Haemorrhagic Thymic Cyst Masquerading a Thick Walled Neoplasm: A Case Report and Review of Literature

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ABSTRACT

Thymic cysts are rare anterior mediastinal cysts that are incidentally detected during routine imaging in patients or during the workup for chest pain with dyspnea. Here, we describe a rare case of a hemorrhagic thymic cyst in a 30-year-old man who presented with recurrent chest pain. Upon further evaluation using echocardiography, CT, and MRI, a well-defined, thick-walled, multiloculated cystic lesion in the anterior mediastinum was identified. The patient underwent surgery and was diagnosed with a hemorrhagic thymic cyst. Postoperatively, he was stable and discharged on the fifth day without complications. This report highlights the role of multimodality imaging in the diagnosis of thymic cysts.

Keywords: Haemorrhagic thymic cyst, Cardiac MRI, Cardiac CT

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INTRODUCTION

A 30-year-old man presented to the emergency department with the acute onset of chest pain. He reported a history of similar episodes over the past six months. There was no history of weight loss. His electrocardiogram (ECG) was normal. The patient was immunocompetent, and tests for human immunodeficiency virus (HIV) and tuberculosis (Mantoux test) were negative. He had no history of primary heart disease. The patient was a chronic smoker and alcoholic, with a past history of extrapulmonary tuberculosis at age 12, which had been treated for six months.

On examination, his blood pressure was 110/60 mmHg, his pulse rate was 68 beats per minute, and his temperature was 37°C. Routine blood and urine analyses were within normal limits. No significant family history was noted. The general physical examination was unremarkable, without any deformities or abnormalities. Chest examination revealed normal breath and heart sounds, though local examination showed a few small cervical nodes. The remainder of the systemic examination was clinically normal. Thyroid function tests were normal, and all hematological and biochemical investigations were within normal ranges.

A chest radiograph revealed an opacity in the right parahilar region, abutting the mediastinum, with obliteration of the superior vena cava (SVC) and the hilum overlay sign **(Figure 1).**

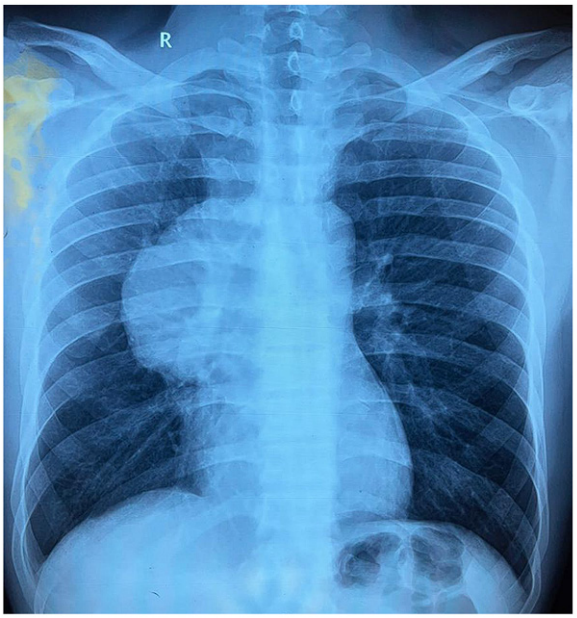

Figure 1. **Chest radiograph shows widening of mediastinum with right parahilar mass overlying the right hilum.**

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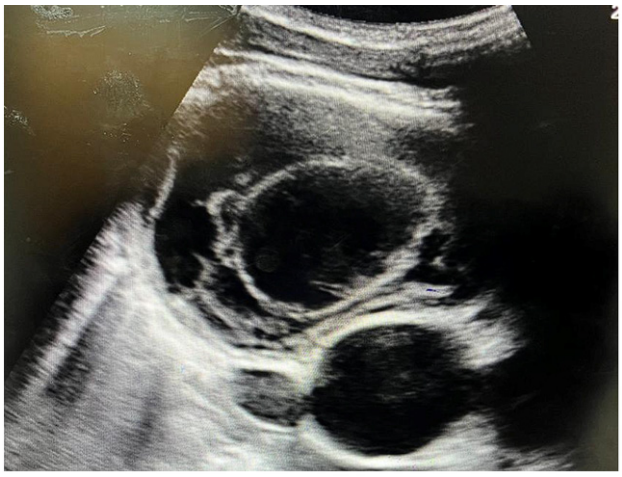


