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Case Report

Radiology Section

# Thymic Epidermoid Cyst in a Young Woman: A Case Report

VIJAYA TEJASWINI[1], SUSEELA KODANDAPANI[2], HARISH KACHARAGADLA[3], VEERAIAH KOPPULA[4]

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## ABSTRACT

Cystic lesions of the anterior mediastinum have diverse aetiologies and frequently demonstrate overlapping radiological features. Thymic epidermoid cysts are uncommon benign lesions and their Computed Tomography (CT) appearance may closely resemble more common entities such as thymic cysts, cystic thymomas and mature teratomas. Hereby, the authors present the case of a 24-year-old woman who was evaluated for persistent cough. A normal chest radiograph was obtained, but High-Resolution Computed Tomography (HRCT) of the chest performed at an outside facility revealed an anterior mediastinal mass. She was subsequently referred to the present institute for further evaluation. A CT scan revealed a large, well-defined, non enhancing, mixed-attenuation unilocular lesion with a few internal hyperdense foci in the anterior mediastinum. CT-guided Fine-Needle Aspiration Cytology (FNAC) and cell block were performed, suggesting a mediastinal epidermoid cyst of thymic origin. Thoracoscopic excision of the anterior mediastinal mass was done and sent for histopathological examination which confirmed the same.

**Keywords:** Biopsy, Computed tomography, Fine-needle aspiration cytology, Histopathology, Mediastinum

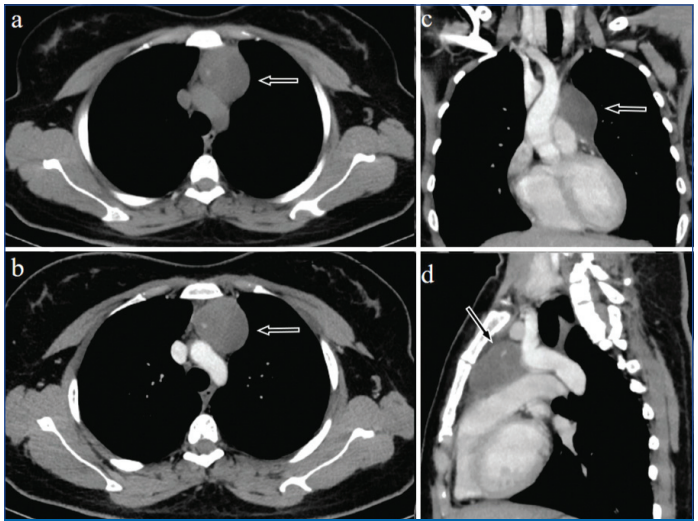
## CASE REPORT

A 24-year-old woman was evaluated for persistent cough of two weeks' duration, non productive in nature. There was no associated fever, dyspnoea, chest pain, weight loss or other constitutional symptoms. Following a normal chest radiograph, HRCT of the chest performed at an outside facility revealed an anterior mediastinal mass involving the left lateral aspect of the thymus. She was referred to the institute for further evaluation. On examination, she was conscious, oriented, afebrile, with stable vital signs and normal oxygen saturation. Respiratory and cardiovascular examinations were unremarkable. Routine investigations, including Complete Blood Count (CBC), Renal Function Tests (RFT), Liver Function Tests (LFT) and urine analysis, were within normal limits. Random plasma glucose was 137 mg/dL. Serum tumour markers were within normal limits: Alpha-Fetoprotein (AFP) 2.14 ng/mL, β-human Chorionic Gonadotropin (β-hCG) <2.39 mIU/mL and Lactate Dehydrogenase (LDH) 180 U/L. Acetylcholine Receptor (AChR)-binding antibody was 0.23 nmol/L.

Contrast-enhanced CT of the thorax revealed a well-defined, smoothly marginated, unilocular lesion in the left side of anterior mediastinum, involving the left lateral aspect of the thymus. The lesion measured 4.8×5.3×6.1 cm (anteroposterior×transverse ×craniocaudal). It demonstrated predominantly hypodense internal contents with attenuation values of 20-30 HU (Hounsfield Unit), with a few focal hyperattenuating areas measuring 90-110 HU, likely representing proteinaceous/keratinaceous contents [Table/Fig-1a]. The lesion had a smooth, thin wall measuring 2 mm, without mural nodularity or enhancing solid component [Table/Fig-1b]. It was closely abutting the aortic arch, pulmonary trunk and left main pulmonary artery, with no evidence of invasion/compression [Table/Fig-1c,d]. There was no mediastinal lymphadenopathy and the lung parenchyma showed no abnormality.

