

Case Report

A Case Report of Infected Thick-walled Bronchial Cyst in the Posterior Mediastinum: Imaging, Pathology and Surgical Correlation

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Abstract

Research Background: Bronchial cysts are congenital disorders resulting from abnormal embryonic development of the trachea and bronchi, leading to ectopic formation. Clinical symptoms are often subtle, but as the cysts enlarge, they may compress adjacent tissues and organs, causing symptoms. Surgical resection is the preferred treatment method. **Objective:** To summarize the clinical features, imaging manifestations and surgical treatment experience of posterior mediastinal bronchial cyst. **Methods:** By summarizing and analyzing the case data and reviewing the literature, we summarize one case of infected bronchial cyst of the posterior mediastinum treated by thoracoscopy in our department. **Results:** Infected thick-walled bronchial cysts, due to prolonged inflammatory stimulation, exhibit tight adhesions between the cyst wall and surrounding tissues such as the esophagus and bronchi. Complete surgical resection is challenging, and dissection may cause esophageal rupture. Segmented resection offers a safe and feasible approach. **Conclusion:** Posterior mediastinal bronchial cyst is a relatively common benign disease, but infected thick-walled cystic lesions are relatively rare, and surgical resection needs to pay attention to the anatomical relationship of the cyst wall with the esophagus and pericardium.

Keywords

Posterior Mediastinal Bronchial Cyst, Infected Thick-Walled Cyst, Surgery

1. Introduction

Bronchial cysts are a common benign condition, frequently occurring near the trachea, bronchi, hilum, and pericardium. Ninety percent are located in the middle and upper mediastinum. In clinical practice [3], thin-walled bronchial cysts in the posterior mediastinum are relatively common, while infected thick-walled cysts are comparatively rare. Infected thick-walled cysts present significant surgical challenges due

to their tight adhesion to surrounding tissues and indistinct boundaries between the cyst wall and the esophageal adventitia [2], increasing the risk of esophageal injury during dissection. This report summarizes a case of a posterior mediastinal infected thick-walled bronchial cyst treated in our department, aiming to analyze its clinical characteristics and discuss surgical management strategies.

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2. Case History/Examination

A 73-year-old male was admitted to the hospital with chest tightness and dysphagia for 2 months. He had frequent colds, coughs and phlegm, and had smoked for more than 40 years, one pack a day. Upper gastrointestinal imaging: lower esophageal stenosis, filling defect, contrast agent can be passed, esophageal occupation possible (Figure 1). Chest CT enhancement scan suggested: cystic liquid hypodense shadow was seen in the lower esophageal region, which was closely related to the esophagus, and submucosal encapsulated effusion of the esophagus or parietal cyst of the esophagus was possible (Figure 2). Gastroscopy suggested that a bulge was seen in the esophagus 32 cm from the incisors, and the lumen of the esophagus was narrowed with external compressive stenosis (Figure 3).

3. Differential Diagnosis, Investigations and Treatment

This condition requires differential diagnosis from esophageal cysts, mediastinal tumors, and other diseases. After excluding surgical contraindications, a nasogastric tube was placed pre-operatively. Under general anesthesia, a thoracoscopic posterior mediastinal cystectomy was performed. Intraoperatively, the entire pleural cavity was found adherent. After dissecting the adhesions, a pear-shaped cyst was identified in the posterior mediastinum adjacent to the esophagus, measuring approximately 8 cm × 5 cm at its greatest diameter. The cyst wall was tightly adherent to the pericardium and esophageal adventitia. The cyst cavity did not communicate with the bronchi or esophagus. Dissection was performed along the inner surface of the cyst wall, and the cyst was resected in segments. The cyst fluid that drained was pale green. Postoperative pathological examination revealed grayish-white to brownish-gray, tough, cyst wall-like tissue with a wall thickness of 0.5-1 cm. The inner surface of the cyst was rough (Figure 4).

4. Images



Figure 1. Upper Gastrointestinal Imaging: Lower Esophageal Stenosis, Filling Defect, Passable Contrast, Possible Esophageal Occupancy.



Figure 2. Chest CT Enhancement Scan: Cystic Liquid Hypodense Shadow is Seen in the Lower Esophageal Region, Which is Closely Related to the Esophagus, with the Possibility of Submucosal Encapsulated Effusion or Parietal Cyst of the Esophagus.



Figure 3. Gastroscopy: a Bulge was Seen in the Esophagus 32 cm from the Incisors, with Narrowing of the Esophageal Lumen and External compressive Stenosis.



