Giant Bronchogenic Cyst with Minimal Clinical Presentation

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ABSTRACT
Bronchogenic cysts are rare congenital malformations of the respiratory tract, typically presenting as cystic structures filled with fluid or air. Although generally detected in childhood, some cases remain asymptomatic and are discovered incidentally in adulthood. This case report aims to describe the clinical findings, diagnostic process, and management of a giant bronchogenic cyst detected incidentally in an adult patient. This study used a case report approach. A 56-year-old female patient underwent routine health screening in which a thoracic abnormality was detected. Diagnostic evaluation included chest radiography, thoracic computed tomography (CT) scan, and CT-guided fine needle aspiration biopsy with cytological examination. Chest radiography revealed a large mass in the paratracheal region without mediastinal shift. Further evaluation with thoracic CT scan confirmed a massive hypodense cystic lesion measuring 14.8 × 9.0 × 17.0 cm in the left hemithorax, extending to the left paracardial region and causing partial collapse of the left lung. CT-guided fine needle aspiration produced clear fluid, and cytological analysis showed no evidence of malignancy, supporting the diagnosis of a benign bronchogenic cyst. The patient subsequently underwent surgical resection. In conclusion, Giant bronchogenic cysts may remain asymptomatic and be detected incidentally. Imaging modalities combined with histopathological confirmation play a crucial role in establishing the diagnosis. Surgical resection is the definitive treatment to prevent potential complications and possible malignant transformation, even in asymptomatic cases.
Keywords: bronchogenic cyst; congenital lung cyst; case report

INTRODUCTION
Bronchogenic cysts are rare congenital malformations of the respiratory tract that typically present as cystic structures filled with fluid or air. These lesions arise from developmental abnormalities of the tracheobronchial tree during embryogenesis and are most commonly located in the intrapulmonary region or mediastinum. Clinically, bronchogenic cysts are often asymptomatic and are frequently discovered incidentally during radiological examinations performed for other medical purposes. Although most cases are benign, the presence of these cysts may still pose clinical concerns because they can potentially cause complications if the cyst enlarges or compresses adjacent anatomical structures [1].

In rarer situations, bronchogenic cysts may occur in ectopic locations due to migration of embryonic tissue during development. This phenomenon is associated with variations in the level and direction of tissue displacement during the embryogenesis phase. Embryologically, bronchogenic cysts originate from abnormal budding of the ventral foregut, which later develops into the tracheobronchial tree between the 26th and 40th days of gestation. Incomplete or aberrant development during this stage may lead to the formation of cystic cavities lined with respiratory epithelium and containing mucous fluid or air [1].

The exact prevalence of bronchogenic cysts in the general population remains uncertain. However, several reports estimate that the condition occurs in approximately 1 out of 42,000 to 1 out of 68,000 hospitalized patients. Within the spectrum of mediastinal tumors, bronchogenic cysts account for about 10–15% of all mediastinal tumors and approximately 50–60% of mediastinal cystic lesions. Most patients with bronchogenic cysts do not exhibit specific clinical symptoms, and the diagnosis is therefore often established incidentally through routine imaging examinations such as chest radiography, computed tomography (CT) scans, or magnetic resonance imaging (MRI) [2].

Clinical manifestations generally appear when the cyst enlarges sufficiently to compress surrounding structures or when complications such as infection, rupture, or hemorrhage occur. Symptoms that may develop include cough, hemoptysis, chest pain, dysphagia, and shortness of breath. Approximately 60% of bronchogenic cyst cases eventually develop symptoms, which are often more influenced by the location of the cyst than by the size of the lesion itself. Although bronchogenic cysts are predominantly benign, around 0.6% of cases have been reported to undergo malignant transformation, highlighting the importance of appropriate diagnostic evaluation and management [3].

The uniqueness and clinical significance of the present case lie in the exceptionally large size of the cyst accompanied by minimal clinical symptoms. The size of the lesion in this case approaches that of the largest bronchogenic cyst reported in the literature, which reached approximately 21 cm, yet the clinical presentation is markedly different. This situation challenges the commonly held assumption that the severity of symptoms is directly proportional to the size of the lesion [4]. Such minimal clinical manifestations in the presence of a very large lesion present a diagnostic challenge in clinical practice. Overreliance on clinical symptoms alone may lead to misdiagnosis or delays in appropriate management. Therefore, the use of appropriate imaging modalities together with histopathological confirmation plays a crucial role in establishing an accurate diagnosis of bronchogenic cysts.

