

# Posterior Mediastinal Bronchogenic Cyst in an Adult: A Case Report and Review of Diagnostic Challenges

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## Abstract

Bronchogenic cysts are rare congenital lesions of the mediastinum originating from abnormal development of the tracheobronchial tree. In adults, posterior mediastinal involvement is uncommon and may present diagnostic challenges due to nonspecific clinical symptoms and radiologic similarities to other mediastinal masses. A 51-year-old man presented with a one-month history of persistent chronic cough unresponsive to antibiotics. Chest radiography revealed a left paracardiac mass. Contrast-enhanced thoracic computed tomography demonstrated a large, well-circumscribed cystic lesion measuring 9.3 × 9 × 14 cm in the left hemithorax with compressive atelectasis of the left lower lobe. Flexible bronchoscopy showed extrinsic compression with narrowing of the left B8 and B9 bronchi without endobronchial lesions. Complete excision was achieved via video-assisted thoracoscopic surgery, and histopathology confirmed a bronchogenic cyst. Posterior mediastinal bronchogenic cysts in adults are rare and diagnostically challenging. Minimally invasive surgical resection provides definitive diagnosis and excellent clinical outcomes.

**Keywords:** Bronchogenic Cyst, Posterior Mediastinum, Diagnostic Challenges, Computed Tomography, Video Assisted Thoracoscopic Surgery

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## Introduction

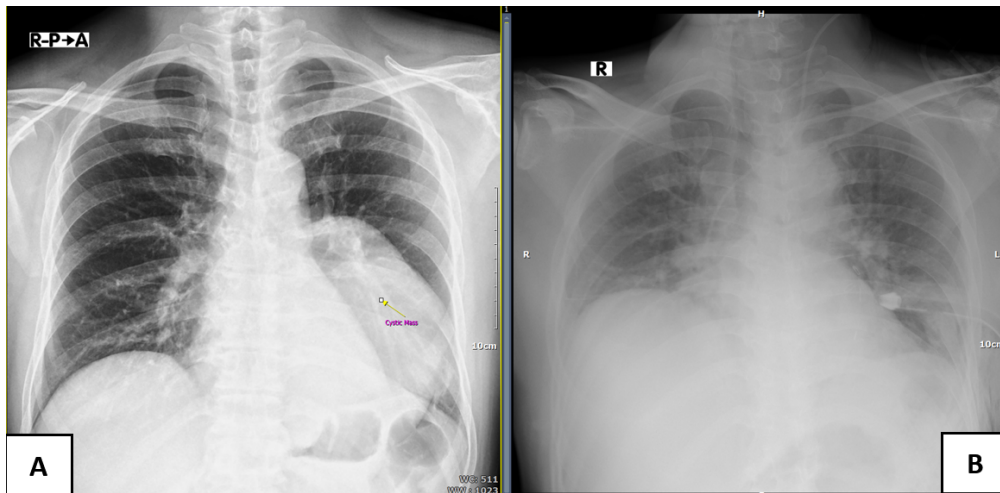
Bronchogenic cysts are a rare type of mediastinal tumor. The incidence of bronchogenic cysts is estimated to be approximately 1 in 42,000–68,000 patients, and they account for 10–15% of mediastinal tumors and 50–60% of mediastinal cystic masses.<sup>1</sup> These cysts arise from abnormal budding of the tracheobronchial tree or the ventral lung bud during early gestation, and the final location of the cyst largely depends on the timing and stage of this aberrant embryologic process.<sup>1</sup>

In adult patients, mediastinal bronchogenic cysts are most commonly detected incidentally on thoracic imaging. However, when the mass reaches a considerable size, it may cause symptoms such as chronic cough, dyspnea, chest pain, or recurrent respiratory tract infections due to compression of adjacent mediastinal and pulmonary structures.<sup>1,2</sup> Posterior mediastinal bronchogenic cysts are reported even less frequently, and their clinical and radiologic features may closely mimic other mediastinal masses, making the diagnosis particularly challenging.<sup>1</sup> This case report describes a posterior mediastinal bronchogenic cyst in an adult patient, emphasizing the diagnostic considerations and the role of minimally invasive surgery as definitive treatment.

