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When Asthma Isn't Asthma: An Original Case Study of Endobronchial Carcinoid Tumor Mimicking Uncontrolled Asthma

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Abstract

Background: Uncontrolled asthma is a common clinical problem, often attributed to therapy non-compliance or severe asthma phenotypes. However, rare conditions such as endobronchial tumors can mimic asthma, leading to diagnostic challenges and delayed treatment.

Objective: To present the case of a 36-year-old male misdiagnosed with uncontrolled asthma, later found to have an endobronchial carcinoid tumor, and discuss its diagnostic challenges and management.

Case Presentation: A 36-year-old male presented with intermittent wheezing, dyspnea, and minimal response to standard asthma therapy. Persistent symptoms prompted further evaluation, including pulmonary function tests, high-resolution computed tomography (HRCT), and bronchoscopy, which revealed Near total obstruction of Hyperemic mass lesion at left main bronchus, 2.5cm distal to carina. Histopathological examination confirmed a carcinoid tumor, S/P Rigid bronchoscopy and debulking led to complete symptom resolution, with no recurrence observed 6month post operatively.

Conclusion: This case underscores the importance of considering rare differential diagnoses like endobronchial tumors in refractory asthma. A systematic diagnostic approach can facilitate timely management and improve patient outcomes.

Keywords

Asthma; Endobronchial tumor; Carcinoid tumor; Misdiagnosis; Diagnostic challenges

Introduction: Asthma is a prevalent chronic respiratory disease affecting millions worldwide, characterized by reversible airway obstruction, bronchial hyperresponsiveness, and inflammation. Despite significant advances in the diagnosis and management of asthma, approximately 5–10% of cases remain refractory to standard therapy, leading to considerable morbidity and a reduced quality of life **[1, 2]**. The differential diagnosis of refractory asthma is broad, including conditions such as vocal cord dysfunction, pulmonary embolism, cardiac failure, and rare neoplasms like endobronchial tumors. Failure to identify these alternative diagnoses can lead to prolonged symptoms and delayed intervention, compounding the burden on patients **[3, 4]**.

Endobronchial carcinoid tumors, a subtype of neuroendocrine tumors, are rare and account for approximately 1–2% of all pulmonary neoplasms. These tumors arise from neuroendocrine cells in the bronchial epithelium and are classified into typical and atypical subtypes based on their histological features and clinical behavior. While typical carcinoid tumors are low-grade with a favorable prognosis, atypical carcinoids exhibit aggressive behavior and are associated with a higher risk of metastasis **[5, 6]**. Patients with endobronchial carcinoids often present with non-specific respiratory

symptoms such as cough, wheezing, and dyspnea, which mimic common conditions like asthma, frequently leading to diagnostic delays **[7]**.

In cases where patients with "asthma" exhibit poor response to conventional therapy, a systematic evaluation to exclude alternative causes is essential. Diagnostic modalities such as high-resolution computed tomography (HRCT), pulmonary function tests, and bronchoscopy play a pivotal role in uncovering hidden conditions. Bronchoscopy, in particular, allows direct visualization of the airway, aiding in the identification of obstructive lesions and enabling tissue diagnosis through biopsy **[8. 9]**.

This article presents a case of a 36-year-old male with a prolonged history of refractory asthma, ultimately diagnosed with an endobronchial carcinoid tumor. The case highlights the importance of maintaining a high index of suspicion for rare differential diagnoses in asthma, the role of advanced diagnostic modalities, and the effectiveness of surgical intervention in managing such conditions.

Case Presentation

Patient History: A 36-year-old male presented with complaints intermittent wheeze, and tiredness since 1 year, cough with scanty mucoid expectoration with no h/o purulence, foul smelling or hemoptysis, with breathlessness - grade1 mmrc since 1 year. The patient reported a poor response to inhaled corticosteroids and long-acting beta-agonists prescribed for presumed asthma. Over the preceding six months, he experienced recurrent episodes of chest tightness and frequent respiratory infections, along with fatigue and an unintentional weight loss of 6 kg. There was no significant history of allergies, smoking, or occupational exposure to respiratory irritants.

