Case Report

Giant mature teratoma in the mediastinum presenting with rapid growth

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Abstract

Teratomas are primary germ-cell tumours in the mediastinum. Although they are generally slow-growing and asymptomatic, rapid growth causing life-threatening complications can occur. Sebaceous secretion, insulin production, chorionic gonadotropin secretion and pancreatic enzyme secretion are the presumptive causes of tumour progression. Only few cases of rapidly growing teratomas have been reported previously. Here, we present a case of a giant mature teratoma in the mediastinum that presented with rapid growth and compare the characteristics of this case with those of previous cases.

INTRODUCTION

Teratomas are common primary germ-cell tumours in the mediastinum. As they are usually slow-growing and asymptomatic, they are often discovered incidentally on chest X-rays obtained for unrelated reasons [1]. Rapid growth of teratomas occurs in rare cases, most likely due to secretion of ectopic hormones and digestive enzymes, and can cause life-threatening complications [2–4]. When rapid growth is accompanied by symptoms, physicians should consider immediate surgical resection owing to the possibility of tumour rupture or acute infection [5]. Here, we describe a giant mature teratoma, which grew rapidly and required resection.

CASE REPORT

A 17-year-old female high-school student presented to our hospital owing to a dull feeling in the right thorax. She had no history of illness. A chest X-ray at the initial visit showed a large infiltration in the right lower thorax (Fig. 1a). Chest computed tomography (CT) revealed a large mass in the anterior mediastinal area with low-level pleural effusion (Fig. 1b–d), an internal fluid component and external parenchyma mixed with calcification. Serum tumour markers (carcinoembryonic antigen, cytokeratin19 fragment, soluble interleukin-2 receptor, alpha-fetoprotein and human chorionic gonadotropin) were all negative. Positron emission tomography (PET)-CT (Fig. 2a and b) showed high uptake of fluorodeoxyglucose in the marginal area of the mass. A chest X-ray taken at a school physical examination 16 months earlier showed no obvious abnormal shadow (Fig. 3).

A germ-cell tumour was suspected, and further pathological examinations were required. A week after the initial visit, we performed a CT-guided biopsy to determine whether the tumour was malignant or benign. The biopsy specimens showed no evidence of malignancy, but did not allow a detailed pathological diagnosis. Calcification, pleural effusion and the heterogeneous density of the tumour, along with the results of the CT-guided biopsy, strongly suggested rupture of the mature teratoma.
A week later, the patient was referred to a thoracic surgeon, and tumorectomy with median sternotomy was performed. The resected tumour had a multiloculated cyst-like structure with wall thickening (Fig. 4a and b). There was no evidence of tumour rupture. The pleural effusion contained mostly serous exudative fluid but no blood. Microscopically, the tumour consisted of ciliated columnar epithelium and mature squamous epithelium with sweat glands and sebaceous glands. Mucous-secreting glands and pancreatic tissue were also detected (Fig. 5a and b). These findings confirmed the diagnosis of a mature teratoma. The patient’s post-surgical condition was good, and she was discharged from the hospital 1 week after surgery. A chest X-ray showed no mass in the mediastinum at a follow-up visit 1 month after surgery.

**DISCUSSION**

Teratoma is the third-most common mediastinal tumour. Most teratomas are mature teratomas, which typically occur in female patients in their 20s and 30s [6]. In more than 50% of cases, mature teratomas have no symptoms at initial diagnosis and are detected by chance [1]. When symptoms arise in
patients with teratomas, rapid progression of the tumour should be suspected. Haemorrhage, infection and rupture are the major causes of progression [5]; additional causes include sebaceous secretion, insulin production, chorionic gonadotropin secretion and pancreatic enzyme secretion, whereas malignant transformation is very rare [7]. After rupture, the density of the teratoma is less likely to homogeneous than before; rather, each part of the tumour is heterogeneous [5].

Although many cases of mature teratoma of the mediastinum have been reported, only three described a rapidly growing mature teratoma (Table 1) [2–4]. In these reports, the patients with such tumours were all less than 30 years of age and were equally men and women. The growth rate of teratomas caused by hormone or enzyme secretion was determined monthly, whereas that of teratomas caused by bleeding was determined daily. Rupture or bleeding is likely to be the more life-threatening condition. We first suspected that the rapid growth of the tumour in the present case was due to rupture.
and bleeding; however, after surgical resection, there was no evidence of rupture. Therefore, the mechanism underlying the rapid growth of this tumour is unknown. Because we found inflammatory changes with lymphocyte infiltration in some area of resected tissue (Fig. 5c and d), exudative fluid in the right thorax and pancreatic tissue in the tumour, we speculate that pancreatic enzymes might partially affect inflammation in the tumour, resulting in its enlargement, as observed in a previous report [4].

In summary, we presented a case of a rapid growing mature teratoma. Any mature teratoma in young patient has a potential risk of rapid progression on a monthly basis. We think it is an optimal time to surgical treatment for teratomas when they are detected.

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**CONFLICT OF INTEREST STATEMENT**

None declared.

**ETHICAL APPROVAL**

Our institution does not require ethical approval for case reports. This submission was approved by the patient and her relatives.

| Author | Patient age (years)/sex | Duration of progression | Symptom | Pathogenesis (presumption) | Reference |
|--------|-------------------------|-------------------------|---------|---------------------------|-----------|
| Hussain | 27/male | 5 days | Chest pain | Haemorrhage | [2] |
| Uyama | 12/female | 14 months | Chest pain | Oestrogen hormone | [3] |
| Omachi | 23/male | 4 months | Dyspnoea | Pancreatic enzyme | [4] |
| Present case | 17/female | 16 months | Chest discomfort | Pancreatic enzyme | – |

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**CONSENT**

We obtained written consent from the patient as well as from one of her parents because she was underage.

**GUARANTOR**

K.F. is the guarantor of this work.