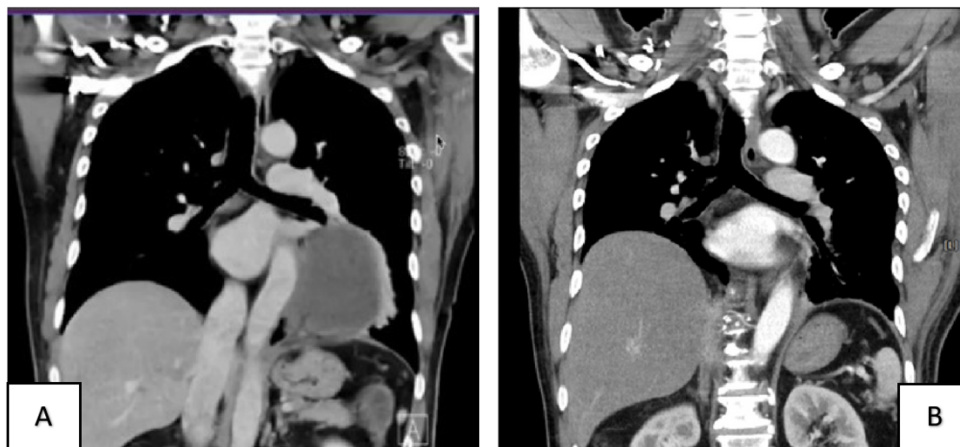
## Case

A 51-year-old man presented with a one-month history of persistent chronic cough that had not responded to a course of oral antibiotics. He denied exertional dyspnea, prolonged fever, or significant unintentional weight loss, and his medical history was negative for chronic lung disease or previous thoracic surgery.

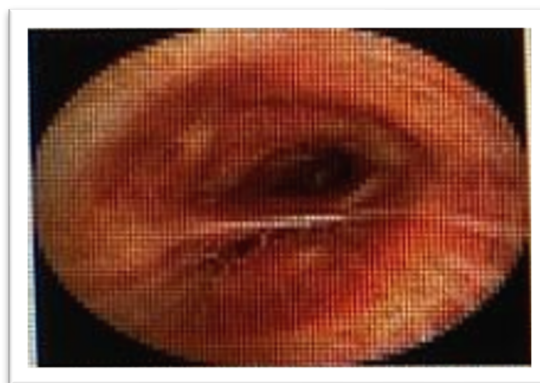
A chest radiograph obtained at presentation demonstrated a mass in the left paracardiac region. (Figure 1A and 1B) Contrast-enhanced thoracic computed tomography (CT) revealed a well-circumscribed cystic lesion measuring 9.3 × 9 × 14 cm within the left hemithorax, associated with compressive atelectasis of the left lower lobe, consistent with a large mediastinal cyst exerting mass effect on the adjacent lung parenchyma. (Figure 2A) Flexible bronchoscopy showed narrowing of the airway lumen of the left B8 and B9 bronchi due to extrinsic compression, without evidence of an endobronchial lesion. (Figure 3)



**Figure 1** Chest X-Ray before VATS (A) and after VATS (B).



**Figure 2** Chest CT before VATS (A) and after VATS (B)



**Figure 3** Compressive stenosis occluding the orifices of the left B8 and B9 bronchi.

The patient subsequently underwent video-assisted thoracoscopic surgery (VATS). Intraoperatively, the cystic content was evacuated, and the cyst wall was completely resected without relevant intraoperative complications, in keeping with the principle of total excision to minimize the risk of recurrence. (Figure 2B) Histopathological examination confirmed the diagnosis of a bronchogenic cyst, showing a cyst wall lined by respiratory-type epithelium. The postoperative course was uneventful, and the patient was discharged in good general condition with arrangements for long-term outpatient follow-up.

## Discussion

Bronchogenic cysts are benign congenital anomalies that arise from the disordered development of the ventral foregut and tracheobronchial tree.<sup>1</sup> The mediastinum is the most frequent site of involvement, whereas intrapulmonary and ectopic locations are less common.<sup>1,3</sup> In a CT and MRI series including 83 patients, 66 cysts were located in the mediastinum and the remainder in the lung parenchyma or at ectopic sites, underscoring the predominance of mediastinal disease.<sup>3</sup>

