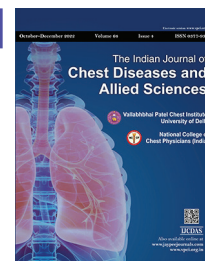


## CASE REPORT

# Huge Anterior Mediastinal Teratoma Leading to Orthopnea in a Young Patient

Vikas Deep Goyal<sup>1</sup>, Gaurav Misra<sup>2</sup>, Subhra Kumari<sup>3</sup>, Sudipta Bera<sup>4</sup>

Received on: 31 May 2021; Accepted on: 10 December 2021; Published on: 05 January 2023



This article is available on [www.vpci.org.in](http://www.vpci.org.in)

## ABSTRACT

The anterior mediastinal cysts and masses (AMCM) can be of varied origin and presentation. Although the space in the mediastinum is limited the cysts and masses can grow to a large size before the presentation. They displace the adjacent structures and then can grow into the pleural cavities thereby acquiring a large size. We share our experience of a case of a huge anterior mediastinal cystic mass in a young female who had a characteristic presentation of sudden onset breathlessness in the supine position and immediate relief in the sitting position. The patient recovered well after surgical treatment.

**Keywords:** Anterior mediastinum, Mature cystic teratoma, Orthopnea, Surgical management.

*The Indian Journal of Chest Diseases and Allied Sciences* (2022); 10.5005/jp-journals-11007-0046

## ABBREVIATIONS USED IN THIS ARTICLE

GCTs = Germ cell tumors; AP = Anteroposterior; CT = Computed Tomography; GA = General anesthesia; HPE = Histopathologic examination; MRI = Magnetic resonance imaging; PET = Positron emission tomography; FDG = Fluorodeoxyglucose; VATS = Video-assisted thoracoscopic surgery; RATS = Robotic-assisted thoracoscopic surgery.

## INTRODUCTION

Anterior mediastinal cysts and masses have varied origins and presentations.<sup>1,2</sup> A wide variety of cysts and masses can be seen in the mediastinum. Thymomas, germ cell tumors (GCTs), lymphomas, mesothelial and thymic cysts predominate in the anterior mediastinum, pericardial and pleural cysts in the middle mediastinum, and neurogenic tumors and enteric cysts in the posterior mediastinum.<sup>3</sup> This case is being reported because of its characteristic presentation, huge size, and rarity. Informed consent was taken from the patient for the publication of images and clinical data.

## CASE DESCRIPTION

A 35-year-old female patient presented with complaints of progressively increasing breathlessness more on a supine position for 3 months. The patient had characteristic symptoms, she complained of episodes of sudden onset breathlessness in the supine position and immediate relief in the sitting position or lateral position. She also had atypical chest pain off and on. On clinical examination, her neck veins were prominent. Auscultation revealed bilateral equal air entry with occasional rhonchi. Heart sounds were normal without any murmur or additional sounds and all peripheral arterial pulsations were palpable. Her oxygen saturation in the sitting position was 96% which varied from 90% to 92% in the supine position. Chest X-ray in anteroposterior (AP)

<sup>1,4</sup>Department of Surgery, Shri Ram Murti Smarak Institute of Medical Sciences, Bareilly, Uttar Pradesh, India

<sup>2</sup>Department of Anesthesia, Shri Ram Murti Smarak Institute of Medical Sciences, Bareilly, Uttar Pradesh, India

<sup>3</sup>Department of Pathology, Shri Ram Murti Smarak Institute of Medical Sciences, Bareilly, Uttar Pradesh, India

