

Vanishing Right Bronchus: From Diagnostic Pitfall to Successful Treatment with Flexible Bronchoscopic Cryotherapy

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Abstract:

Background

Endobronchial hamartoma is an uncommon benign airway tumor representing 1–20% of pulmonary hamartomas [1–3]. When located in the main bronchus, it may cause near-total airway obstruction, recurrent infection, or lobar collapse, often mimicking malignancy [4–6].

Case presentation

A 31-year-old woman presented with progressive dyspnea and recurrent right-sided infections over four years. CT demonstrated a 20 × 14 mm heterogeneous endoluminal lesion in the right main bronchus with middle-lobe atelectasis and bronchiectasis. Flexible bronchoscopy confirmed near-total obstruction extending toward the carina. Staged flexible bronchoscopic cryotherapy was performed under general anesthesia with bronchoflex intubation. A balloon catheter was positioned locally to allow immediate endobronchial tamponade if required. Blood pressure was maintained at 100–110 mmHg using titrated propofol to reduce hemorrhagic risk. Cryobiopsy confirmed chondroid hamartoma. Complete airway recanalization was achieved. No recurrence was observed at three-year follow-up.

Conclusion

In carefully selected stable patients, staged flexible bronchoscopic cryotherapy represents a safe and effective alternative to rigid bronchoscopy or surgical resection for benign central airway obstruction.

Key words: cryobiopsy; endobronchial mass; fibrobronchoscopy

Introduction

Endobronchial hamartoma is an exceptionally rare benign tumor, constituting less than 20% of pulmonary hamartomas [1] and accounting for 0.025–0.32% of adult chest tumors [2]. When located in the main bronchus, it may cause near-total obstruction, recurrent infection, or lobar collapse [3,4]. Although histologically benign, its central position and progressive growth can mimic malignant neoplasms on imaging [5]. With the advancement of interventional bronchoscopy, cryotherapy has emerged as a minimally invasive alternative to surgical resection,

enabling effective airway recanalization while preserving bronchial wall integrity [6].

Case Presentation

A 31-year-old woman presented in 2019 with right-sided chest pain, exertional dyspnea, and productive cough persisting for four years. In 2014, she had been diagnosed with an endobronchial mass at the entrance of the right main bronchus, without contact with the tracheal carina (Figure 1).

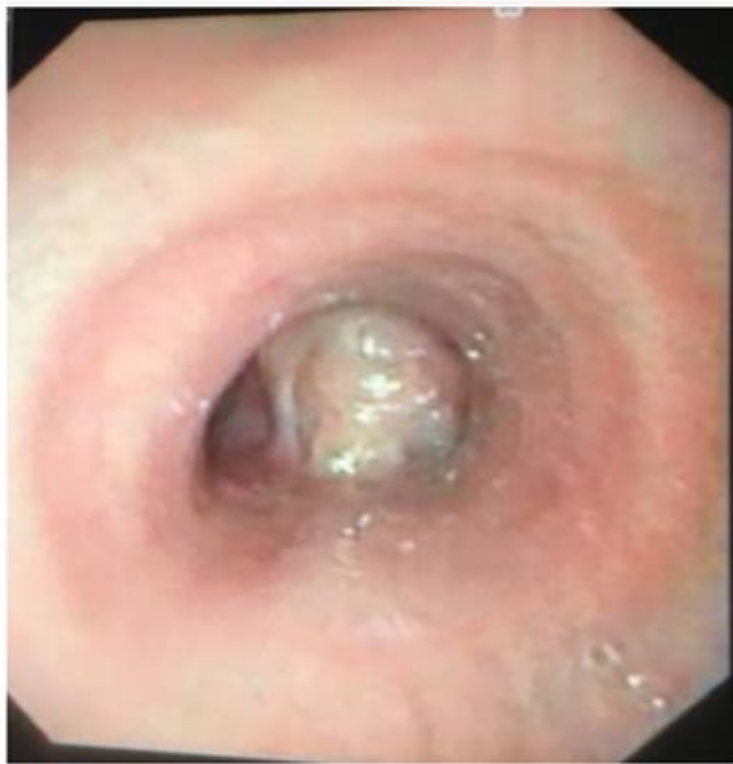


Figure 1: In 2014, endobronchial mass in the entrance of the right main bronchus, without direct contact with the tracheal carina. ©

Surgical or specialized endoscopic removal had been recommended, but she declined treatment.

demonstrated a well-circumscribed mass at the entrance of the right main bronchus now saddling the tracheal carina (Figures 2 and 3).