Microscopic examination of the CT-guided FNAC smears yielded cellular smears composed of sheets of anucleate squamous cells in a necrotic background. Sections from the cell block demonstrated abundant anucleate squamous cells and keratin flakes, consistent with a cytological diagnosis of an epidermoid cyst.

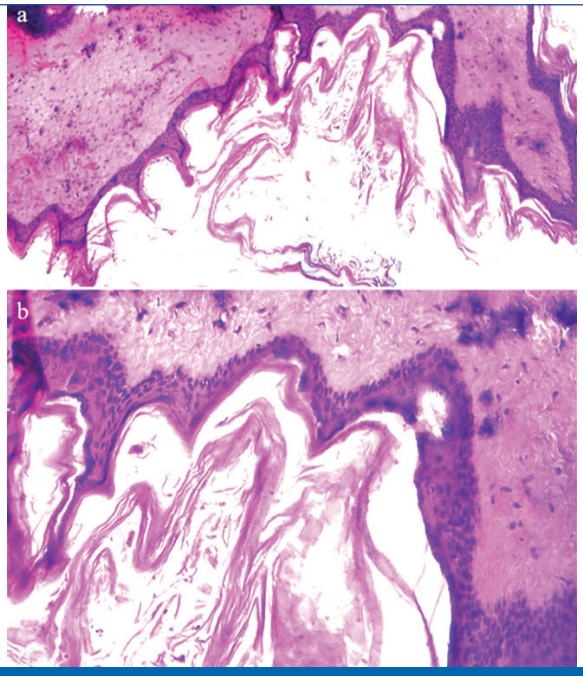
Thoracoscopic excision of anterior mediastinal mass was done. Intraoperatively, a well-defined cystic mass was noted in the anterior mediastinum, predominantly on the left side abutting the left phrenic nerve and pericardium and adherent to the left horn of the thymus. The cyst was completely excised intact without rupture or spillage of its contents, with preservation of the surrounding residual normal thymic tissue, suggesting its thymic-association. The excised cyst was sent for frozen-section examination, which revealed a cystic lesion containing pultaceous material, with the cyst wall lined by mature stratified squamous epithelium and containing lymphoid tissue, consistent with a thymic epidermoid cyst.




**[Table/Fig-1]:** (a) Axial non contrast CT image showing a predominantly hypodense lesion with focal internal hyperattenuating areas; (b) Axial contrast enhanced CT image showing non enhancement of the lesion; (c,d) Oblique coronal and sagittal contrast enhanced CT images showing anterior mediastinal mass lesion closely abutting pulmonary artery and aortic arch (Black arrows).

The left thoracic cavity and pleura appeared normal. Dissection was performed all around, safeguarding the phrenic nerve. Preserved planes were present surrounding the adjacent structures. The specimen was sent for histopathological examination, which revealed the mass to be a cyst lined by stratified squamous epithelium showing laminated keratin flakes and internal keratohyaline granules, with the surrounding tissue showing normal thymic parenchyma, confirming the mass to be an epidermoid cyst of thymic origin [Table/Fig-2a,b]. The postoperative course was uneventful, with removal of

the Intercostal Drainage (ICD) tube on day 4 after satisfactory lung expansion. She was discharged in stable condition with advice for spirometry and prescribed medications. The patient was followed up at three months after surgery and remained clinically well with no new complaints. No follow-up imaging was advised.




**[Table/Fig-2]:** a) Photomicrograph cyst lined by stratified squamous epithelium with lumen showing laminated keratin flakes Haematoxylin and Eosin (H&E, 4×); (b) Photomicrograph stratified squamous epithelium with intact granular layer (H&E, 10×).

## DISCUSSION

Mediastinal cysts are grouped by location: anterior, middle and posterior. Mediastinal cysts are predominantly found in the middle mediastinum and make up 12-20% of mediastinal masses [1]. The most common mediastinal cysts are bronchogenic, oesophageal, thymic and pericardial.

Radiologically, thymic epidermoid cysts have no pathognomonic imaging features, making preoperative diagnosis challenging. Previously reported cases have generally appeared as well-circumscribed anterior mediastinal lesions with variable internal CT attenuation. Qureshi JM et al., reported a 5-cm lesion with relatively homogeneous CT attenuation, whereas Kim JH et al., described a smaller 2.8-cm lesion with heterogeneous attenuation (22-95 HU) and focal peripheral hyperattenuation [2,3]. In contrast, our lesion was larger (4.8×5.3×6.1 cm), predominantly low attenuating (20-30 HU), with more pronounced focal hyperattenuating areas (90-110 HU) and close association with the left thymic horn. A further distinguishing feature was that, unlike both reported cases, CT-guided FNAC in the present case enabled a preoperative diagnosis, showing anucleate squamous cells and keratin flakes.

