

# Thymic Cavernous Hemangioma Misdiagnosed as Thymoma: A Case Report and Review of the Literature

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## Case Report

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# Abstract

**Introduction:** Thymic cavernous hemangioma, a rare mediastinal tumor, is difficult to diagnose by imaging examinations.

**Case presentation:** We treated a 63-year-old woman with thymic cavernous hemangioma. She was found to have an anterior mediastinal mass during a routine examination, and enhanced chest CT showed that it was approximately 3.5×2.4×2.1 cm in size. Enhanced abdominal CT indicated a 2.5cm space-occupying lesion in the right kidney. We considered it to be thymoma and renal carcinoma, so we resected it by using thoracoscope and laparoscope. The postoperative pathological reports showed that the mass was thymic cavernous hemangioma and renal clear cell carcinoma. Twenty months postsurgery, the patient was alive with no evidence of tumor recurrence.

**Conclusions:** We report a rare case of thymic cavernous hemangioma misdiagnosed as thymoma. It is difficult to obtain pathological results by needle biopsy before surgery because the location of the anterior mediastinal mass is very challenging to reach. Therefore, a thorough CT evaluation before the operation can prevent inappropriate operations from being performed.

## Introduction

Cavernous hemangiomas are benign tumors or congenital venous malformations that rarely grow in the mediastinum. It has been reported that approximately 0.5% or even fewer of these hemangiomas grow in the mediastinum<sup>[1]</sup>. After consulting the literature, we found that this condition was first reported by Lungenschmid in 1990<sup>[2]</sup>. While most cases are asymptomatic, they can grow over time and cause clinically significant symptomatology, such as chest pain, cough, and dyspnea. Invasive tests, such as needle biopsy before surgery, are impossible because of the specific location of the mass. Therefore, cavernous hemangiomas are easy to misdiagnose. It is difficult to estimate whether a mass is benign or malignant, and it can only be determined by postoperative pathological tests. This article reviews a rare case of thymic cavernous hemangioma misdiagnosed as thymoma. We discuss the imaging features, histologic characteristics and treatments for the two kinds of tumors by reviewing published papers.

## Case Presentation

A 63-year-old woman was hospitalized after undergoing a physical examination that revealed an anterior mediastinal mass. She had no history of hypertension, diabetes, heart disease or smoking. Written informed consent was obtained from the patient for the publication of the present study. The results of her routine blood, biochemistry, coagulation function, electrolyte, electrocardiogram, lung function and echocardiography tests were basically normal. The enhanced chest CT scan (Philips, Brilliance ICT CP 200063) showed a mass in the anterior mediastinum, which was approximately 3.5 x 2.4 x 2.1 cm in size (Fig. 1). Enhanced abdominal CT indicated a 2.5cm space-occupying lesion in the right kidney (Fig. 2). The enhanced chest CT scan showed irregular enhancement within the mass, so it was likely to be thymoma. To verify the diagnosis and excise the mass, we removed the patient's anterior mediastinal mass under general anesthesia by using a thoracoscope on February 12, 2019. The anterior mediastinal mass was located in the right thymus, with a clear border and no engulfment of the surrounding vessels. There were dilated and densely distributed vessels of different sizes on the mass. The pathological diagnosis was a cavernous hemangioma (Fig. 3). We removed the right kidney mass under general anesthesia by using a laparoscope on February 27, 2019. The mass was completely excised and the postoperative margin was negative. The pathological diagnosis was a renal clear cell carcinoma (Fig. 4). Postoperative pathological staging was stage 1. The patient recovered well and was successfully discharged from the hospital. There were no abnormalities at twenty month after the operation.

## Literature review

Studies published from January 1990 to January 2019 were searched with the keywords "thymus", "thymic" and "cavernous hemangioma". Ten studies were retrieved, and a total of 10 patients were included<sup>[2-11]</sup>. The patients included 5 males and 5 females. The mean age was 46.1 years, and the ages ranged from 27 to 71 years. Six patients were symptom-free. Two patients felt pain, one patient had cough, and one patient felt discomfort in his chest. In 9 patients, the mass was located in the left lobe of the thymus, while in the remaining patient, the thymus tissue was located in the left side of the neck. All patients received

surgical treatment and recovered well after the operation. Two patients were lost to follow-up after the operation. Eight patients were followed up, one of whom died (Table 1).