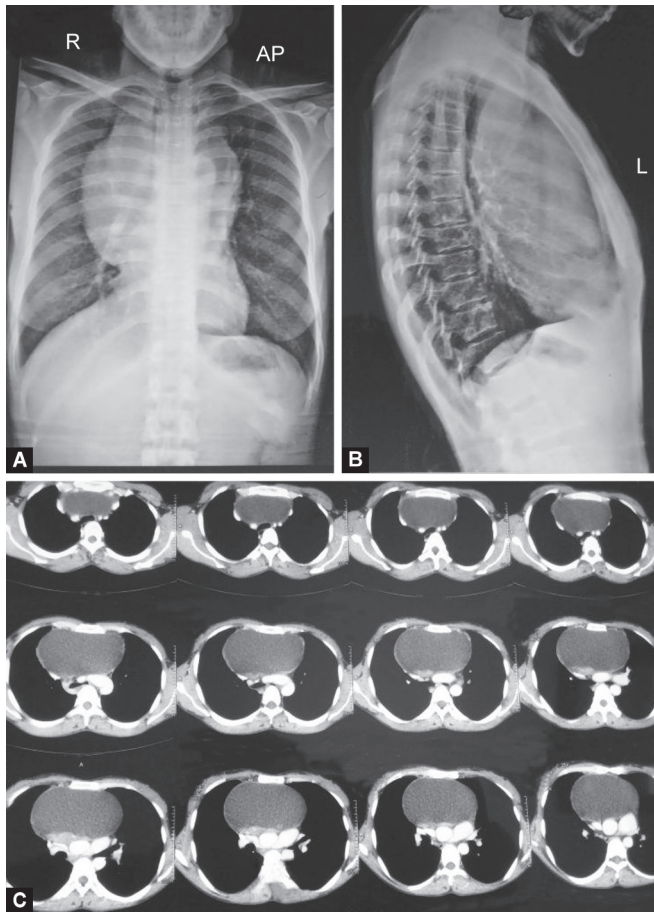
**Corresponding Author:** Vikas Deep Goyal, Department of Surgery, Shri Ram Murti Smarak Institute of Medical Sciences, Bareilly, Uttar Pradesh, India, Phone: +91 9915872343, e-mail: [goyalv34@gmail.com](mailto:goyalv34@gmail.com)

**How to cite this article:** Goyal VD, Misra G, Kumari S, *et al.* Huge Anterior Mediastinal Teratoma Leading to Orthopnea in a Young Patient. *Indian J Chest Dis Allied Sci* 2022;64(4):307–310.

**Source of support:** Nil

**Conflict of interest:** None

and lateral view showed a large mediastinal mass with mediastinal widening (Figs 1A and B). Computed tomography (CT) scan of the chest with contrast showed a large cystic mass 11 cm × 9.5 cm present in the anterior mediastinum with extension into both pleural cavities more so, on the right side, and compression on the great vessels, pericardium, and trachea (Fig. 1C). Pulmonary function tests revealed a moderate obstructive pattern. Open surgical removal of the cystic mass was planned as it was very large and was causing compression on the adjacent vital organs and structures. General anesthesia (GA) was given and a fiberoptic bronchoscope was used for intubation and induction of anesthesia. A median sternotomy was done and the cystic mass was located just posterior to the sternum (Fig. 2A). A small incision in the cystic mass (Fig. 2B) was made and its contents were aspirated to decompress it. Approximately 1.5 L of fluid was drained from the cyst. After decompression, the cyst wall was then gradually dissected from the surrounding structures using a combination of blunt and sharp dissection. The cyst wall and



**Figs 1A to C:** (A) Chest X-ray showing a large mediastinal mass in AP view; (B) Chest X-ray in lateral view; (C) A CT chest image showing a large cystic mass in the anterior mediastinum

the mass within were densely adherent to the innominate vein and were obliterating its lumen. The cystic mass was completely excised after dividing the innominate vein. The innominate vein was ligated and transfixed at both ends. The cyst wall was excised intact from all the sites along with the thymus gland (Fig. 2C). The specimen was sent for histopathologic examination (HPE). Standard sternotomy closure was done after placing pleural and mediastinal drains. The HPE report showed it to be a mature cystic teratoma (Fig. 3). The patient recovered well and was discharged on the fifth postoperative day (Fig. 4). The patient is in regular follow-up for 1 year and is doing well without any evidence of recurrence.

## DISCUSSION

Anterior mediastinal cysts and masses can be divided pathologically into neoplastic and non-neoplastic and morphologically into cystic and solid. Sometimes there also occurs a combination of cystic and solid components as was seen in this case. Anterior mediastinal cysts and masses reported in the literature include thymomas, GCTs, lymphomas, thymic cysts, bronchogenic cysts, pericardial

cysts, seminoma, parathyroid cysts, gastroenteric cysts, and sarcomas.<sup>3</sup> The mnemonic 4T's help in the differential diagnosis of AMCMs and includes thymoma, teratoma, "terrible" lymphoma, and thyroid.<sup>4</sup> Apart from the anterior mediastinum, various cystic masses can also be seen in the middle mediastinum and posterior mediastinum.<sup>5</sup> Their location and radiologic appearance help in provisional diagnosis (Table 1).

