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## A Case Report of Mediastinal Teratoma with Brain Tissue as the Main Component

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Teratoma; Mediastinum; Brain tissue

## 1. Abstract

A 15-year-old female presented with chest tightness and chest pain of unknown reasons for more than a week. Computed tomography (CT) of the chest showed a space occupying the anterior mediastinum, suggesting the possibility of teratoma. The lesion was completely removed through thoracoscopic single-port mediastinal resection. Histopathology showed cystic-solid teratoma of the anterior mediastinum. Glial cells proliferated in the brain tissue of Dali, and no original neural tubes were found. After surgical resection, the patient's condition was stable during two years of follow-up.

## 2. Introduction

Teratoma originates from abnormal differentiation of germ cells [1]. According to the degree of differentiation, teratoma is divided into mature (benign) and immature (malignant) [2]. Mature teratoma is cystic, usually containing fat, hair and teeth. Teratoma mostly occurs in the ovary and testis, followed by sacrococcygeal, mediastinal, retroperitoneal and other parts. Extragonadal teratoma has been rarely reported [3]. In this case, we report a large mature teratoma of mediastinum with brain tissue and glial cell hyperplasia.

## 3. Case Report

A 15-year-old healthy girl was admitted to our hospital because

of chest tightness and chest pain. Chest enhancement CT showed a mixed-density tumor in the anterior mediastinum, with a size of about 58\*47 mm, and slight enhancement in the solid part, suggesting the possibility of teratoma (Figure 1).

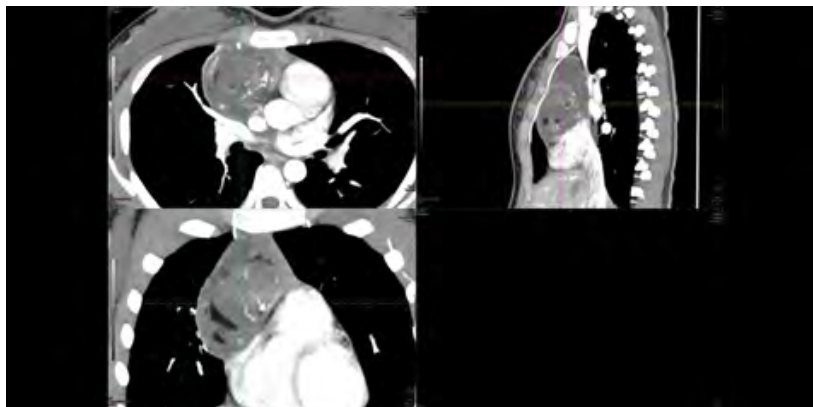
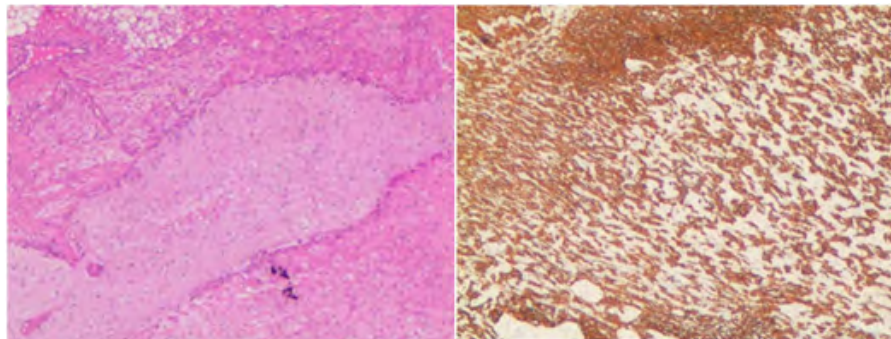
CEA, AFP, hcG and carbohydrate antigen were in the normal range, SCCA (1.7 ng/ml) and tumor-specific growth factor (72.6 U/ml) were higher than their upper limits (1.5 ng/ml, 71U/ml, respectively) (Table 1).