Table 1  
Characteristics of patients in published English literature

Author	Age (years)	Sex	Symptoms	Size (cm)	Treatment	Localization	Follow-up (months)	Status
Lungenschmid D <sup>[2]</sup>	29	Female	None	unknown	Surgery	Left lobe of thymus	12	Alive
Shen C <sup>[3]</sup>	52	Male	None	2.1×1.4	VATS	Left lobe of thymus	12	Alive
Papagiannopoulos K <sup>[4]</sup>	63	Male	Dyspnea	6×6	Median sternotomy	Left lobe of thymus	44	Death
Yamazaki A <sup>[5]</sup>	52	Female	None	4.2×3.2	Completely resected	Left lobe of thymus	96	Alive
Romeo GP <sup>[6]</sup>	35	Male	Pain in neck	3×3	Surgical excision	Cervical ectopic thymus tissue	24	Alive
Roldán-Baños S <sup>[7]</sup>	59	Female	None	5×4	Surgery	Left lobe of thymus	26	Alive
Akiba T <sup>[8]</sup>	27	Male	Cough	5×4.5	Median sternotomy	Left lobe of thymus	Unknown	Unknown
Nakada T <sup>[9]</sup>	43	Male	Chest pain	6.0×5.2	Lshaped sternotomy with a left-sided cervical collar incision and a subtotal thymectomy	Left lobe of thymus	5	Alive
Ose N <sup>[10]</sup>	71	Female	pericardial discomfort	2.0×1.8	VATS	Left lobe of thymus	Unknown	Unknown
Zheng C <sup>[11]</sup>	30	Female	None	2.3×1.7	VATS	Left lobe of thymus	12	Alive
This case	63	Female	None	3.5×2.4	VATS	Right of thymus	3	Alive

VATS: video-assisted thoracic surgery

## Discussion

Cavernous hemangioma is a kind of venous malformation that occurs when blood flow is low at birth. It mostly grows on the head, face, oral mucosa, limbs, liver, spine and other parts of the body but rarely grows in the thymus. When the mass becomes enlarged, it can constrict the heart and nearby blood vessels, causing chest tightness, cough, breathing difficulties and other symptoms. Histologically, hemangiomas are congenital benign tumors or vascular malformations that generally originate from residual embryonic angioblasts and are caused by abnormal embryonic vascular development<sup>[12]</sup>. Ninety percent of hemangiomas are cavernous hemangiomas and capillary hemangiomas, some of which disappear with age. Cavernous hemangiomas are rare vascular malformations. Microscopically, the hemangioma is composed of abnormally dilated blood vessels lined with endothelial cell monolayers. Phlebolith is the characteristic manifestation of thymic cavernous hemangiomas,

but only 10% of cases show phlebolith on CT scans. CT scans can show round or oval soft tissue masses in the anterior mediastinum, and they have clear borders and the same density. Calcification, which is caused by thrombosis, can be detected within the mass. Dynamic enhanced CT scans can reveal progressive enhancement in most but not all tumors.

Thymic cavernous hemangiomas should be differentiated from thymomas, teratomas and lymphomas. Thymomas are common primary tumors located in the anterior mediastinum, accounting for approximately 20–40% of mediastinal tumors. They always originate from thymic epithelium. Thymomas mainly occur in people aged 50 to 60 years old, with no significant differences in prevalence between men and women. Most patients have no obvious clinical symptoms, but chest X ray scans can reveal the tumors. When tumors grow, they oppress nearby tissues and organs, often causing chest distress, chest pain and other types of discomfort. CT scans can reveal round or oval soft tissue masses in the anterior mediastinum, which can be seen more clearly when enhanced. Therefore, it is difficult to distinguish thymic cavernous hemangiomas from thymomas in clinical and imaging examinations. Shen C<sup>[3]</sup> et al misdiagnosed one case of thymic cavernous hemangioma as thymoma. The postoperative pathology results revealed that it was a cavernous hemangioma.

Therefore, surgical resection of thymic cavernous hemangiomas should be performed as soon as possible. Thoracotomy can be performed for larger tumors or tumors that constrict nearby blood vessels, while thoracoscopic surgery can be performed for smaller tumors. Careful intraoperative separation is needed to avoid massive hemorrhage caused by vascular injury<sup>[13]</sup>. A review of the literature found that all the 10 patients underwent surgical treatment and recovered well. However, The patient had both a thymus hemangioma and a renal carcinoma in our case. For patients with thymic cavernous hemangioma complicated with renal carcinoma, no such report has been found in the literature review. We adopted a relatively conservative treatment plan, namely minimally invasive resection of thymic cavernous hemangioma, and laparoscopic radical nephrectomy after the condition was stabilized. It is still uncertain whether simultaneous thoracoscopic laparoscopic surgery is feasible in these patients. More research is needed.

