Case report - Thoracic oncologic

Giant mediastinal teratoma presenting with paroxysmal atrial fibrillation

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Received 27 August 2010; received in revised form 18 October 2010; accepted 25 October 2010

Abstract

Mediastinum is a common site where benign tumors, like teratomas, can develop. Usually, these lesions do not cause any symptoms and the diagnosis is reached accidentally. As they enlarge they may cause symptoms by compressing the nearby structures of the thorax, mostly the trachea and the bronchi. Extrinsic compression of the heart or the great vessels appears to be a very rare occurrence. Atrial fibrillation as the first clinical presentation of left atrial compression by a giant mediastinal teratoma is extremely uncommon and very few cases have been described in the English literature.

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Keywords: Mediastinal tumor; Atrial fibrillation; Thoracic surgery

1. Introduction

Mediastinal teratomas account for 10–20% of all mediastinal tumors [1]. Usually they are located in the anterior mediastinum and occur in young adults. Their origin is from germ cells and a wide variety of tissues, such as epithelial, muscle, cartilage, or even teeth, may be discovered inside a teratoma. The physical history of benign teratomas is well known. Initially, they are asymptomatic, while they grow very slowly. When they reach a critical size, patients may complain for unspecific chest discomfort which sometimes is disregarded [2]. Chest X-rays can imply the presence of a mediastinal mass and put the diagnostic algorithm on the right path. In very few cases, teratomas can become enormous and compress the adjacent trachea and bronchi. Compression of the heart and the great vessels is extremely rare. Atrial fibrillation as the first clinical presentation of left atrial compression by a huge tumor is considered to be a very unusual occurrence [3].

2. Case report

A 30-year-old female was admitted to our Institution complaining of dizziness and palpitation during the past 45 min. Her medical history was clear. The blood pressure was 100/60 mmHg, while the pulse examination revealed arrhythmia with 185 beats/min. The electrocardiogram showed atrial fibrillation with a rapid ventricular response. The patient received intravenous digoxin and amiodarone.

Intravenous infusion of 300 mg amiodarone was started for 20 min as a loading dose, while 0.5 mg digoxin was used for fast digitalism. A maintenance dose of 750 mg amiodarone/24 h combined with 0.25 mg digoxin in a single dose/24 h was decided. Sinus rhythm was restored after one hour. The use of digoxin was no longer necessary and was ceased the next day. However, amiodarone was continued. A chest X-ray revealed a large mass occupying the mediastinum and an important part of the right hemithorax, pushing the heart to the left (Fig. 1a).

Computed tomography (CT)-scan of the chest showed a giant multilocular lesion measuring 13.5×11.5×15 cm located in the upper and middle mediastinum with regular borders (Fig. 1b). Inside the lesion, areas of soft tissue, fluid and fat attenuation, and calcification were described suggesting the diagnosis of a mature teratoma. Further CT-scans of the brain and the abdomen were negative, as was the bone scanning. The magnetic resonance imaging (MRI) of the chest showed that the large tumor was intensely compressing the heart and the great vessels, while it was pushing them to the left (Fig. 1c, d). Serum α-fetoprotein and β-human chorionic gonadotropin (β-HCG) levels were measured normal.

After a median sternotomy was carried out, the giant mass was found in front of the bifurcation of the trachea extending almost from the right lateral thoracic wall to the pericardium, compressing the left atrium (Fig. 2a). The tumor was dissected very carefully, to prevent penetration. Dissection from the pericardium of the left atrium was very difficult because of the strong adhesions. The tumor weighed 983 g and its largest diameter was 15 cm (Fig. 2b). The postoperative period was uneventful, while no
Fig. 1. Giant mediastinal teratoma. (a) Chest X-ray showing a large mass occupying the mediastinum and an important part of the right hemithorax, pushing the heart to the left. (b) Chest CT-scan revealing a giant multilocular lesion measuring 13.5 x 11.5 x 15 cm located in the upper and middle mediastinum with regular borders. The compression of the heart by the large mass is obvious. (c) Chest MRI (transverse section) showing accurately the anatomical relation between the tumor and the heart. (d) Chest MRI (coronary section). The tumor’s size as well as the compression of the heart and the great vessels is easily recognized. CT, computed tomography; MRI, magnetic resonance imaging.

3. Discussion

The first case of mediastinal teratoma was described in 1823. Since then, a variety of atypical presentations have been reported. They are usually diagnosed due to their complications. Compression of the adjacent organs, because of the tumor’s enlargement is the most common complication [4]. Perforation of the pleural cavity, pericardial sac, compression of the trachea and bronchi, as well as invasion of the lung tissue and massive hemoptysis, have also been reported, although malignancy is rare.

Arrhythmias are not a common clinical expression of mediastinal lesions. To the best of our knowledge, very few cases have been reported in the English literature. Compression of the left atrium by a large mass is a condition which obviously has the potential for a catastrophic hemodynamic derangement. It is of crucial importance that the first clinical manifestation of the mass was the sudden paroxysm of atrial fibrillation, which was probably due to mechanical stretching of the atrial myocardial fibers [3].

Diagnostic assessment of mediastinal tumors is performed with plain chest X-rays, followed-up by chest CT. Teratoma usually appears as a well-circumscribed anterior mediastinal mass. CT accurately estimates the density of all included tissues, such as soft tissue (in virtually all cases), fluid (88%), fat (76%), calcification (53%) and teeth, which are considered specific image findings [5]. MRI is a very valua-
ble tool in detecting the anatomical relations to the mediastinal and the hilar structures, like vessels and airways. Serum α-fetoprotein and β-HCG levels must be measured if a teratoma is suspected. An abnormal level of one or both markers is diagnostic.

The treatment of choice for benign mediastinal teratomas is surgical excision. Median sternotomy is a very common approach, although many authors suggest that lateral thoracotomies which are performed from the side of tumor that has more extension offer a significant advantage [2, 6].

Although benign teratomas usually cause mild symptomatology, in some cases they can provoke serious symptoms [7]. Compression of the heart and the great vessels can lead to an emergency situation. Atrial fibrillation as the first clinical expression is very rare and of special interest, because it suggests that a benign tumor can be the reason for life-threatening situations.

References


Fig. 2. Giant mediastinal teratoma. (a) The large mass is almost dissected from the adjacent mediastinal structures. Strong adhesions to the pericardium of the left atrium are the only obstacle before excising completely the tumor (not shown). (b) Surgical specimen. Its largest diameter was 15 cm and it weighed 983 g.