Her condition was improved, until imaging and preoperative blood testing results were indicative of surgical resection. On the sixth day, mediastinal lesion resection was performed under a single-port thoracoscope. During the operation, a tumor with a diameter of about 7 cm was found in the anterior mediastinum. The tumor was completely removed, and sent to pathological examination. The tumor measured 10\*7\*5 cm, with a gray-yellow section and a cystic focus containing transparent liquid. Pathological analysis confirmed a diagnosis of cystic solid teratoma, which contained a lot of brain tissue with gliosis, but no primitive neural tubes (Figure 2).

The patient's condition was stable during three days after operation. During the two-year follow-up after discharge, the patient showed no symptoms and recurrence.

**Table 1:** Complete tumor set (female)

Projects	Results	Unit	Sign	Reference value range
CA72-4	1.82	U/mL.		0-6
CYFRA211	1.11	ng/ml.		0-3.07
NSE	3.01	ng/mL		0-7
SCCA	1.7	ng/ml		0-1.5
CEA	8.04	ng/ml.	↑	Smoking: 0-10   Non-smoking: 0-5
AFP	2.01	ug/L		0-8.78
HCg	0.18	mIU/mL		Non-pregnancy: 0-5
CA125	11.7	U/mL.		0-35
CA153	6.4	U/ml.		0-31.3
CA199	16.55	U/ml.		0-37
SF	25.58	ng/ml.		4.63-204
TSGF	72.6	U/mL	↑	Negative: < 64   suspicious: 64-71   positive > 71

**Figure 1:** enhanced CT findings of teratoma**Figure 2:** Pathological section

#### 4. Discussion

Here we reported a case of teratoma in extragonadal organs. Thymoma is the most common tumor in the anterior mediastinum, followed by germ cell tumor, lymphoma and metastatic tumor [4]. Among them, germ cell tumor accounts for 15-20% of all anterior mediastinum tumors, and benign mediastinal teratoma accounts for 60% of all germ cell tumors [5]. Benign tumors often grow slowly in the mediastinum, and during its early stage, few patients are alert. When the tumor reaches a volume large enough to oppress or invade the surrounding organs, the patients begin to complain of chest pain, chest tightness and other symptoms [6].

In this case, CT showed that a mixed-density tumor in the anterior mediastinum, with a clear boundary, naturally distributed trachea and blood vessels (lumen unobstructed), and no obvious stenosis, expansion and compression changes. These indicated the presence of a teratoma of the anterior mediastinum. After surgical resection, the pathological results confirmed a huge benign teratoma of the anterior mediastinum, which is consistent with the imaging diagnosis. Mature teratoma contains well-differentiated tissues from ectoderm, mesoderm and endoderm [7]. Therefore, the components in the cyst cavity are often complicated, mainly fat, hair, teeth, etc. In this case, the tumor was filled with brain tissue and glial cells evolving from ectoderm. The biological behavior and

prognostic value of glial cell proliferation in teratoma are still unclear [8]. However, the immature neural tissue in the tumor may determine its malignant degree; in particular, the appearance of primitive neural tubes may suggest a high malignancy. So, the number of primitive neural tubes is often used to grade immature teratoma [9]. In this case, no primitive neural tubes were detected in the tumor, 0-1 primitive neural tube/LPF/slice, thus excluding the risk of immature teratoma. Generally speaking, the five-year survival rate of benign teratoma or grade 0-1 immature teratoma can be greater than 90%.

Surgery is usually the first choice for the treatment of mediastinal tumors [10]. Radical resection can ensure a long-term survival of patients. Preoperative diagnosis is difficult, which increases the risk of malignant transformation and perforation into adjacent tissues, so teratoma should be treated earlier after diagnosis [11]. In this case, the patient complained of no discomfort, except chest tightness with slight chest pain. After preoperative auxiliary examination and excluding the relevant surgical contraindications, we adopted a single-hole thoracoscopic resection, which successfully relieved the symptoms. Compared with the traditional median thoracotomy, thoracoscopic mediastinal resection can achieve less pain, a better incision appearance and a quicker postoperative recovery [12]. However, to resect huge tumors, single-port thoracoscope still has shortcomings, such as difficult procedures, a long operation time and a high risk of intraoperative bleeding. Therefore, we also informed her parents of a possibility of switching to thoracotomy. It should be noted that thoracoscopic mediastinal lesion resection requires CT or enhanced CT to clarify the anatomy and invasiveness of the tumor and mediastinum [5].

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