## Conclusions

This article reports a rare case of thymic cavernous hemangioma misdiagnosed as thymoma and reviews the published literature. This article revealed six important findings. First, thymic cavernous hemangiomas can occur at any age, and there are no significant differences between males and females. Second, most cases are asymptomatic. Third, it is difficult to diagnose thymoma before surgery and easy to misdiagnose thymoma. Fourth, surgery is an effective way to treat thymic cavernous hemangiomas. Five, Detailed imaging studies can rule out lesions in other parts of the body. Last, the long-term follow-up indicated that the prognosis of the disease was good.

## Abbreviations

CT: Computed tomography

## Declarations

### Ethical review:

The study was reviewed and approved by the Clinical College, Lishui Municipal Central Hospital Institutional Review Board.

### Funding/Conflicts of Interest information

No/The authors have no competing interests.

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### License to Publish:

Completed.

### Authors' contributions

Authors WZJ and CY drafted the manuscript. TSS, WZJ and ZFB performed the surgery. CY helped collect clinical data and made critical revisions for important intellectual content. All authors read and approved the final manuscript.

### Availability of data and materials

We declare that the materials described in the manuscript, including all relevant raw data, will be freely available to any scientist wishing to use them for noncommercial purposes, without breaching participant confidentiality.

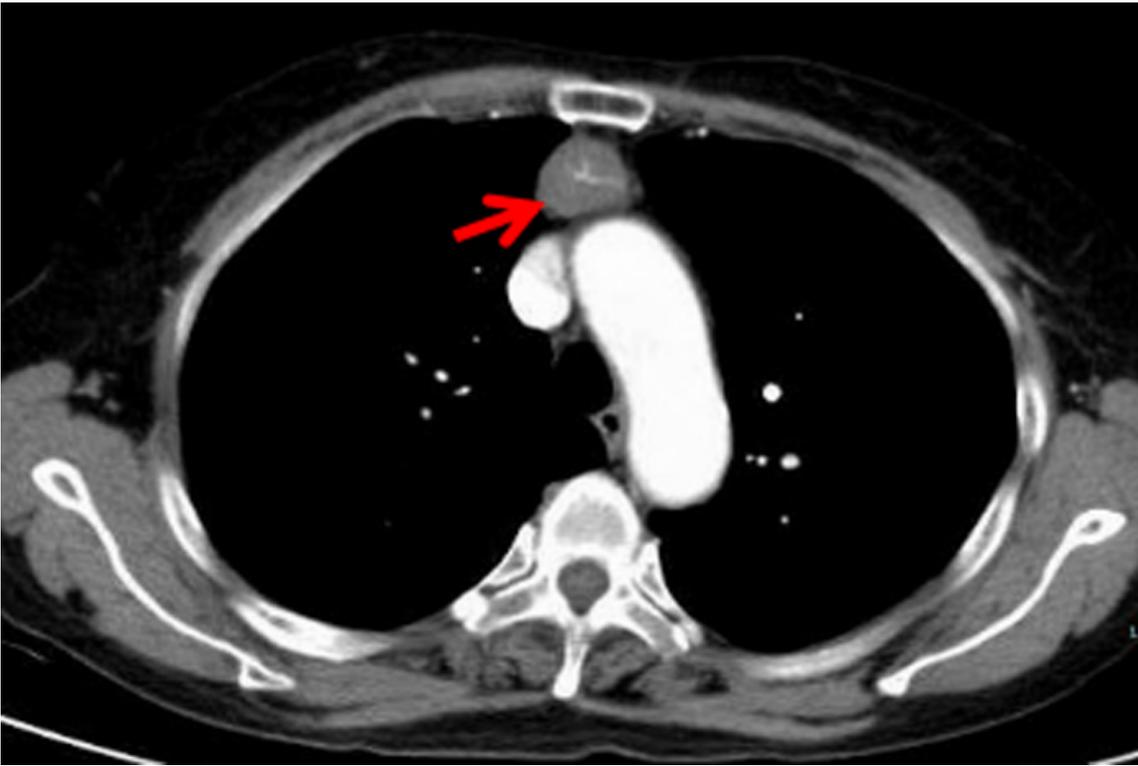
### Consent

Written informed consent was obtained from the patient for the publication of this case report. A copy of the consent form is available for review by the editor-in-chief of this journal.