Based on this background, the aim of this article is to present a case of a giant bronchogenic cyst incidentally detected in an adult patient and to provide insights into its diagnostic evaluation and management.

METHODS
This case report employed a descriptive observational study design. Data were collected retrospectively from the patient's medical records at Bethesda Hospital Yogyakarta in May 2025. The case was identified incidentally when a large pulmonary cyst was detected during a routine radiological examination. Information obtained from the medical records included clinical findings, radiological evaluations, diagnostic procedures, and therapeutic management.

The collected data were analyzed descriptively to illustrate the clinical course of the disease, the process of diagnostic confirmation, and the outcomes of the management provided. The analysis focused on presenting the chronological sequence of events, including the initial detection of the lesion, subsequent diagnostic investigations, and the definitive treatment performed.

RESULTS

A 56-year-old woman presented for further radiological evaluation after a chest X-ray performed as part of a routine medical check-up incidentally revealed a large pulmonary mass involving the paratracheal region without mediastinal shift. The patient had no history of thoracic trauma, previous surgery, past pulmonary infections, family history of similar diseases, or smoking habits. The main complaint reported by the patient was easy fatigability during physical activity, which had been experienced for approximately 20 days prior to the examination.

Physical examination revealed vital signs within normal limits, including blood pressure of 120/80 mmHg, pulse rate of 82 beats per minute, respiratory rate of 18 breaths per minute, and body temperature of 36.5°C. However, thoracic examination demonstrated dullness on percussion and decreased vesicular breath sounds over the left hemithorax. These findings suggested the presence of an underlying pulmonary abnormality requiring further investigation.

Subsequent evaluation with thoracic computed tomography (CT) scan demonstrated a massive hypodense cystic lesion with a density of 1–5 Hounsfield units (HU), measuring approximately 14.8 × 9.0 × 17.0 cm in the left hemithorax. The lesion extended toward the mediastinum in the left paracardial region and caused partial collapse of the left lung. No enhancement was observed after contrast administration, and the cardiac configuration appeared normal. These radiological findings were suggestive of a giant bronchogenic cyst (Figure 1).

