

Mediastinal hemangioma presenting with a characteristic feature on dynamic computed tomography images

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Abstract: Hemangiomas are uncommon benign tumors of the mediastinum. The definite diagnosis is sometimes difficult to make because of usually nonspecific features on single-phase contrast-enhanced computed tomography (CT) images. We described a 60-year-old woman suffering from a neck mass with progressive enlargement. On the dynamic CT study, the tumor showed peripheral nodular enhancement on early phase images and progressive centripetal fill-in on delayed phase images. Hemangioma was preoperatively diagnosed on the basis of this characteristic CT appearance.

Keywords: Mediastinal hemangioma; hypervascular mass; dynamic computed tomography (CT)

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Introduction

The computed tomography (CT) features of the mediastinal hemangioma are nonspecific and are often described as an enhancing mass or associated with calcified phleboliths (1). This might be attributed to the histological varieties of hemangiomas which are classified into cavernous, capillary and venous types according to the size of their vascular spaces. More than 90% cases are composed of cavernous or capillary types (2). Dynamic CT images may play an important role in diagnosis and are rarely mentioned in the literature (3). We reported a patient presenting with a superior mediastinal mass. The dynamic CT images made the correct diagnosis of hemangioma before operation based on the characteristic enhancement pattern.

Case presentation

A 60-year-old woman presented with a right neck mass showing gradual enlargement for half a year. The physical examination revealed no other remarkable abnormality. Initially, a thyroid lesion was suspected. The laboratory data

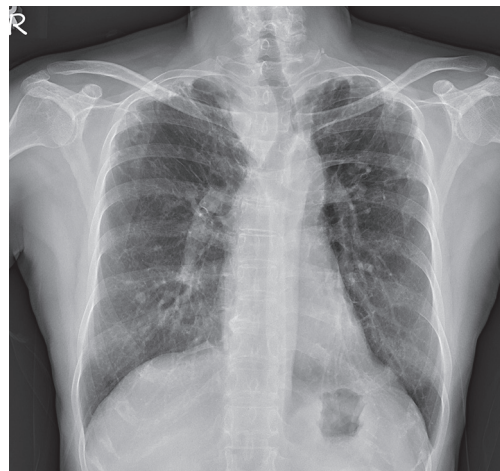


Figure 1 Chest radiograph showed a bulging mass in right superior mediastinum causing left-sided tracheal deviation.

including thyroid functions were within normal limits. The chest radiograph showed a bulging mass in right superior mediastinum causing left-sided tracheal deviation (*Figure 1*). The pre-contrast CT scan showed a low attenuation and

