

RUPTURED MEDIASTINAL TERATOMA

Pulmonary Medicine

Dr Loolu

Rahumath S

Dr Nalin T Shah

ABSTRACT

Introduction: Mediastinal teratomas are the most common type of mediastinal germ cell tumor. Most patients with mediastinal teratomas remain clinically silent. However, these teratomas occasionally rupture into the thoracic cavity, causing severe complications; surgical intervention is always required for ruptured teratomas. Herein, we report that case of a large anterior mediastinal teratoma that ruptured into the pleural cavity and caused a lung infection, pleural effusion, and subsequent mediastinitis. **Case Report:** A 20-year-old man presented with rapidly progressive dyspnea and chest pain. Chest radiography revealed a large opacity in the entire right hemithorax. A thoracostomy tube was introduced into the right pleural cavity, and 200 mL of purulent fluid was evacuated. Thoracic computed tomography (CT) revealed a mass in the right hemithorax compressing the adjacent structures. The patient underwent total resection of the mediastinal mass via right posterolateral thoracotomy. Intraoperatively, the chest cavity was filled with adhesions and pus. The teratoma ruptured and adhered to surrounding structures. Postoperatively, the patient recovered completely. Microscopy revealed a mature teratoma. **Conclusion:** Ruptured mediastinal mature teratoma is a serious complication. Once it is diagnosed, early surgical excision should be performed to reduce rupture-related complications.

KEYWORDS

Mediastinal mass, Pleural effusion, Rupture, Teratoma

Case Report

A 20-year-old man presented with a dry cough and dyspnea that had started two weeks previously. His dyspnea suddenly worsened with the appearance of chest pain, and he immediately presented to our emergency department. Patient is a non-smoker no other significant respiratory or systemic illness. On examination, the patient's body temperature and blood pressure were within the normal range, but his pulse rate was 106 beats/min, and oxygen saturation was 94% on room air. Chest auscultation revealed decreased breath sounds in the right hemithorax. Results of the rest of the physical examination were normal. Chest radiography revealed an opacity in the right lower zone (Figure 1).

A thoracostomy tube was introduced into the right pleural cavity, and 200 mL of purulent fluid was evacuated. Pleural fluid analysis revealed a neutrophil-predominant exudative effusion. Laboratory data revealed neutrophilic leucocytosis (white blood cells, 11,600/ μ L; neutrophils, 79.7%) and increased C-reactive protein level (26.1 mg/dL).

Thoracic computed tomography (CT) displayed Approximately 60x72x78 mm (APxTRxCC) sized heterogeneously enhancing soft tissue density lesion with interspersed areas of fat density within is noted in anterior compartment of superior mediastinum. Inferiorly the lesion shows spillage of contents within anterior mediastinum (inferolateral to lesion) reaching upto right hilum. It also extends along lower part of major oblique fissure into right middle lobe with its resultant collapse consolidation.

Rest of the middle lobe shows centrilobular nodules with tree in bud appearance - s/o endobronchial spread of contents-secondary infection cannot be ruled out. Findings suggestive of Endobronchial rupture of Anterior Mediastinal mass; (Figure 2A and B) Differentials to be considered. The patient was diagnosed with a mediastinal teratoma that had ruptured into the right pleural cavity. Therefore, mediastinitis and right pleurisy were suspected. Treatment with a broad-spectrum intravenous (IV) antibiotic was initiated immediately.

Patient referred to cardiothoracic vascular surgeon for further management. where patient underwent right posterolateral thoracotomy and tumor resection on day 3 after admission. Intraoperative findings revealed a ruptured tumor wall with exposure of its white contents, which appeared to be sebaceous material, pus, and necrotic tissue, in the anterior mediastinum. The mass was adherent to the right lower lobe, pericardium, and right hemidiaphragm. Severe adhesions between the tumor and adjacent structures were observed. The mass was completely excised with careful blunt and sharp dissection (Figure 3). The right thoracic cavity was irrigated with a sufficient amount of warm saline and a chest drainage tube was placed.



Figure 1: Chest X-ray showed an opacity of the right LZ.

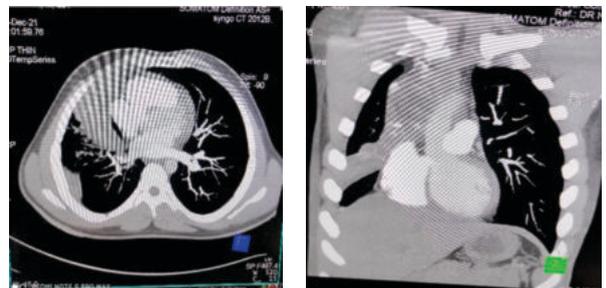


Figure 2: Chest CT scan revealed large, heterogenous, lobulated anterior mediastinal mass (A) compressing the right diaphragm, mediastinal great vessels and right hilar structures (B).