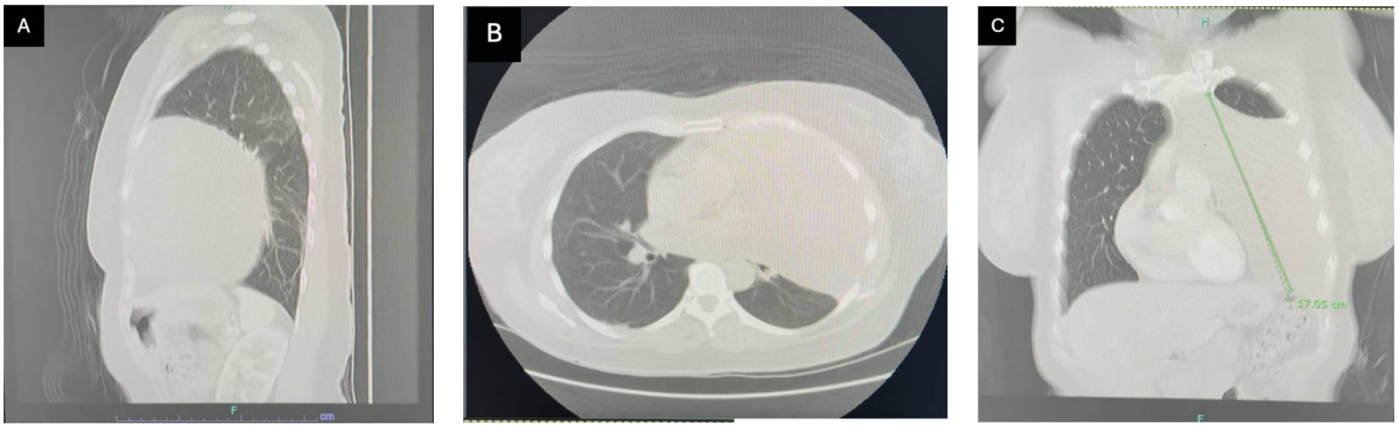


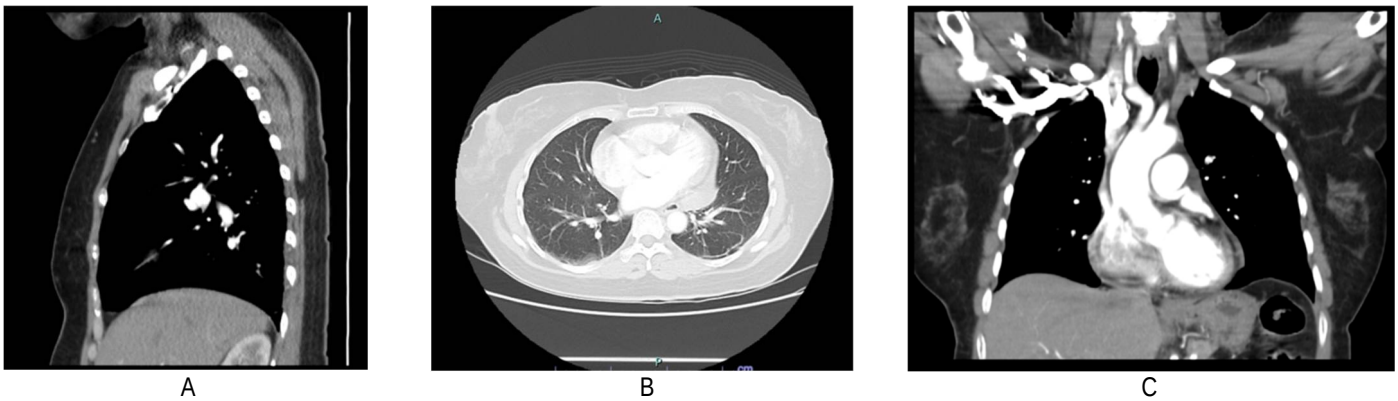
Figure 1. Lung-window CT scan showing sagittal (A), axial (B), and coronal (C) sections

The patient was subsequently admitted for further management, including CT-guided fine needle aspiration biopsy (FNAB), which yielded approximately 500 ml of clear fluid (Figure 2). Cytological examination of the aspirated sample revealed no malignant cells, supporting the diagnosis of a pulmonary cyst. During the surgical procedure, a large cystic mass with a smooth wall containing clear serous fluid was identified. The cyst was loosely attached to the surrounding tissues and showed no infiltration into vital mediastinal structures. The lesion was successfully excised completely without significant complications.

Postoperatively, the patient underwent close monitoring, particularly for respiratory function. No evidence of air leakage or infection was observed during the recovery period. Histopathological examination confirmed the diagnosis of a bronchogenic cyst, characterized by a cyst wall lined with ciliated columnar epithelium and areas of mild squamous metaplasia without evidence of malignancy. The patient demonstrated good clinical recovery and was discharged on the fourth postoperative day with scheduled outpatient follow-up.

At six months after cyst removal, follow-up CT scan showed normal lung parenchymal structure with no evidence of recurrent cystic lesions (Figure 3). The patient also reported good overall health and remained free of respiratory or systemic symptoms.

Figure 2. Pleural fluid showing a clear appearance during aspiration



A B C

Figure 3. CT scan showing sagittal (A), axial (B), and coronal (C) sections at follow-up

DISCUSSION

Bronchogenic cysts are congenital anomalies that originate from the endodermal lining of the respiratory tract, specifically from the bronchial bud, which undergoes abnormal development during the early stages of pregnancy. Following the growth phase of the bronchial bud between the 20th and 40th days of gestation, the respiratory tract and digestive tract begin to separate. It is during this developmental process that bronchogenic cysts may form [5]. The reported incidence of bronchogenic cysts ranges from approximately 1 in 42,000 to 1 in 68,000 hospitalized patients. These cysts account for about 10–15% of mediastinal tumors and approximately 50–60% of mediastinal cystic lesions [2].

This condition is most commonly detected in young adults, although it may also be discovered incidentally through imaging at any age. As a space-occupying lesion, the clinical manifestations of bronchogenic cysts depend largely on the location and size of the mass. Symptoms typically arise when the cyst compresses surrounding structures or when complications develop [6]. This observation is consistent with our case, in which the cyst size was relatively large compared with previously reported cases, measuring 14.8 × 9.0 × 17.0 cm in the left paracardial region. Interestingly, the patient did not report significant symptoms despite the massive size of the lesion. A previous case report described a mediastinal bronchogenic cyst measuring 21 cm—the largest reported in the literature—which caused significant dyspnea and mediastinal shift [4]. In contrast, a much smaller cyst measuring 8.4 cm in the middle lobe was reported to cause recurrent infections over a decade [7]. Our case therefore represents a relatively unique presentation, as the lesion size approaches the upper range reported in the literature while producing only minimal clinical manifestations. This phenomenon may be explained by the cyst's location in the relatively spacious paracardial region, where it did not directly compress the main bronchus or esophagus and showed no imaging evidence of infection, hemorrhage, or rupture [8].