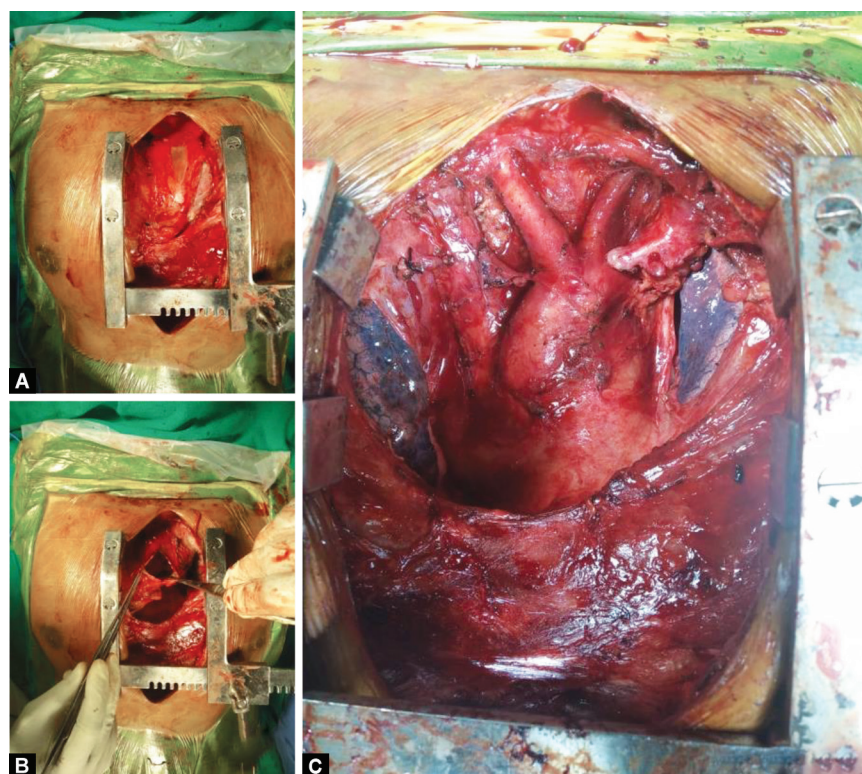
Anterior mediastinal cysts and masses initially are asymptomatic, later on as their size increases symptoms arise due to pressure effects or invasion into the surrounding structures.<sup>6</sup> Orthopnea is an important symptom of large AMCMs due to compression of the trachea or main stem bronchus as was seen in this case. The characteristic feature is rapid onset and relief of breathlessness with the change in posture. Pressure on the pericardium can lead to palpitations, arrhythmias, hypotension, and syncope. There are reports in the literature on mature teratomas rupturing into the pericardium leading to pericardial tamponade and requiring emergency surgery.<sup>7</sup> Malignant transformation into teratoma can also occur.<sup>8</sup>

Investigations useful in the diagnosis are chest X-rays in anteroposterior and lateral views and CT chest with contrast. The CT images with contrast are very helpful in differentiating solid masses from cysts in the anterior mediastinum. Teratomas appear as well-defined, unilocular, or multilocular cystic lesions with fluid, soft tissue, and fat attenuation. The presence of fat attenuation suggests the diagnosis of GCTs whereas the presence of a mediastinal mass in addition to mediastinal lymphadenopathy points towards lymphoma. A CT-guided biopsy helps confirm the diagnosis preoperatively especially when the mass is solid. Magnetic resonance imaging (MRI) has the added advantage of better tissue differentiation than CT. Positron emission tomography (PET)/CT using fluorodeoxyglucose (FDG) may help localize the site of biopsy, however, false-positive results may be seen in cases of granulomatous infections like sarcoidosis and tuberculosis.<sup>9</sup> Yajima et al. in their study on anterior mediastinal masses compared the addition of PET to CT and MRI to CT. They concluded that adding PET to CT significantly improved the specificity and accuracy of diagnosing malignant lesions as compared to adding MRI to CT and CT alone.<sup>10</sup>