Cystic mediastinal masses may be congenital or acquired. Congenital mediastinal cysts include foregut, pericardial and thymic cysts. Foregut cysts may be classified as bronchogenic, oesophageal duplication and neurenteric cysts [4]. Chest radiography is usually the first imaging modality for evaluating mediastinal masses [4].

Imaging findings for epidermoid cysts are generally inconclusive. Imaging differential diagnosis of the present study included thymic cyst, cystic thymoma, mediastinal epidermoid cyst and mature teratoma. The authors considered thymic cyst and cystic thymoma given the anterior mediastinal location and thymic involvement; however, the authors favoured an epidermoid cyst based on the well-circumscribed, unilocular morphology, thin, smooth wall and predominantly hypodense contents with focal hyperattenuating areas, likely representing concentrated keratinaceous material. Mature teratoma was less likely in the absence of macroscopic fat, a substantial solid component, or characteristic calcification.

Magnetic Resonance Imaging (MRI) offers superior soft-tissue contrast and tissue characterisation, facilitating further evaluation of indeterminate mediastinal lesions detected on chest radiography or CT. It also enables better assessment of lesion extent, involvement of adjacent structures and potential phrenic nerve involvement, thereby aiding surgical planning. Additionally, MRI allows dynamic imaging during free breathing without exposure to ionising radiation [5].

The management of thymic epidermoid cysts depends on the diagnostic certainty, clinical presentation, lesion size and relationship with adjacent mediastinal structures. As these cysts are rare and their imaging characteristics are non specific, differentiating them from other anterior mediastinal lesions, including cystic thymomas and thymic malignancies, can be challenging. Surgical excision is therefore an important management option when the diagnosis remains uncertain, allowing definitive histopathological confirmation and exclusion of malignancy [2,3]. Minimally invasive approaches, such as Video-Assisted Thoracoscopic Surgery (VATS), may be considered depending on the lesion's size, location and relationship with surrounding structures. Complete excision while preserving adjacent structures is desirable whenever feasible [2,3,6].

Monaco F et al., reported a 65-year-old man with an intrathymic epidermoid cyst that progressively enlarged over approximately 12 years following an earlier history of blunt thoracic trauma. CT demonstrated an oval intrathymic lesion measuring 47 mm, while PET showed low fluorodeoxyglucose uptake. Because of the progressive increase in lesion size, thymectomy was performed through a sternotomy. Histopathological examination confirmed an epidermoid cyst lined by thickened stratified squamous epithelium. The authors proposed that ectopic skin tissue islands might have contributed to its development following trauma and previous surgical procedures. The present case highlights the potential for gradual enlargement of intrathymic epidermoid cysts and the importance of histopathological examination for definitive diagnosis [7].

Abe M et al., described a 68-year-old man with an anterior mediastinal mass showing heterogeneous cystic features on MRI [8]; thymectomy established the diagnosis histopathologically. Similarly, Rodrigues C et al., reported an incidentally detected anterior mediastinal lesion in a 52-year-old woman [9], for which surgical excision confirmed an epidermoid thymic cyst.

MRI was not performed for the current case, so its additional value in characterising this lesion could not be assessed. Clinical follow-up was limited to three months with no subsequent follow-up imaging, so long-term outcome could not be evaluated.

## CONCLUSION(S)

Although mediastinal epidermoid cysts are rare, clinicians should recognise their imaging features and include them in the differential diagnosis when a well-defined, non enhancing, predominantly hypodense mass is detected in the anterior mediastinum. Histopathological examination is confirmatory and surgical excision is an important option for a definitive diagnosis when the diagnosis remains uncertain.

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**PARTICULARS OF CONTRIBUTORS:**
1. Consultant Radiologist, Department of Radiodiagnosis, Basavatarakam Indoamerican Cancer Hospital and Research Institute, Hyderabad, Telangana, India.
2. Head, Department of Pathology, Basavatarakam Indoamerican Cancer Hospital and Research Institute, Hyderabad, Telangana, India.
3. Consultant Radiologist, Department of Radiodiagnosis, Basavatarakam Indoamerican Cancer Hospital and Research Institute, Hyderabad, Telangana, India.
4. Head, Department of Radiodiagnosis, Basavatarakam Indoamerican Cancer Hospital and Research Institute, Hyderabad, Telangana, India.

**NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:**
Dr. Vijaya Tejaswini,
Consultant Radiologist, Department of Radiodiagnosis, Basavatarakam Indoamerican Cancer Hospital and Research Institute, Road No.-10,
Banjara Hills, Hyderabad-500034, Telangana, India.
E-mail: dr.teja.radio@gmail.com

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