Between 2014 and 2019 she experienced recurrent right-lung infections treated intermittently with antibiotics. Flexible bronchoscopy in 2019



Figure 2: In 2019, bronchoscopic view showing enlargement of the endobronchial mass with overlap/extension onto the tracheal carina.



Figure 3: In 2019, bronchoscopic view showing enlargement of the endobronchial mass and cryoprobe during devitelisation procedure. ©

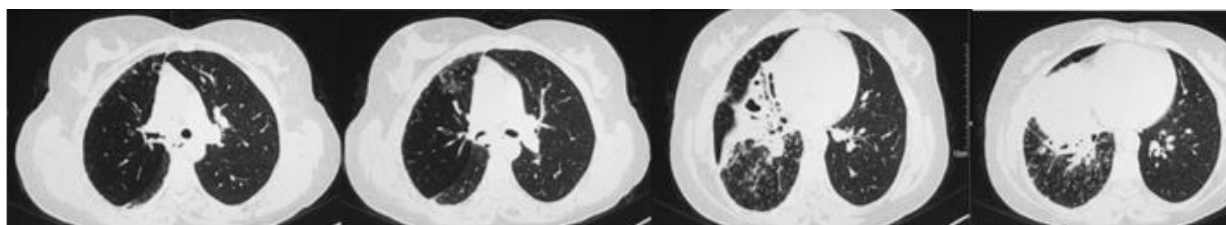


Figure 4: Lung CT show obstruction of the right primary bronchus, direct and indirect signs of atelectasis, bronchiectasis and bronchiolitis, ©

mm heterogeneous endoluminal lesion within the right main bronchus (Figure 4).

Pulmonary-window images demonstrated middle-lobe atelectasis with associated bronchiectasis and bronchiolitis, consistent with post-obstructive changes [4–6].

After antibiotic therapy, staged cryotherapy was performed using a 1.9 mm Erbe cryoprobe. Under general anesthesia and bronchoflex

intubation, a balloon catheter was positioned at the level of the right main bronchus to enable immediate local endobronchial tamponade if necessary. Five to six freeze–thaw applications of approximately 20 seconds were performed during the first session [6,9].

Three to four days later, cryobiopsy was obtained following additional cryotherapy applications to reduce vascularity. Histopathological examination confirmed chondroid hamartoma (Figure 5).