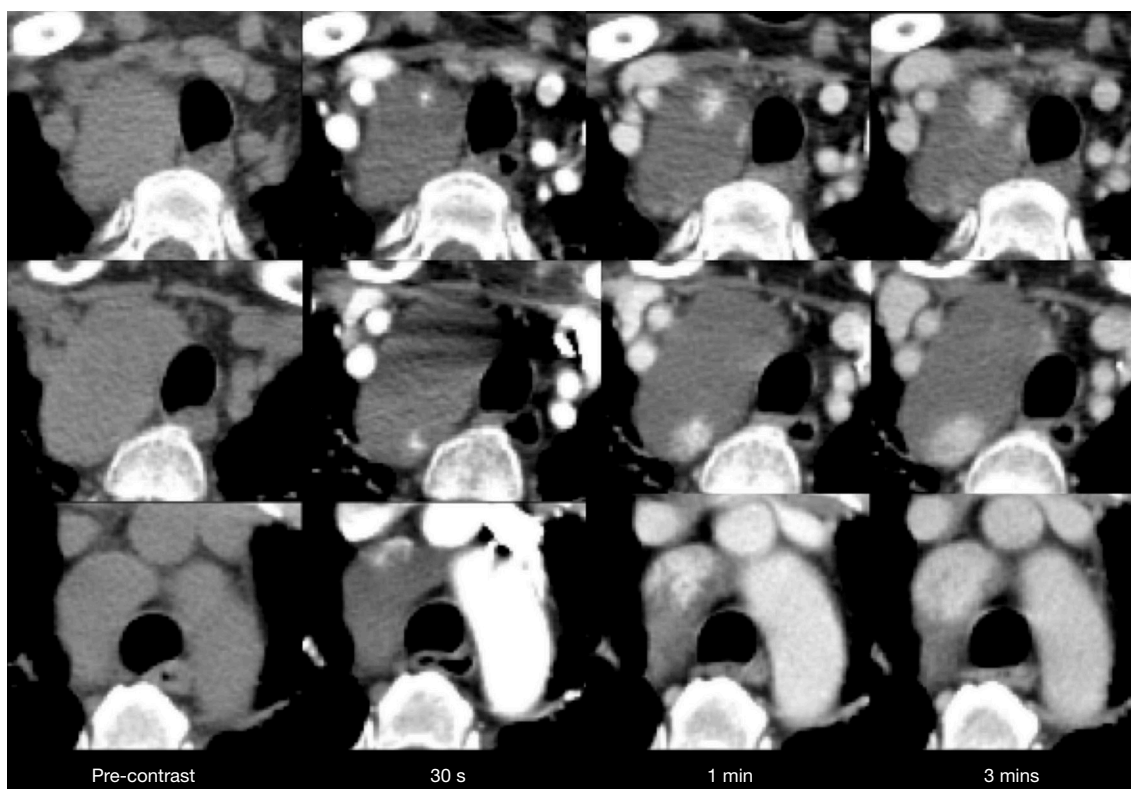


Figure 2 Dynamic computed tomography images were composed of pre-enhanced, 30 seconds, 1min and 3mins phases following intravenous contrast medium administration at the different level of the mediastinal mass, which showed peripheral nodular enhancement on arterial phase images and progressively centripetal fill-in on delayed phase images.

circumscribed mass in right superior mediastinum. The interface between the mass lesion and the thyroid gland was clear. A bronchogenic cyst was initially suspected according to its location and low attenuation on the pre-contrast images. However, due to a few peripheral enhancing foci seen on the post-contrast images, the possibility of a bronchogenic cyst was unlikely. In order to evaluate the nature and enhancing pattern of the mass, we performed a dynamic CT study with intravenous administration of 100 mL contrast medium at the rate of 3.5 mL/s by the powerful injector. Spiral scanning of the mediastinal mass was done repeatedly at 30 seconds, 1 minute and 3 minutes after injection. The mass revealed initially peripheral nodular enhancement with gradually central fill-in on the delayed phase images (*Figure 2*). The mediastinal hemangioma was first considered based on its enhancing pattern. Biopsy was not warranted due to high risk of major bleeding. The median sternotomy was performed for tumor resection. Grossly, the tumor revealed a well-circumscribed and hypervascular appearance (*Figure 3*). Pathological findings

showed proliferation of small to medium-sized vessels with variable anastomosing channels (*Figure 4*). The cavernous hemangioma was confirmed.

Discussion

Hypervascular mediastinal masses may show strong enhancement after contrast media administration. They are divided into anterior, middle and posterior according to their location. Each compartment of mediastinal mass contains different differential diagnoses (4). Several entities such as Castleman disease, paraganglioma, vascular malformation, ectopic parathyroid adenoma and hypervascular metastasis should be taken into account as hypervascular anterior mediastinal masses are mentioned.

Mediastinal hemangiomas are very rare and consist of only 0.5% of mediastinal masses (5,6). According to International Society for the Study of Vascular Anomalies (ISSVA) classification, hemangiomas are classified into benign vascular tumors. They occur more frequently at the

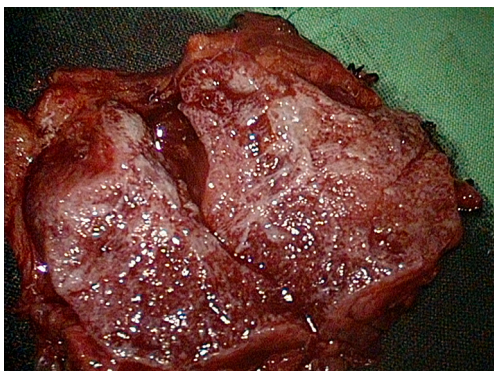


Figure 3 The tumor shows a well-circumscribed and hypervascular appearance.