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## Figures



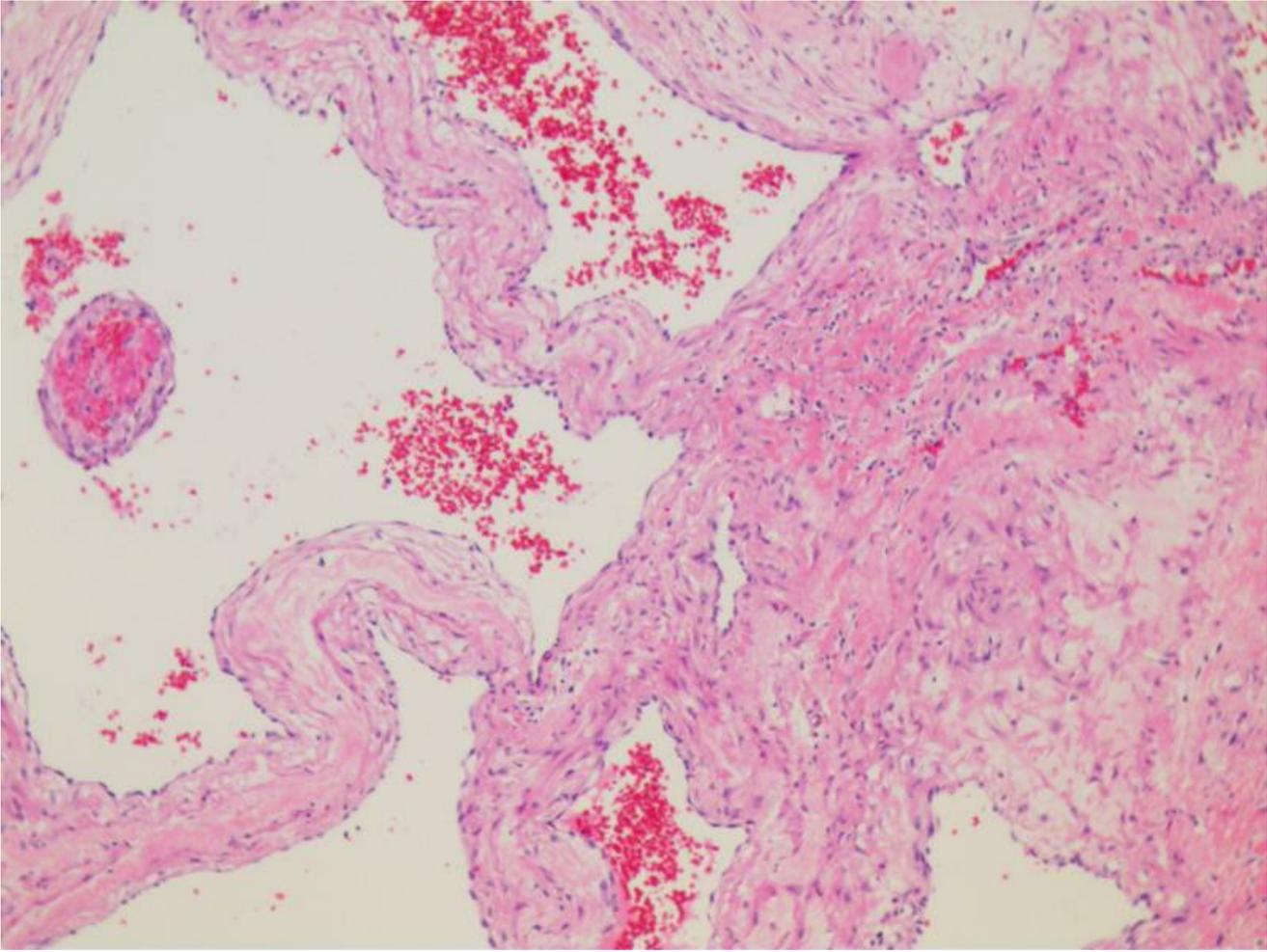
**Figure 1**

The enhanced chest CT scan showed an oval soft tissue mass measuring 3.5×2.4 cm in size (red arrow).



