RF. Primary cysts and tumors of the mediastinum. Ann Thorac Surg. 1991;51(3):378-86.
15. Moran CA, Suster S, Koss MN. Germ cell tumors of the mediastinum: a clinicopathologic and immunohistochemical study of 120 cases. Cancer. 1997;80(4):691-98.
16. Lewis BD, Hurt RD, Payne WS, Farrow GM, Knapp RH, Muhm JR. Benign teratomas of the mediastinum. J Thorac Cardiovasc Surg. 1983;86(5):727-31.
17. Wright CD, Wain JC, Wong DR, Donahue DM, Gaissert HA, Grillo HC, et al. Predictors of recurrence in thymic tumors: importance of invasion, stage, and resection. Ann Thorac Surg. 2005;80(3):1001-07.
18. Marino M, Müller-Hermelink HK. Thymomas: changes in the WHO classification, reclassification of the cortical type, and its clinical significance. Virchows Arch. 2014;465(4):383-89.
19. Kesler KA, Tatem BA, Kron IL, Heimansohn DA, Daniel TM, Shaw C. Primary mediastinal germ cell tumors: the influence of histology on treatment strategy. Ann Thorac Surg. 1999;67(3):658-64.
20. Koyama S, Sone S, Hasegawa M, Takashima S, Li F, Honda T, et al. CT findings of mediastinal mature teratoma with rupture: correlation with the clinical and pathologic findings. AJR Am J Roentgenol. 2002;178(2):323-28.
21. Bokemeyer C, Nichols CR, Droz JP, Horwich A, Gerl A, Fossa SD, et al. Extragonadal germ cell tumors of the mediastinum and retroperitoneum: results from an international analysis. J Clin Oncol. 2002;20(7):1864-73.
22. De Backer A, Mortelé K, De Schepper AM. Imaging features of mediastinal germ cell tumors. Eur J Radiol. 1998;29(1):65-73