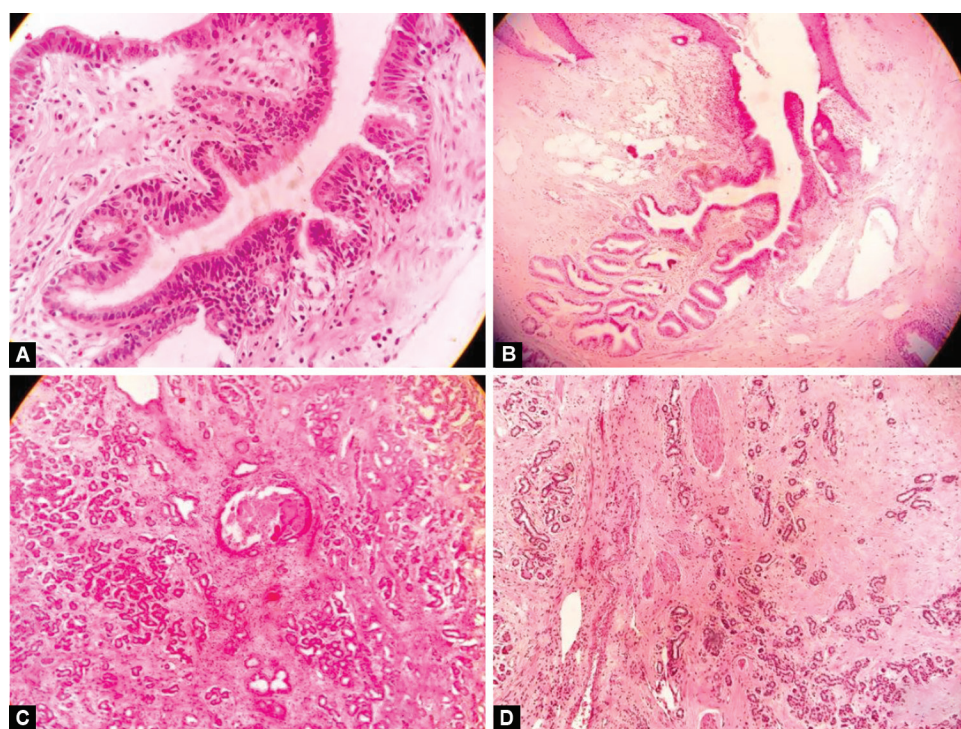
Excision of giant AMCMs is usually required to prevent complications, relieve pressure on the adjacent structures, rule out malignancy, and confirm the diagnosis by HPE. GA exacerbates the effect of the airway and vascular compression by the AMCMs. Anesthesia for AMCM surgery requires special consideration as there are chances of airway collapse during induction.<sup>11</sup> Rigid and fiberoptic bronchoscope should be available and even preparation for a rapid cardiopulmonary bypass through the femoral route in case of emergency should be planned preoperatively.

Surgical approaches for AMCM include median sternotomy, right or left anterior thoracotomy, mediastinoscopy, Video-assisted thoracoscopic surgery (VATS), and robotic-assisted thoracoscopic surgery (RATS). For large central lesions with extension into both pleural spaces and with infiltration into surrounding tissues, median sternotomy provides relatively better access and ease of dissection than other approaches.

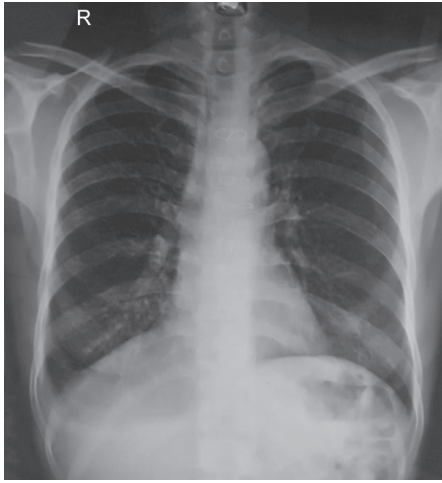




**Figs 2A to C:** (A) Intraoperative image showing anterior mediastinal cystic mass; (B) Intraoperative image showing opened anterior mediastinal cystic mass; (C) Intraoperative image after removal of the anterior mediastinal cystic mass



**Figs 3A to D:** Histopathologic examination image showing (A) Respiratory epithelium; (B) Squamous and respiratory epithelium; (C) Mucous glands; and (D) Smooth muscle cells