Figure 2. **USG showed a multiloculated cystic lesion with internal echoes.**

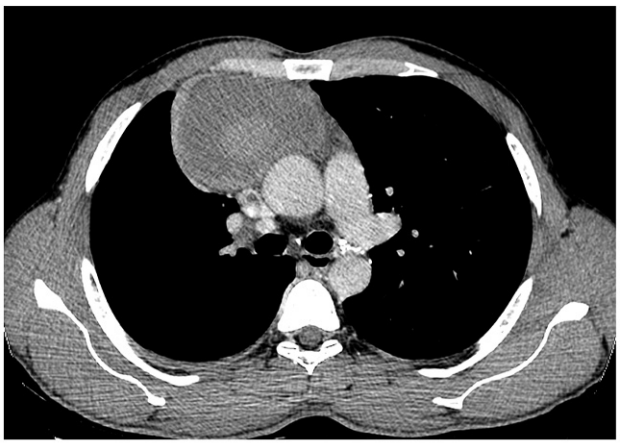
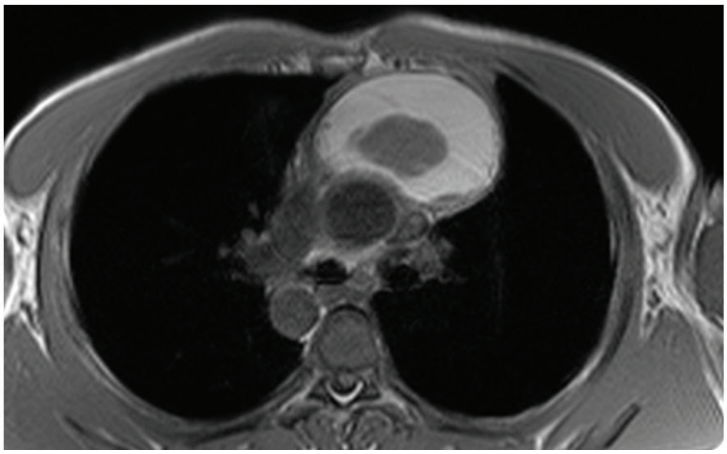


Figure 3. **CT scan of the chest showed a multiloculated fluid density lesion with enhancing thick wall and septae in the pre vascular space.**

Ultrasound showed a multiseptated cystic lesion in the anterior mediastinum without any solid areas or vascularity **(Figure 2)**

A contrast CT scan of the chest **(Figure 3)** showed a multiloculated fluid-density lesion with an enhancing thick wall and septae in the prevascular space, projecting into the right thoracic cavity. There was associated subsegmental collapse and consolidation of the anterior segment of the right upper lobe, but no obvious infiltration into adjacent vascular structures of the mediastinum.

For further characterization, an MRI was performed **(Figures 4,5,6,7).** MRI revealed a well-defined heterogeneous signal-intensity cystic lesion measuring 9.7 x 7.2 x 8.8 cm (CC/TR/AP) in the anterior mediastinum, located in the prevascular space. The lesion appeared multiloculated with multiple thin septations. Post-contrast T1-weighted sequences showed enhancement of