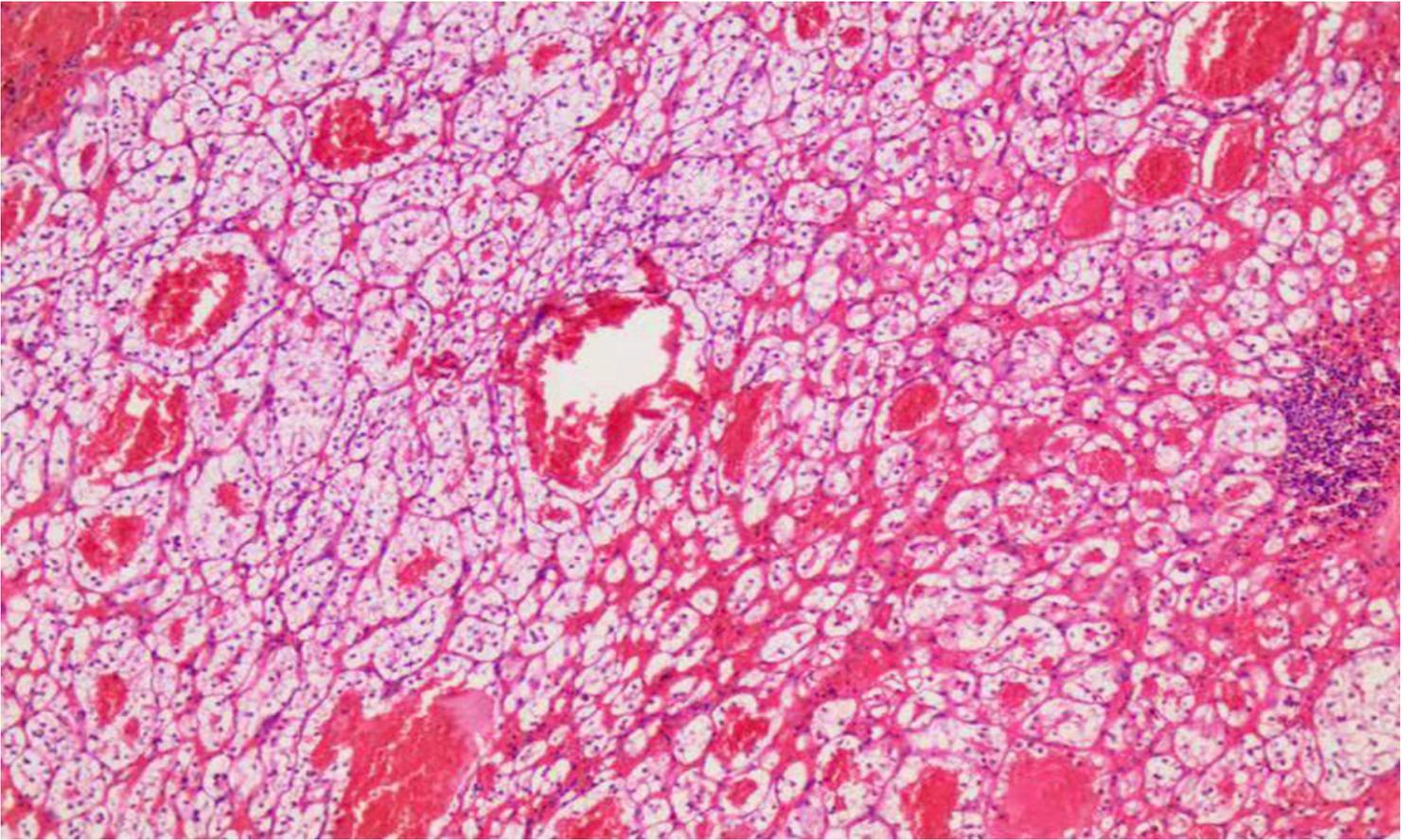
**Figure 2**

The enhanced abdominal CT scan indicated a 2.5cm space-occupying lesion in the right kidney (red arrow).



**Figure 3**

The hematoxylin-eosin stained cavernous hemangioma shows prominent ectatic vessels filled with blood ( $\times 200$ ).



**Figure 4**

Hematoxylin-eosin staining showed clear and empty cytoplasm of tumor cells ( $\times 40$ )

## Supplementary Files

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- [carechecklist.jpg](#)