Figure 4. Postoperative Gross Pathology: the Eye Saw Multiple Blocks of Grayish-White Brown Tough Cystic Wall-Like Tissue with a Wall Thickness of about 0.5-1 cm and Rough Inner Wall of the Capsule.

5. Conclusion and Results (Outcome and Follow-Up)

Pathological Diagnosis: Bronchogenic cyst with chronic inflammation of cyst wall tissue. Postoperative management included fasting, gastrointestinal decompression, parenteral nutrition support, anti-infective therapy, and pleural effusion

drainage. Follow-up upper gastrointestinal imaging and chest CT revealed no abnormalities. The patient experienced significant improvement in chest tightness and dysphagia. No recurrence was observed during a 3-year follow-up after discharge. Therefore, the authors conclude that although posterior mediastinal bronchial cysts are common benign lesions, infected thick-walled cystic lesions are relatively rare. During surgical resection, attention must be paid to the anatomical relationships between the cyst wall and the esophagus and pericardium.

6. Discussion

Bronchial cysts evolve as a result of abnormal development of tracheobronchial germs during the embryonic period and their displacement to the mediastinum [1, 8], and are categorized as mediastinal, intrapulmonary, or ectopic according to the location of the lesion [4], with most of them reported to be intrapulmonary in nature, and mediastinal type is relatively uncommon in the literature [9]. Cysts can occur in any part of the mediastinum, often in the vicinity of the trachea, main bronchus, hilar and bronchioles, and most are located in the middle and upper mediastinum [10], and most of them are thin-walled cysts, and infected thick-walled cysts like these are relatively rare.

Most bronchial cysts have no obvious symptoms in the early stage, and the symptoms are mainly related to the compression of the cyst on the surrounding tissues and organs [7], and the formation of fistulas in communication with the tracheobronchus. In this case, the symptoms of “chest tightness and dysphagia” were related to the anatomical location of the cyst in the posterior mediastinum and the compression of the esophagus, and the boundaries between the cyst and the esophagus were unclear, so it was difficult to differentiate whether it was an esophageal cyst originating from the esophageal wall or other cysts before the operation, and it was necessary to improve the bronchoscopy, gastroscopy, and gastrointestinal imaging to help determine whether the cyst was connected to the esophagus or not, bronchus, which helps to fully evaluate the condition and preparation before surgery.

Most of the bronchial cysts are benign lesions, and cases of carcinoma have also been reported in the literature [6], which are mainly treated by surgery [5]. In this type of thick-walled infected posterior mediastinal bronchial cyst, because of the chronic inflammation formed by long-term infection, the boundary between the cyst wall and the esophagus and pericardium is not clear, and the adhesion is tight, so it is difficult to distinguish the esophageal epithelium and the cyst wall during the surgical operation and it is easy to peel through the esophagus to form an esophageal fistula or rupture of the esophagus [2]. Reviewing the surgical process of this case, several surgical techniques and experiences are summarized as follows: 1. Preoperative gastric tube is left in place to facilitate intraoperative judgment of whether to strip the esophagus. 2. Along the gap between the outer wall of the cyst and the esophagus, the

side of the outer wall of the cyst is stripped tightly, to avoid damage to the esophagus, and the boundary between the outer wall of the cyst and the esophagus is not clear can be along the inner wall of the cyst to be stripped, and then resected the wall of the cyst in pieces. 3. If it encroaches upon the myometrium, it is possible to incise the esophagus, strip the outer wall of the cyst, and remove the esophagus. In case of invasion of the muscular layer of the esophagus, the outer wall of the cyst can be peeled off and the esophagus can be sutured in layers, and gastrointestinal decompression can be carried out after surgery. 4. The anatomical position of the thoracic duct can be changed due to compression by the cyst, and the thoracic duct should be visualized by taking olive oil and whole milk orally before surgery to avoid injury during surgery. 5. In case of serious adhesion between the cyst and the pericardium, the pericardium can be opened, peeled off and resected together. 6. In case of unclear anatomical position of ruptured cysts, the cysts can be operated by open thoracic surgery under direct visualization in the middle.

Abbreviations

BC Bronchogenic Cys

Author Contributions

Fengbo Yao: Conceptualization, Resources, Writing - original draft, Writing - review & editing

Dingbiao Li: Methodology, Supervision

Ying Wang: Methodology

Yanfei Wang: Methodology

Yongchang Lv: Data curation

Data Availability Statement

The data supporting the findings of this study were obtained from the hospital medical records management system. Access to these data is restricted and was used in this study under permission. The data are available from the authors upon permission from the hospital's Medical Records Management Committee.

Conflicts of Interest

The authors declare no conflicts of interest.

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