**Fig. 4:** Postoperative chest X-ray in AP view

**Table 1:** Pathologic types of mediastinal cystic masses, their location and appearance on CT chest

S. No.	Mediastinal cystic masses	Location	Appearance on CT chest
1	Mature cystic teratoma	Anterior mediastinum	Heterogenous/mixed cystic and solid components
2	Thymic cysts	Anterior mediastinum	Primarily cystic
3	Hodgkin's lymphoma	Anterior mediastinum	Primarily solid mass/may undergo cystic degeneration
4	GCTs	Anterior mediastinum	Primarily solid mass/may undergo cystic degeneration
5	Mediastinal carcinoma	Anterior/middle/posterior mediastinum	Primarily solid mass/may undergo cystic degeneration
6	Pericardial cysts	Middle/anterior mediastinum	Primarily cystic
7	Bronchogenic cysts	Middle/anterior/posterior mediastinum	Primarily cystic
8	Lymphangioma	Anterior/middle/posterior mediastinum	Primarily cystic
9	Cystic schwannoma	Posterior mediastinum	Heterogenous/mixed cystic and solid components

10	Esophageal Duplication cysts	Posterior mediastinum	Primarily cystic
11	Meningocele	Posterior mediastinum	Homogenous
12	Mediastinal Pancreatic Pseudocyst	Posterior mediastinum	Primarily cystic

## CONCLUSION

Development of sudden orthopnea and immediate relief in a sitting position or lateral position can be the presenting feature of large AMCMs. Anterior mediastinal cysts and masses can grow to a large size before symptoms arise. Median sternotomy gives good exposure for the excision of large AMCMs which may not be amenable to other approaches.

## REFERENCES

1. Aydin Y, Ogul H, Turkyilmaz A, et al. Surgical treatment of mediastinal cysts: Report on 29 cases. *Acta Chir Belg* 2012;112(4):281–286. PMID: 23008992.
2. Carter BW, Marom EM, Detterbeck FC. Approaching the patient with an anterior mediastinal mass: A guide for clinicians. *J Thorac Oncol* 2014;9(9 Suppl. 2):S102–S109. DOI: 10.1097/JTO.0000000000000294.
3. Szolkowska M, Szczepulska-Wojcik E, Maksymiuk B, et al. Primary mediastinal neoplasms: A report of 1,005 cases from a single institution. *J Thorac Dis* 2019;11(6):2498–2511. DOI: 10.21037/jtd.2019.05.42.
4. Rashidfarokhi M, Gupta J, Leytin A, et al. Ectopic anterior mediastinal pathology in the chest: Radiologic–pathologic correlation of unexpected encounters with the “Terrible Ts”. *J Clin Imaging Sci* 2016;6:49. DOI: 10.4103/2156-7514.197025.
5. Jeung MY, Gasser B, Gangi A, et al. Imaging of cystic masses of the mediastinum. *Radiographics* 2002;22 Spec No:S79–S93. DOI: 10.1148/radiographics.22.suppl\_1.g02oc09s79.
6. Priola AM, Priola SM, Cardinale L, et al. The anterior mediastinum: Diseases. *Radiol Med* 2006;111(3):312–342. DOI: 10.1007/s11547-006-0032-5.
7. Oomman A, Santhosham R, Vijayakumar C, et al. Anterior mediastinal teratoma presenting as cardiac tamponade. *Indian Heart J* 2004;56(1):64–66. PMID: 15129796.
8. Paliwal N, Gupta K, Dewan RK, et al. Adenocarcinoma (somatic-type malignancy) in mature teratoma of anterior mediastinum. *Indian J Chest Dis Allied Sci* 2013;55(1):39–41. PMID: 23798089.
9. Koç ZP, Özcan PP, Ayan E, et al. Metabolic characterization of anterior mediastinal masses by <sup>18</sup>F-FDG PET/CT. *Mol Imaging Radionucl Ther* 2020;29(3):105–111. DOI: 10.4274/mirt.galenos.2020.05657.
10. Yajima T, Mogi A, Yamaki E, et al. Advantages of additional PET vs. MRI in the clinical diagnosis of anterior mediastinal tumors. *Mol Clin Oncol* 2020;13(6):85. DOI: 10.3892/mco.2020.2155.
11. Gardner JC, Royster RL. Airway collapse with an anterior mediastinal mass despite spontaneous ventilation in an adult. *Anesth Analg* 2011;113(2):239–242. DOI: 10.1213/ANE.0b013e31821f9c95.