The diagnosis of bronchogenic cysts relies heavily on a combination of imaging modalities and histopathological confirmation. Imaging studies are generally used to determine the characteristics of the lesion and to guide subsequent management decisions [9]. Computed tomography (CT) scan is the most commonly used modality for evaluating bronchogenic cysts, which typically appear as well-defined masses with cystic components [2]. In our case, the initial chest radiograph demonstrated a large pulmonary mass without mediastinal shift. These findings were further confirmed by CT imaging, which revealed a well-defined oval hypodense cystic lesion without contrast enhancement, consistent with the typical radiological characteristics of a bronchogenic cyst [10]. Histologically, bronchogenic cysts are characterized by a lining of pseudostratified ciliated columnar epithelium consistent with respiratory epithelium, sometimes accompanied by areas of squamous metaplasia.

Because bronchogenic cysts are relatively rare, there is currently no universally accepted gold standard for their management. In asymptomatic cases, close monitoring and cyst aspiration are often recommended to confirm the diagnosis, whereas symptomatic cases generally require surgical resection to relieve symptoms. Even in asymptomatic patients, definitive management through complete surgical resection is strongly recommended, as supported by studies in both pediatric and adult populations, due to the potential for rapid lesion growth or malignant transformation, which occurs in approximately 0.7% of bronchogenic cyst cases [3,11]. The principle of complete excision is particularly important because incomplete resection may lead to cyst recurrence years later, potentially resulting in symptoms and the need for repeat intervention [12].

The occurrence of a giant bronchogenic cyst without symptoms, as observed in our patient, has also been reported in other studies, further emphasizing that the absence of symptoms does not necessarily indicate a small or harmless lesion [13]. Furthermore, the presence of a large cyst in the paracardial region requires special consideration, as mediastinal bronchogenic cysts have been associated with congenital pericardial defects and a potential risk of postoperative arrhythmia, necessitating careful intraoperative preparation and monitoring [14]. Early surgical intervention may also help prevent complications such as infection, abscess formation, hemorrhage, compression of surrounding structures, and recurrence [9].

It is also important to recognize that surgical management may present certain challenges, including the risk of adhesions to surrounding structures, particularly in cases involving giant cysts, which may occasionally require more extensive resection [15,16]. Imaging characteristics that support the diagnosis—such as the hypodense, well-defined lesion without contrast enhancement observed in our patient—represent key findings that are consistent with other reported imaging features of bronchogenic cysts [17].

Nevertheless, minimally invasive surgical techniques such as Video-Assisted Thoracoscopic Surgery (VATS), including the uniportal approach (U-VATS), can still be considered and have been successfully performed even in infected cysts. These approaches offer advantages including lower postoperative morbidity, reduced postoperative pain, and faster recovery. The development of other minimally invasive surgical techniques, including robotic-assisted procedures, has further expanded the options for safe and complete cyst resection [18,19]. In this context, aspiration serves primarily as a temporary diagnostic measure and is not curative, and therefore should be followed by surgical resection [2]. Even in infected cysts, adequate aspiration—such as endobronchial ultrasound-guided transbronchial aspiration (EBUS)—may function as a temporary measure to control sepsis before definitive surgical resection [20].

In the present case, aspiration was performed due to the large size of the lesion and to exclude the possibility of malignancy. The patient subsequently underwent surgical removal of the cyst in its entirety. Complete removal of the cyst wall epithelium is essential, as incomplete excision may result in cyst regeneration even decades later, with recurrence reported up to 25 years after surgery [10]. This case highlights two important clinical messages. First, bronchogenic cysts may present with minimal symptoms, and the absence of complaints should not lead clinicians to underestimate the need for further evaluation of incidental thoracic lesions. Second, a multimodal diagnostic approach—including imaging, cytological aspiration, and histopathological examination—is crucial for accurate diagnosis, while surgical resection remains the definitive therapy to prevent long-term complications regardless of whether symptoms are present.

CONCLUSION

Giant bronchogenic cysts may present with minimal symptoms and are often detected incidentally. The diagnosis is established through CT scan imaging and confirmed by aspiration and cytological examination. Although asymptomatic, complete surgical resection is recommended as the definitive treatment to prevent potential complications, reduce the risk of malignant transformation, and avoid recurrence.

Ethical consideration, competing interest and source of funding

-Ethical considerations were addressed by ensuring complete confidentiality of the patient's identity. Written informed consent was obtained from the patient prior to the preparation of this report. This case report was prepared solely for scientific and educational purposes.
-There is no conflict of interest related to this study.
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