Life-threatening and Rapidly Growing Teratoma in the Anterior Mediastinum

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Abstract

This report describes the case of a 23-year-old man with a mediastinal teratoma. Five months before admission, a chest radiograph during a routine health checkup was normal. Four months before admission, the patient developed sudden onset of mild right-sided chest pain. He gradually developed dyspnea and was admitted to our hospital. Computed tomography revealed a giant tumor that was markedly compressing the right atrium. Urgent surgery was performed, and a ruptured, benign mature teratoma was diagnosed. Mature mediastinal teratomas are benign tumors, but they can rupture and have the potential to grow rapidly, potentially leading to life-threatening complications.

Key words: mediastinal tumor, teratoma, rapidly growing

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Introduction

Teratomas are common tumors of the mediastinum, usually located in the anterior portion (1-3). They generally grow very slowly (1, 2) but can become enormous and compress adjacent organs, such as the trachea, bronchi and heart (1). Occasionally, mature mediastinal teratomas rupture into adjacent structures, such as the pleural space, pericardium, lung or tracheobronchial tree (3, 4). This report describes the case of a patient with a life-threatening, benign mature teratoma compressing the right atrium; the tumor grew rapidly to a giant tumor over a four-month period.

Case Report

A 23-year-old man was admitted to our hospital with dyspnea on exertion. Five months earlier, a chest radiograph performed during a routine health checkup had shown no abnormal shadow (Fig. 1A). Four months before admission, he developed sudden onset of mild right-sided chest pain, and a chest X-ray showed a slight mass shadow in the right hilum (Fig. 1B), but further examination was not indicated. He was admitted to our hospital four months later because of gradual onset of dyspnea on exertion. Serum levels of α-fetoprotein (AFP), carcinoembryonic antigen (CEA) and lactate dehydrogenase (LDH) were normal. The level of β-subunit of human chorionic gonadotropin (β-HCG) was slightly elevated to 0.22 ng/mL (normal range: 0-0.10). Laboratory tests showed the following: a hemoglobin level of 14.7 g/dL; hematocrit of 43.5%; and white blood cell count of 9,700/μL (76.9% neutrophils, 11.4% lymphocytes, 7.9% monocytes, 3.6% eosinophils, and 0.2% basophils). Arterial blood gas analyses showed a pH of 7.41, an arterial carbon tension of 40.1 mmHg and an arterial oxygen tension of 71.8 mmHg.

A chest X-ray showed a massive infiltrative shadow in the right lung field (Fig. 1C). Contrast-enhanced computed tomography (CT) showed a lobulated, non-homogeneous giant tumor located in the anterior mediastinum and growing into the right thoracic cavity. The tumor was composed of fat, fluid and calcification (Fig. 2A). Magnetic resonance imag-
Fluorodeoxyglucose-positron emission tomography (FDG-PET) showed a focally elevated FDG uptake inside the tumor [Standard uptake value (SUV) max=4.9]. Because radiological findings revealed the presence of fat and calcification within the mass and the tumor had grown rapidly, an immature teratoma or a mature teratoma with malignant transformation was suspected preoperatively. As compression of the heart could lead to a decompensated circulatory state, urgent surgery was performed via median sternotomy. The tumor was observed in the anterior mediastinum, and this tumor had ruptured into the thoracic cavity and was tightly adherent to the surface of the right middle lobe and pericardium. However, there was no apparent hemorrhage or invasion into the major blood vessels or adherent structures. En-bloc resection of the tumor with resection of the adherent partial right lung middle lobe and pericardium was performed.

The resected tumor measured 231×145×93 mm in size. Macroscopically, the tumor was occupied mainly by multiple cysts, and contained yellowish sebaceous material, hair and fat. Microscopically, cystic lesions were lined by squamous epithelium with underlying sebaceous glands and hair, smooth muscle, cartilage and pancreatic tissue. Numerous neutrophils, macrophages, edema and necrosis surrounding the pancreas-like tissue were noted, indicating inflammation inside the tumor, and the inflammation site inside the tumor corresponded to the abnormal FDG-PET uptake site inside the tumor. No malignant or immature component was observed within the tumor and consolidated lung. Microbial cultures showed no growth. Based on these findings, a diagnosis of ruptured, benign mature teratoma was made. The postoperative period was uneventful, and the patient was discharged on the 12th day after surgery. A chest X-ray performed at one year after surgery was normal.
Discussion

Mature teratomas are the most common histologic type of germ cell tumors (GCTs). Primary GCTs of the mediastinum are rare (10-15% of all mediastinal tumors), and they usually appear during the third to fourth decade of life (5). The anterior mediastinum (specifically near or within the thymus gland) is the most common site of extragonadal germ cell tumors (6). Mediastinal teratomas are usually asymptomatic and are often discovered incidentally on chest radiography taken for other reasons (1, 3, 4). The patient may present with symptoms relating to compression of the neighboring organs. Mediastinal teratomas can rupture in up to 36-41% of cases (3, 4), resulting in severe symptoms, including chest pain, hemoptysis, dyspnea and expectoration of hair and sebaceous material (3, 4), which occasionally results in acute respiratory distress (4).

Teratomas are generally slow-growing benign tumors (1, 2). Only two cases of rapidly growing mediastinal mature teratoma have so far been published (7, 8). In our case, the tumor had progressed within only four months, so this case is thought to be extremely rare. The exact mechanisms of rapid growth of a mature teratoma are unknown. One study suggested that pancreatic enzymes inside the tumor played a role in rupture of the teratoma (9). In our case, we considered that pancreatic enzymes caused inflammation and triggered the tumor to rupture within an adherent structure, resulting in the formation of multi-cystic lesions and rapid growth over a period of four months. We assume that rupture of the teratoma can be a cause of rapid growth and rupture of the tumor within the confined thoracic cavity can lead to a life-threatening condition. Although mediastinal teratomas usually grow slowly, they can grow rapidly in cases of rupture.

In conclusion, mature mediastinal teratomas are usually benign, but can occasionally rupture and grow rapidly, resulting in life-threatening complications. Physicians should therefore be careful with ruptures, a unique, but serious, complication of mature teratomas.

The authors state that they have no Conflict of Interest (COI).

References


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