DISCUSSION

The mediastinum is located in the central portion of the thorax. It is bounded by the pleural cavities laterally, thoracic inlet superiorly, and diaphragm inferiorly. It is further divided into the anterior, middle, and posterior compartments. The anterior mediastinum refers to the retrosternal space anterior to the heart and the great vessels. It contains the thymus, lymph nodes, adipose tissue, and connective tissue. Approximately half of all mediastinal tumors occur in the anterior mediastinum. Thymomas, lymphomas, and germ cell tumors are the most frequently diagnosed tumors in the anterior mediastinum, with relative incidences of 30%, 20%, and 18%, respectively [1]. Mediastinal germ cell tumors (GCTs) are derived from primitive germ cells that fail to migrate completely during early embryonic

development. These are usually found in young adults, with no significant sex differences [5]. Based on cell type, GCTs are classified into benign teratomas, seminomas, and embryonal tumors (malignant teratomas or nonseminomatous GCTs). Mature teratomas are composed of well-differentiated derivations from at least two of the three germ cell layers (ectoderm, mesoderm, and endoderm). Ectodermal elements may be represented by skin, teeth, and hair; mesodermal elements by bone, cartilage, and muscle; and endodermal elements by bronchial epithelium, gastrointestinal epithelium, and pancreatic tissue [3, 6]. Mature teratomas represent 60–70% of mediastinal GCTs and are usually benign in nature. Benign teratomas are often asymptomatic and discovered on chest radiographs obtained for unrelated reasons [3, 5]. The related symptoms, including cough, dyspnea, or chest pain, are caused by the mass effect exerted by the tumor. Rarely, patients may expectorate hair (trichoptysis), which is considered a pathognomonic symptom [6]. Computed tomography with IV contrast is the imaging modality of choice for suspected germ cell tumors. Benign teratomas are usually rounded, with sharp margins. They often contain variable amounts of fat, soft tissue density, cystic areas, calcification, and bone or teeth [5]. Up to 36% of mediastinal teratomas rupture, most frequently into the lung and bronchial tree, followed by into the pleural space, pericardial space, or great vessels [4, 6, 7]. Rupture into the lungs may cause pneumonia, and the patient may present with cough, fever, chest pain, and dyspnea. Rupture into the pleural cavity produces chemical pleuritis, and the usual complaint is chest pain [4, 6–8]. Computed tomography characteristics of ruptured versus unruptured teratomas have been reported; 90% of unruptured teratomas exhibit homogeneity of their internal components, whereas most ruptured teratomas tend to have inhomogeneous densities of internal components in each compartment. Inhomogeneity of an unruptured tumor should raise suspicion of a malignant component in the cystic teratoma. Other findings suggesting rupture include pleural effusion, observed in 57% of CT scans in ruptured mediastinal teratomas, or pericardial effusions when the tumor is adherent to the pericardium [7]. There are several explanations for the tendency of some teratomas to rupture. These include autolysis by digestive enzymes, chemical inflammation, ischemia, pressure necrosis, and infections [7, 9]. In this case, we speculate that the pleural effusion had high cancer antigen 19-9 levels and pathological examination revealed pancreatic and intestinal tissues, the rupture was probably caused by the digestive enzymes secreted by these tissues. Ruptured teratomas can cause mediastinitis and adhesions, complicating surgical management. Therefore, complete surgical excision should be performed immediately after diagnosis to avoid the risk of rupture.

CONCLUSION

A ruptured mediastinal mature teratoma is a serious complication that causes inflammation and secondary adhesions in the lung or pleural cavity. This makes surgery challenging. Therefore, early diagnosis and treatment are crucial to reduce rupture-related complications in such cases.

Acknowledgements

The authors thank the patient whom this report describes about, for consenting to have his case and medical imaging submitted for publication.

Disclosures

The authors have no financial disclosure of conflicts of interest to declare.

REFERENCES

1. Davis RD Jr, Oldham HN Jr, Sabiston DC Jr. Primary cysts and neoplasms of the mediastinum: Recent changes in clinical presentation, methods of diagnosis, management, and results. *Ann Thorac Surg* 1987;44(3):229–37.
2. 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.
3. Tian Z, Liu H, Li S, et al. Surgical treatment of benign mediastinal teratoma: Summary of experience of 108 cases. *J Cardiothorac Surg* 2020;15(1):36.
4. Suzuki H, Koh E, Hoshino I, Kishi H, Saitoh Y. Mediastinal teratoma complicated with acute mediastinitis. *Gen Thorac Cardiovasc Surg* 2010;58(2):105–8.
5. Yalagachin GH. Anterior mediastinal teratoma – A case report with review of literature. *Indian J Surg* 2013;75(Suppl 1):182–4.
6. Machuca JS, Tejwani D, Niazi M, Diaz-Fuentes G. A large ruptured mediastinal cystic teratoma. *J Bronchology Interv Pulmonol* 2010;17(3):269–72.
7. Uchida T, Matsubara H, Hada T, Sato D, Hasuda N, Nakajima H. Mediastinal mature teratoma with chest pain onset and subsequent perforation: A case report. *Int J Surg Case Rep* 2021;81:105807.
8. Raoufi M, Herrak L, Benali A, et al. Mediastinal mature teratoma revealed by empyema. *Case Rep Pulmonol* 2016;2016:7869476.
9. Miyazawa M, Yoshida K, Komatsu K, Kobayashi N, Haba Y. Mediastinal mature teratoma with rupture