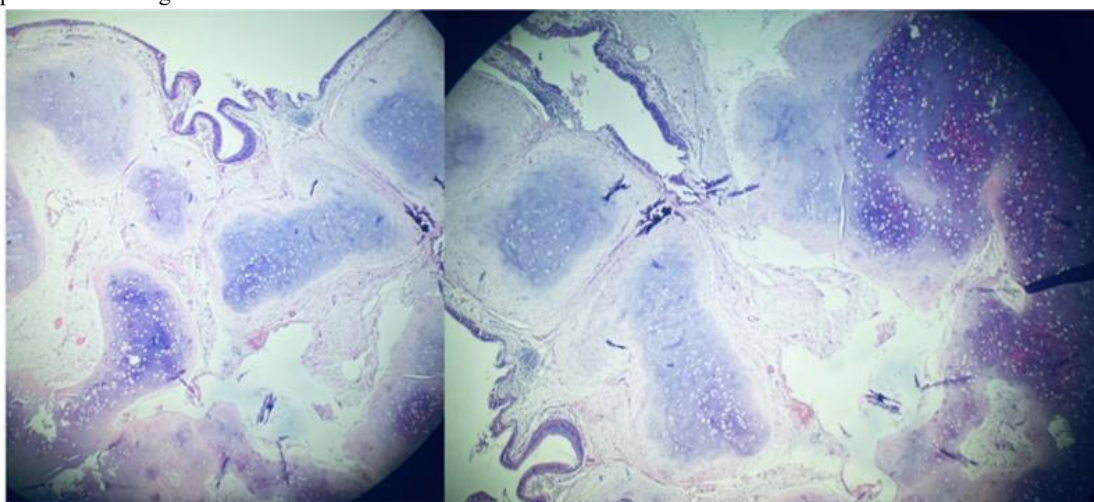


Figure 5: H-Ex4: Bronchial epithelium, mature chondroid cells with lacunar pattern separated from myxoid stroma. No evidence of atypia. [D.Xhemalai, P.Kapisyzi]. ©

As no significant bleeding occurred, sequential cryodebridement was performed in three additional sessions. Purulent secretions drained from the distal airway during recanalization. Residual nodules adherent to the bronchial wall were excised using electrocautery in cutting mode (Figure 6) [9].

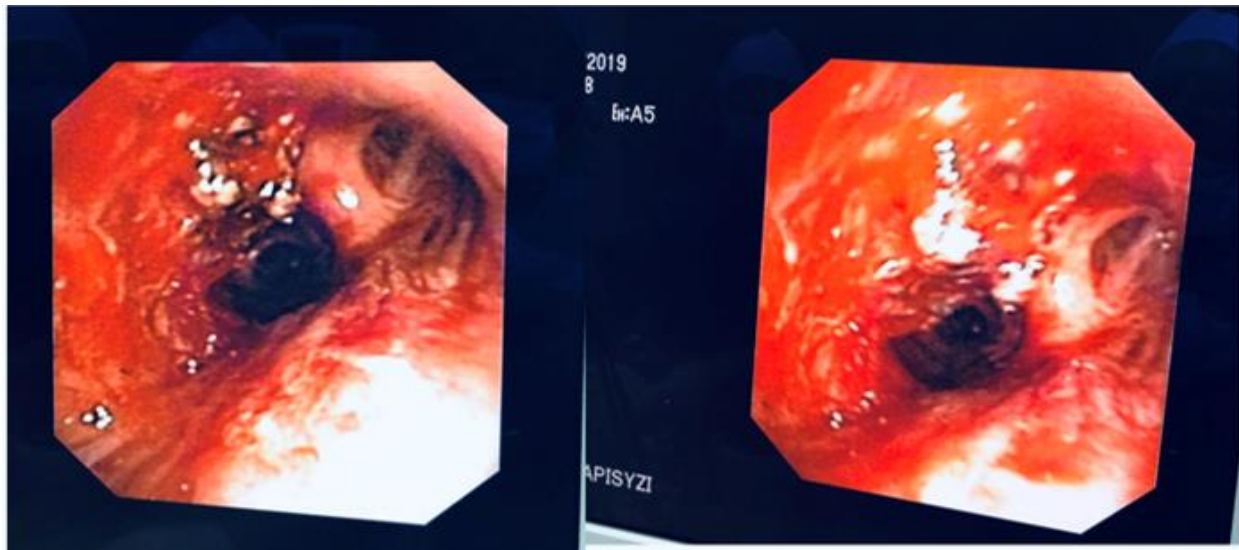


Figure 6: After cryotherapy, flexible bronchoscopy revealed complete airway recanalization with small residual nodules, which were excised by electrocautery. [P.Kapisyzi], ©

Arterial blood pressure was maintained at 100–110 mmHg with titrated propofol infusion throughout the procedures to minimize hemorrhagic risk. At six months, CT demonstrated complete airway recanalization with persistent bronchiectasis but no atelectasis (Figure 7).