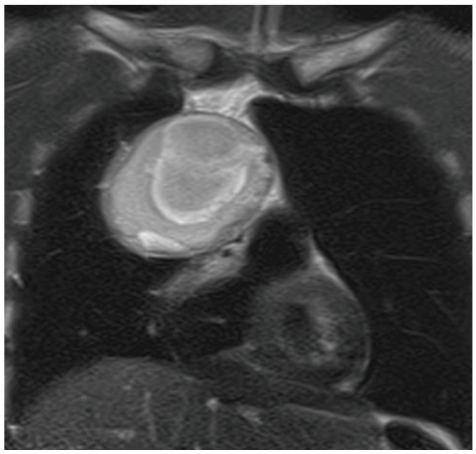
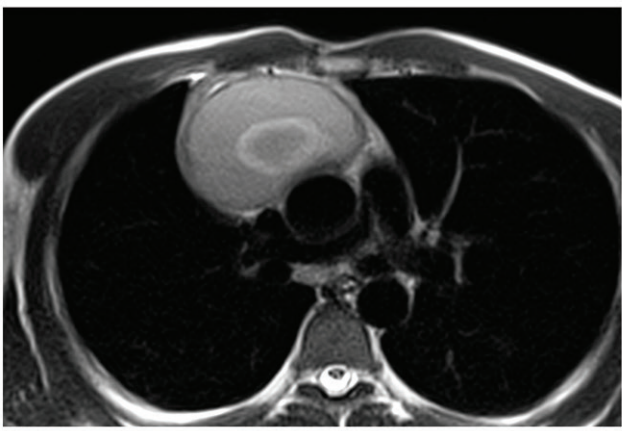


Figure 4 & 5. **Axial T1WI, Coronal T2WI. Shows high signal intensity lesion in T1WI and T2WI sequences.**



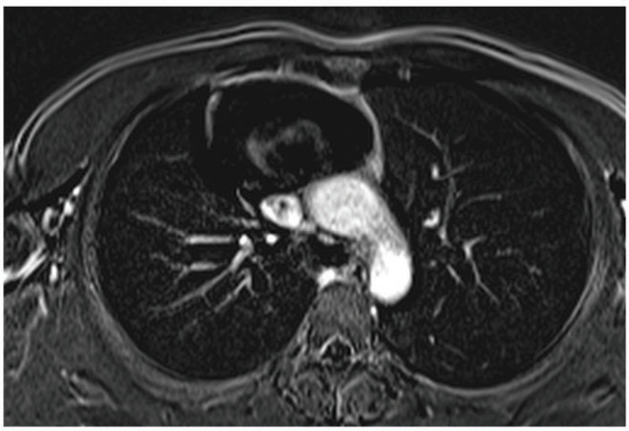


Figure 5 & 6. **Axial T2WI and Axial Post contrast FAT SAT substraction image. shows enhancement of the wall and septations.**

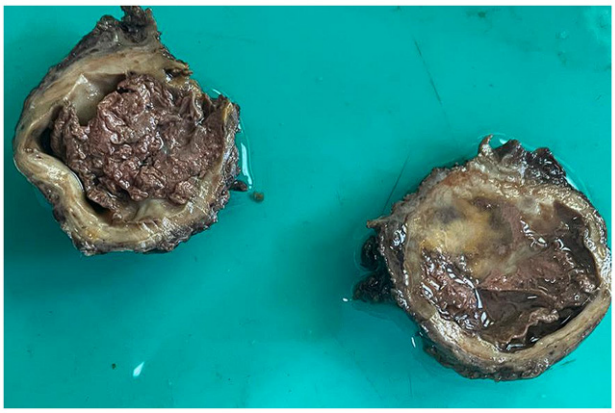


Figure 7. **Cut specimen shows brownish haemorrhagic cystic mass.**

the wall and septations, with no enhancing solid areas within the lesion. One anterior loculation was hyperintense in T1WI and T1FS, and hypointense in T2WI, suggestive of exudates or a hemorrhagic component. Most loculations were hypointense in T1WI and hyperintense in T2WI and STIR. The peripheral wall showed blooming on SWI sequences. Some irregular nodular projections were noted in the lateral walls. There was no fat density in the lesion and no infiltration into the heart, pericardium, or evidence of mediastinal or hilar lymphadenopathy, which suggested the mass was benign.