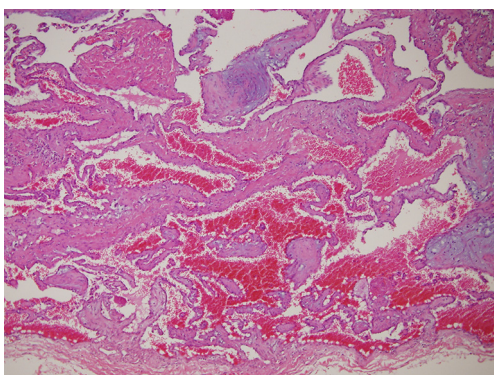


Figure 4 Microscopic feature of the tumor shows proliferation of large dilated vascular channels with irregular and sinusoid lumens. (hematoxylin and eosin stain, magnification $\times 100$).

anterior mediastinum followed by posterior compartment. They also have a higher incidence before the age of 35 (5,7). At the histological examination, these tumors consist of interconnecting vascular spaces interposed with various stromal elements such as fat, myxoid and fibrous tissues. Organized thrombi in hemangiomas are frequent and may calcify as phleboliths that are a potentially diagnostic feature on radiograph or CT images (8). On single-phase contrast-enhanced CT scans, the patterns of contrast enhancement are usually nonspecific and include central, peripheral and mixed type (1). In a review of literatures, there are a few articles mentioning the mediastinal hemangioma diagnosed by dynamic CT scans. Cheung *et al.* reported that a mediastinal hemangioma showed heterogeneous enhancement on early images with persistently and gradually increasing enhancement on delayed images (3). In our case, the hemangioma showed no calcified

phlebolith but a typical feature of early peripheral nodular enhancement and progressively centripetal fill-in. These characteristic features just resembled those in most hepatic hemangiomas seen on dynamic CT scans.

Yamashita *et al.* explained that the different vascular size of cavernous hemangiomas of the liver might attribute to the imaging characters on dynamic CT study (9). The peripheral early enhancing area had the smaller vascular size that made enhancement quickly. The central fill-in region had larger vascular size than those at the peripheral region; hence, slower enhancement would be observed. The most central region that did not enhance might have cyst, bleeding or scar. Therefore, we assumed that the radiological and pathological correlations of our case were similar to those of hepatic cavernous hemangiomas. Its typical imaging features let us make the precise diagnosis before the operation to avoid unnecessary invasive diagnostic procedure. Furthermore, based on its benign nature, if the tumor shows stable appearance and does not cause any symptoms, careful follow-up might be warranted, just like general recommendations for a hepatic hemangioma.

In conclusion, hemangiomas are uncommon benign tumors of the mediastinum and must be taken into a differential diagnosis as a hypervascular mass is seen. Dynamic CT study is helpful to make a precise diagnosis of cavernous hemangioma when the mass shows characteristic features of peripheral nodular enhancement and progressively centripetal fill-in.

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None.

Footnote

Conflicts of Interest: The authors have no conflicts of interest to declare.

Informed Consent: Written informed consent was obtained from the patient's relative for publication of this manuscript and any accompanying images.

References

1. McAdams HP, Rosado-de-Christenson ML, Moran CA. Mediastinal hemangioma: radiographic and CT features in 14 patients. *Radiology* 1994;193:399-402.

2. Moran CA, Suster S. Mediastinal hemangiomas: a study of 18 cases with emphasis on the spectrum of morphological features. *Hum Pathol* 1995;26:416-21.
3. Cheung YC, Ng SH, Wan YL, et al. Dynamic CT features of mediastinal hemangioma: more information for evaluation. *Clin Imaging* 2000;24:276-8.
4. Cabral FC, Trotman-Dickenson B, Madan R. Hypervascular mediastinal masses: action points for radiologists. *Eur J Radiol* 2015;84:489-98.
5. Davis JM, Mark GJ, Greene R. Benign blood vascular tumors of the mediastinum. Report of four cases and review of the literature. *Radiology* 1978;126:581-7.
6. Cohen AJ, Sbaschnig RJ, Hochholzer L, et al. Mediastinal hemangiomas. *Ann Thorac Surg* 1987;43:656-9.
7. Kaya SO, Samancılar O, Usluer O, et al. Giant Cavernous Haemangioma of the Anterior Mediastinum. *Eurasian J Med* 2015;47:216-7.
8. Gindhart TD, Tucker WY, Choy SH. Cavernous hemangioma of the superior mediastinum. Report of a case with electron microscopy and computerized tomography. *Am J Surg Pathol* 1979;3:353-61.
9. Yamashita Y, Ogata I, Urata J, et al. Cavernous hemangioma of the liver: pathologic correlation with dynamic CT findings. *Radiology* 1997;203:121-5.

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