

A large ruptured mediastinal teratoma

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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 29-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

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INTRODUCTION

Mediastinal teratomas are the most common mediastinal germ cell tumors, usually occurring in the anterior superior mediastinum. These are mostly asymptomatic and frequently discovered incidentally on chest radiography [1–3]. Ruptured teratomas are serious and unique complications associated with mediastinal teratomas that require prompt surgical intervention [4]. Herein, we report the case of a large anterior mediastinal teratoma that ruptured into the pleural cavity and caused lung infection, pleural effusion, and subsequent mediastinitis.

CASE REPORT

A 29-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. Upon presentation, 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 a large opacity in the entire right hemithorax (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 leukocytosis (white blood cells, 11,600/ μ L; neutrophils, 79.7%) and increased C-reactive protein level (26.1 mg/dL). Serum α -fetoprotein, human chorionic gonadotropin, and carcinoembryonic antigen levels were within the normal range. Thoracic computed tomography (CT) displayed an 11 \times 0.9 \times 9.6-cm heterogeneous, cystic mass in the anterior mediastinum, with an enhanced wall and mixed fat and soft tissue components. The mass compressed the adjacent mediastinal great vessels and protruded into the right oblique fissure, with a mass effect on the adjacent lung parenchyma and right hemidiaphragm (Figure 2A and B). 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.

The 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.

Macroscopically, the tumor was a 12 \times 9 \times 3-cm cystic mass filled with hair and cheesy and keratotic material. Microscopically, the inner cavity of the cystic tumor was lined mainly with skin, which comprised keratinized squamous epithelium, sebaceous and sweat glands, hair follicles, and smooth muscle cells. The tumor also contained bronchial elements and adipose, pancreatic and intestinal tissues. The wall of the tumor demonstrated necrotizing inflammation with infiltration of neutrophils, lymphocytes, and macrophages. The tumor was diagnosed as a mature teratoma. The patient had an uneventful postoperative course and was discharged on postoperative day 5.



Figure 1: Chest X-ray showed a large opacity of the entire right hemithorax.

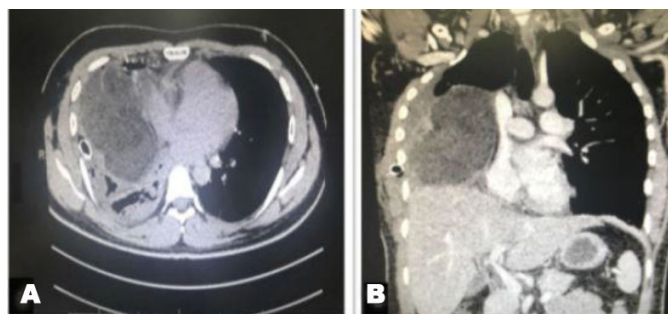


Figure 2: Chest CT scan revealed large, heterogenous, lobulated anterior mediastinal mass (A) compressing the right diaphragm, mediastinal great vessels and right hilar structures (B).

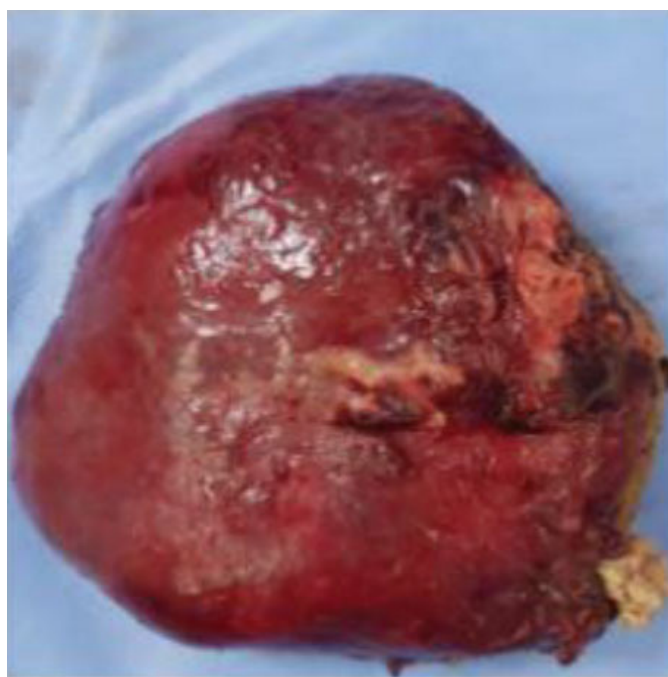


Figure 3: Completely excised cystic mass measures 12 \times 9 \times 3 cm.

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 non-seminomatous 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.

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Conflict of Interest

Authors declare no conflict of interest.

Data Availability

All relevant data are within the paper and its Supporting Information files.

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