The patient underwent surgical excision. The gross specimen revealed a brownish multilocular cystic lesion **(Figure 7)** with haemorrhage without any solid areas. HP report came as multilocular haemorrhagic thymic cyst without any tumour tissue **(Figures 8 A and B).**

DISCUSSION

Thymic cysts are a relatively rare type of anterior mediastinal mass, accounting for approximately 1-3% of anterior mediastinal masses. They are often detected incidentally during routine imaging and can be mistaken for cystic neoplasms, such as thymoma, cystic germ cell tumors, or even infected cysts like hydatid cysts, leading to unnecessary thymectomy. Most surgically confirmed cases show a higher density on imaging (>20 HU), which often leads to a preoperative diagnosis of thymoma. On CT, thymic cysts may present as high-density cysts due to hemorrhage or internal debris.[1-3]

These cysts can either be congenital or acquired. Congenital thymic cysts arise from the persistence of the thymopharyngeal duct and can appear anywhere along the descent path of the thymic primordium, from the angle of the mandible to the mediastinum. They usually occur in relatively young patients and are typically unilocular, with smooth walls and water-density content unless complicated by infection or malignancy. Acquired thymic cysts are usually multilocular and are often secondary to inflammatory or degenerative processes, or due to cystic degeneration associated with malignancies like thymic carcinoma or lymphoma.[3]

In the differential diagnosis of cystic neck masses, thymic cysts must be distinguished from other cystic lesions, including thyroglossal duct cysts, branchial cleft cysts, cystic hygromas, dermoid cysts, epidermoid cysts, and laryngoceles. While thyroglossal duct cysts are usually midline cystic structures related to the hyoid bone, branchial cleft cysts commonly arise from the second branchial cleft and are located laterally in the anterior neck, often associated with a sinus tract or fistula.[1,4]

Given the difficulty in distinguishing thymic cysts from other neoplastic or non-neoplastic cystic lesions based on imaging alone, complete surgical resection and his-

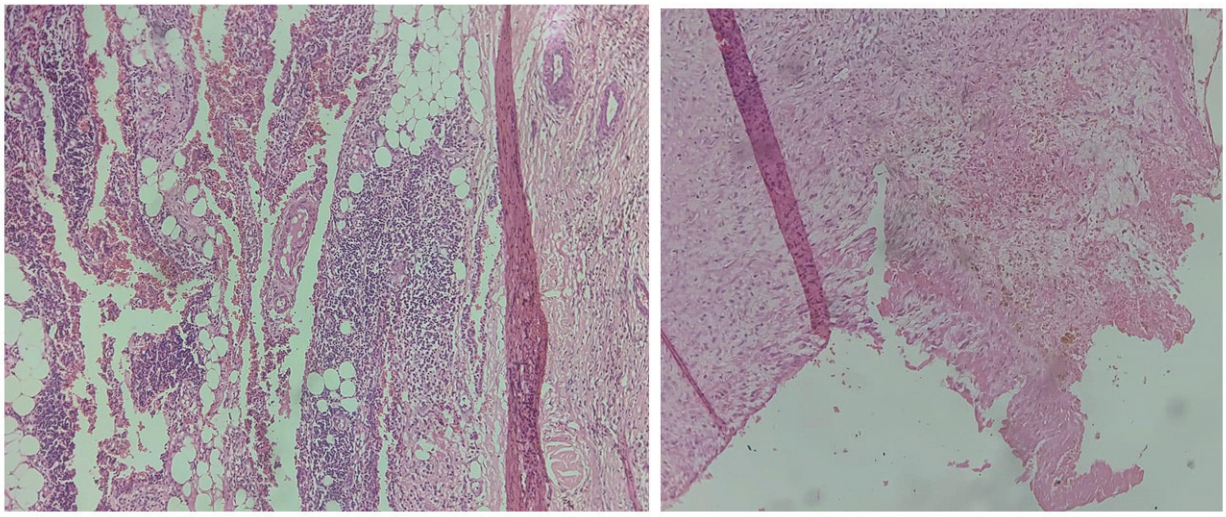


Figure 8A & 8B. Multilocular thymic cyst. The histopathological findings revealed multiple cystic areas lined by squamous and columnar epithelium with fibrovascular proliferation, haemorrhage and necrosis.

topathologic examination are essential. On CT, thymic cysts generally appear as homogeneous low-attenuation masses with smooth, uniformly thin walls, and they may be unilocular or multilocular. MRI typically shows thymic cysts as homogeneous, low to intermediate signal lesions on T1-weighted images and high signal intensity on T2-weighted images.