Among adults, a substantial proportion of mediastinal bronchogenic cysts are detected incidentally and remain clinically silent. However, a subset of patients develops symptoms such as cough, chest discomfort, dyspnea, or other complaints once the lesion enlarges sufficiently to compress neighboring structures.<sup>1,2</sup> In our patient, the chronic cough can be reasonably attributed to the mass effect of the cyst on the lung parenchyma and airways, as indicated by compressive atelectasis of the left lower lobe and bronchial narrowing on CT and bronchoscopy. This observation is consistent with previous reports suggesting that progressive enlargement and increased secretion within the cyst may lead to compression of adjacent organs and the onset of respiratory symptoms.<sup>1,3</sup>

Thoracic CT remains the cornerstone for initial evaluation, as it provides detailed information on the size, location, attenuation characteristics, and anatomical relationships of the cyst with surrounding mediastinal structures.<sup>1,3</sup> Gu et al. reported that most mediastinal bronchogenic cysts exhibit soft-tissue attenuation on CT and may be misinterpreted as thymic or neurogenic tumors, particularly when attenuation values exceed 20 Hounsfield units.<sup>3</sup> MRI offers complementary value by better defining the cystic nature and signal characteristics of these lesions, thereby improving diagnostic confidence; nevertheless, histopathology remains the gold standard for definitive diagnosis.<sup>1,3</sup> Our case followed this pattern, with CT suggesting a mediastinal cystic mass and the final diagnosis established on histological grounds.

Bronchoscopy combined with endobronchial ultrasound (EBUS) and transbronchial needle aspiration (TBNA) has emerged as a less invasive diagnostic tool and, in selected cases, as a therapeutic option for bronchogenic cysts, particularly in patients considered high-risk for surgery.<sup>2</sup> However, several case reports have documented serious

complications such as mediastinitis after cyst aspiration, and therefore, this strategy is generally reserved for carefully selected patients and is not regarded as standard therapy.<sup>2</sup> In the present case, bronchoscopy was used solely to document airway compression, without aspiration of the cyst, and definitive management was achieved through surgical resection.

Accumulating evidence supports complete surgical excision as the preferred treatment for symptomatic bronchogenic cysts and also as a reasonable option for asymptomatic lesions with potential for growth, infection, or, albeit rarely, malignant transformation.<sup>1,4</sup> In a large single-center cohort of primary mediastinal cysts, Wang et al. demonstrated that VATS can be safely employed as the primary surgical approach, with a low conversion rate, low intraoperative and postoperative complication rates, and no local recurrence over a median follow-up of 70 months.<sup>4</sup> Importantly, a maximal cyst diameter greater than 5 cm and adhesion to vital mediastinal structures were associated with prolonged operative time and increased blood loss, suggesting that earlier intervention may reduce operative complexity and risk.<sup>4</sup>

The evolution of minimally invasive techniques, including multiportal and uniportal VATS, has further shifted the management paradigm by offering reduced postoperative pain, shorter hospitalization, and improved cosmetic outcomes compared with open thoracotomy.<sup>5</sup> Ivan et al. reported an Indonesian case of mediastinal bronchogenic cyst successfully resected via uniportal VATS, without the need for postoperative intensive care and with a hospital stay of only three days, reinforcing the safety and feasibility of this approach.<sup>5</sup> This case report is in line with these findings, as the large mediastinal cyst in this patient was completely removed by VATS with minimal postoperative complaints and a fast recovery.

Taken together, this case highlights the importance of including bronchogenic cysts in the differential diagnosis of posterior mediastinal masses in adults. These cases usually present with non-specific respiratory complaints. We also have to consider a bronchogenic cyst in the differential diagnosis when imaging reveals a well-defined cystic lesion.<sup>1,3</sup> It also shows us that minimally invasive surgical resection, such as VATS, is a safe and effective method for definitive diagnostic and treatment, including for large cysts. But appropriate patient selection and thorough preoperative assessment need to be done.<sup>4,5</sup>

## Conclusion

Posterior mediastinal bronchogenic cysts in adults are rare lesions that may present diagnostic challenges due to their nonspecific clinical features and radiologic similarity to other mediastinal tumors. Thoracic CT and MRI are crucial for characterizing lesions. Histopathological examination remains irreplaceable for definitive diagnosis. Complete excision using a minimally invasive approach, such as VATS, offers

excellent clinical outcomes and should be regarded as a definitive treatment option for mediastinal bronchogenic cysts, including those of substantial size.

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