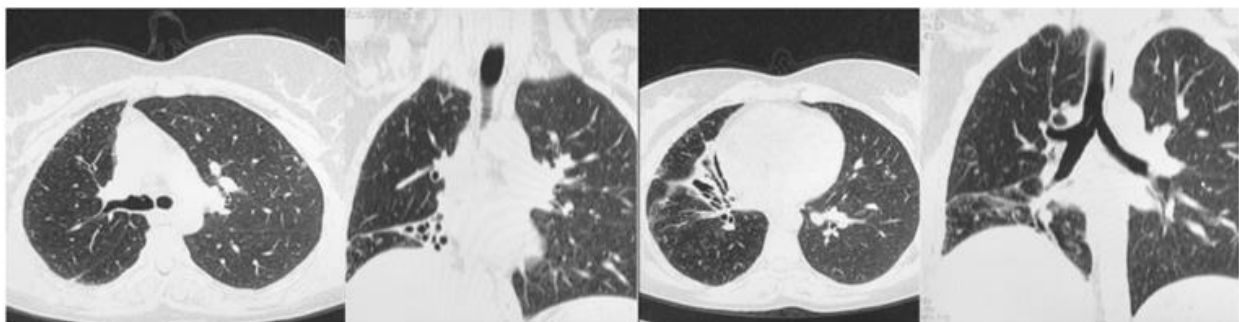


Figure 7: CT scan after 6 month demonstrated complete airway recanalization, persistent bronchiectasis but no direct signs of residual atelectasis ©

Annual follow-up over three years showed no recurrence.

Discussion

Pulmonary hamartoma is the most common benign lung tumor [1]. Endobronchial location is rare but clinically significant because obstruction of the main bronchus may lead to recurrent infection, atelectasis, and irreversible bronchiectasis [2–6].

Main bronchus hamartomas may mimic malignant tumors both radiologically and endoscopically [7–10]. In our case, progressive extension toward the carina increased suspicion of malignancy despite slow evolution.

Rigid bronchoscopy remains the gold standard for management of critical central airway obstruction, particularly when rapid mechanical debulking or advanced airway control is required [11,12]. However, in stable patients with benign endoluminal lesions, flexible bronchoscopic cryotherapy offers controlled tissue necrosis, preservation of bronchial architecture, and the possibility of staged intervention [6–10,13]. Although rigid bronchoscopy provides optimal airway control and allows rapid mechanical debulking, particularly in critical central airway obstruction [11,12], several factors supported the choice of a staged flexible approach in our case. The lesion demonstrated slow progression

over four years without acute respiratory compromise. The patient was hemodynamically stable and did not present with critical hypoxemia. Moreover, the broad attachment of the chondroid lesion to the bronchial wall raised concern that aggressive en bloc mechanical extraction might increase the risk of deep wall injury. Contemporary series have shown that staged bronchoscopic cryotherapy can achieve effective recanalization in selected benign central airway lesions with favorable safety profiles [13]. A staged flexible cryotherapy strategy therefore allowed gradual devitalization, controlled recanalization, and preservation of bronchial architecture while minimizing procedural trauma [13,14].

Recent series report high technical success rates and favorable safety profiles with bronchoscopic cryotherapy in central airway obstruction [13]. Cryobiopsy improves diagnostic yield by preserving tissue architecture [14–16], which was crucial in this case.

Strict hemodynamic control during intervention is essential to minimize hemorrhagic complications in near-total central airway obstruction. Arterial blood pressure was deliberately maintained between 100 and 110 mmHg with titrated propofol infusion to reduce intraprocedural bleeding risk in the setting of near-total central airway obstruction.

Conclusion

Near-total central airway obstruction may remain undiagnosed when indirect imaging findings predominate. Early bronchoscopic evaluation is essential. In carefully selected stable patients, staged flexible bronchoscopic cryotherapy with appropriate hemorrhage control measures can achieve durable airway recanalization and avoid more invasive approaches.

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Data Availability Statement: Data are contained within the article.

Conflicts of Interest: The authors declare no conflict of interest.

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