Cystic neck mass has to be differentiated from other cysts like thyroglossal duct cysts, branchial cleft cysts, cystic hygromas, dermoid cysts, epidermoid cysts, and laryngocele.[3,4] The suprahyoid thyroglossal duct cysts are generally midline cystic structures seen in relation to hyoid bone while infrahyoid cysts are commonly paramedian in location and a lateral suprahyoid thyroglossal duct cyst may show a component piercing the hyoid bone and embedded within strap musculature and in close proximity to the hyoid bone.[5]

Branchial cleft cysts are congenital lesions which commonly arise from the second branchial cleft and are located laterally in the anterior neck, close to anterior surface of the sternocleidomastoid muscle and lateral to the carotid space. A second branchial cleft cyst may occasionally demonstrate a beak sign with extension between the internal and external carotid arteries. Lymphatic malformations are more common in children. They are Lobulated, multiseptated cystic appearance may appear similar to an infected thyroglossal duct cyst. However, the presence of fluid-fluid levels from recent hemorrhage, and associated traversing venous vessels are key distinguishing features of lymphatic malformations[2] Dermoid and epidermoid cysts arise from dermal elements of the first and second branchial arches, and therefore are located at base of tongue in midline or superficially within the subcutaneous tissues of the anterior neck). Epidermoid cysts will show diffusion restriction in MRI.[6,7]

Saccular cyst and aryngoceles are congenital dilatations of the saccule within the laryngeal ventricle located in the supraglottic larynx. They are categorized as internal, external, or mixed, depending on their relationship to the thyrohyoid membrane. Although both saccular cysts and laryngoceles, as well as thyroglossal duct cysts, can extend through the thyrohyoid membrane, thyroglossal duct cysts do not involve the laryngeal ventricle. Laryngoceles, in particular, may be fluid-filled or present with air-fluid levels due to their communication with the airway.

Thymic cysts are rare lesions that arise from the persistent thymopharyngeal duct, which extends from the neck and most commonly occurs on the left side. These cysts can often be identified by their close relationship with the carotid sheath and may displace the carotid artery and jugular vein, sometimes showing a classic dumbbell or bilobed appearance as they extend into the anterior mediastinum.

Congenital thymic cysts typically present as a painless neck swelling during the first or second decade of life. Larger lesions may present earlier due to their compressive effects on adjacent mediastinal structures, causing symptoms such as dysphagia, dyspnoea, and hoarseness of voice.[8]

Congenital cysts are due to the persistence of thymopharyngeal tracts and secondary to cystic degenerative changes within ectopic thymic remnants.[8,9] The thymopharyngeal duct descends from the developing pyriform sinus into the mediastinum, lateral to the thyroid gland. Hence the Thymic tissue nests can be found anywhere along its path of descend from the angle of the mandible to the mediastinum.

Acquired thymic cysts are generally multilocular and often arise from inflammatory or degenerative processes, or as a result of cystic degeneration associated with malignancies. These cysts contain multiple cavities filled with dark blood or necrotic debris and can adhere to adjacent structures due to inflammation, which may mimic an invasive mass. They are linked to tumors such as thymic carcinoma and lymphoma, as well as benign conditions like myasthenia gravis, HIV, and Sjögren's syndrome. The presence of solid, enhancing tissue within the thymus following contrast administration may indicate the presence of tumors like thymoma, lymphoma, or germ cell tumors such as teratoma. Teratomas can exhibit calcification and fat density, although approximately 10% may appear cystic without detectable fat on CT. Elevated serum levels of β-human chorionic gonadotropin or α-fetoprotein may also provide diagnostic clues. Additionally, mediastinal or cervical lymphadenopathy and pleural nodules may suggest a diagnosis of lymphoma or thymoma.[10,11]

Other uncommon cystic lesions in the anterior mediastinum include lymphangiomas and hemangiomas. Lymphangiomas can extend across various planes and show minimal enhancement with contrast, while hemangiomas typically exhibit strong enhancement after intravenous contrast administration, with persistent contrast noted in delayed scans.[12]

Given that CT and MRI cannot consistently distinguish between neoplastic and non-neoplastic cystic lesions, both can present as high-density multilocular

cysts, necessitating complete surgical resection and meticulous histopathological evaluation. On CT, thymic cysts typically appear as homogeneous, low-attenuation lesions (10 to 20 HU) with thin, uniformly smooth walls. They may be either unilocular or multilocular, and post-contrast injection, the cyst wall demonstrates smooth, regular enhancement. In cases of infection, increased protein content leads to higher attenuation or signal intensity observed on CT or MRI respectively. On MRI, thymic cysts generally exhibit homogeneous characteristics with low or intermediate signal intensity on T1-weighted images and high signal intensity on T2-weighted images. The relationship between the cyst and surrounding structures can be clearly delineated on both CT and MRI.[13]

This case highlights the significance of considering thymic cysts as a differential diagnosis for cystic anterior mediastinal masses, despite their rarity.

CONCLUSION

Thymic cysts, though rare, should be considered in the differential diagnosis of any cystic anterior mediastinal masses. Cross-sectional imaging, surgical findings, and histopathological correlation play a crucial role in accurately diagnosing thymic cysts.

END NOTE

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Conflict of Interest: None declared

Ethical Standards: We declare that the patient gave informed consent for publication of the study material

REFERENCES

1. He ZL, Wang ZY, Ji ZY. Special Computed Tomography Imaging Features of Thymic Cyst. Int J Clin Pract. 2022 Oct 11;2022:6837774.
2. Araki T, Sholl LM, Gerbaudo VH, Hatabu H, Nishino M. Intrathymic cyst: clinical and radiological features in surgically resected cases. Clin Radiol. 2014 Jul;69(7):732–8.
3. Suster S, Rosai J. Multilocular thymic cyst: an acquired reactive process. Study of 18 cases. Am J Surg Pathol. 1991 Apr;15(4):388–98.
4. Mittal MK, Malik A, Sureka B, Thukral BB. Cystic masses of neck: A pictorial review. Indian J Radiol Imaging. 2012;22(4):334–43.
5. Thyroglossal duct pathology and mimics | Insights into Imaging | Full Text [Internet]. [cited 2024 Jun 3].
6. Yan C, Low DW. A Rare Presentation of a Dermoid Cyst with Draining Sinus in a Child: Case Report and Literature Review. Pediatr Dermatol. 2016 Jul;33(4)
7. Indeglia RA, Shea MA, Grage TB. Congenital cysts of the thymus gland. Arch Surg. 1967 Jan;94(1):149–52.
8. Strollo DC, Rosado-de-Christenson ML. Tumors of the thymus. J Thorac Imaging. 1999 Jul;14(3):152–71.
9. Davis RD, Oldham HN, Sabiston DC. Primary cysts and neoplasms of the mediastinum: recent changes in clinical presentation, methods of diagnosis, management, and results. Ann Thorac Surg. 1987 Sep;44(3):229–37.
10. Kojima K, Matsuura Y, Ibi T, Nakajima J. Thymic carcinoma developing in a multilocular thymic cyst. J Thorac Dis. 2012;4(5):512–5.
11. Strange CD, Ahuja J, Shroff GS, Truong MT, Marom EM. Imaging Evaluation of Thymoma and Thymic Carcinoma. Front Oncol. 2022 Jan 3;11:810419.
12. Murphy T, Ramai D, Lai J, Sullivan K, Grimes C. Adult neck hemangiolymphangioma: a case and review of its etiology, diagnosis and management. J Surg Case Rep. 2017 Aug 31;2017(8)
13. Nishino M, Matsubara O, Fukuoka J, Suda K, Shimosato Y, Iwasaki Y. Thymic cysts: radiologic-pathologic correlation with emphasis on diagnostic pitfalls. Radiology. 2004 Mar;230(3):535-43.