Clinical Examination

On examination:

- Respiratory auscultation revealed that Trachea was central on inspection with decreased breath sounds heard on left ICA, left SSA , decreased VR on left side with scattered Ronchi present.
- Vital signs were stable, with no evidence of cyanosis or clubbing.
- No abnormalities were detected in cardiovascular or abdominal examinations.

Initial Diagnosis and Treatment: The patient had been managed as a case of uncontrolled asthma. Despite adherence to therapy and multiple adjustments to his asthma regimen, including short bursts of oral corticosteroids, symptoms persisted, prompting further evaluation.

Investigations

1. **Pulmonary Function Test (PFT)**:
    - Demonstrated an obstructive pattern with a forced expiratory volume in 1 second (FEV1) of 60% of predicted value.
    - Post-bronchodilator response was negligible, suggesting fixed airway obstruction.
2. **Chest X-Ray**:
   Left upper lobe collapse with left lower lobe shifting upwards- suggestive of Luftsichel sign.
3. **High-Resolution CT Scan (HRCT)**:
   Near complete collapse of anterior segment of left upper lobe ,rest of B/L lung feilds appear normal with no evidence of distal metastasis or lymphadenopathy.
4. **Bronchoscopy**:
   Revealed a reddish, fleshy hyperemic mass seen nearly occluding the distal lumen of left main bronchus, 2.5cm distal to carina

5. **Histopathology**:

Confirmed the lesion as a typical carcinoid tumor (low-grade neuroendocrine tumor) based on histological features and immunohistochemical staining positive for cytokeratin 3+,synaptophysin 3+,chromogranin 3+,CD56 2-3+ with ki 67 proliferative index of < 5%.

6.Biochemical Markers:

a. Serum chromogranin A levels were elevated.
b. 24-hour urinary 5-hydroxyindoleacetic acid (5-HIAA) levels were within normal limits, ruling out carcinoid syndrome.

7.**Immunoprofile:** showed Endobronchial mass lesion is consistent with carcinoid tumor

Figure 1: Chest X Ray

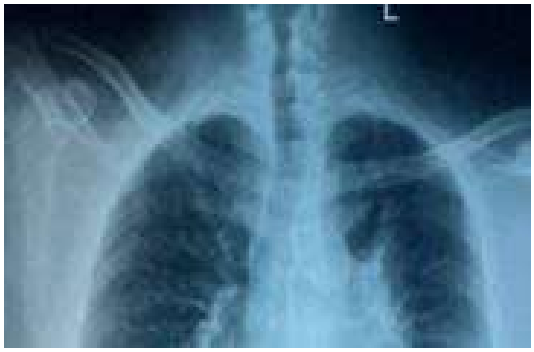


Figure2: CT scan

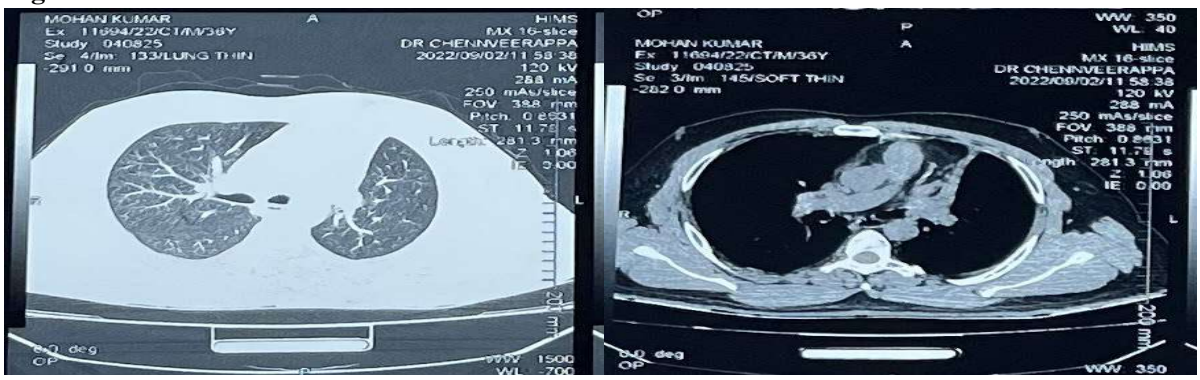
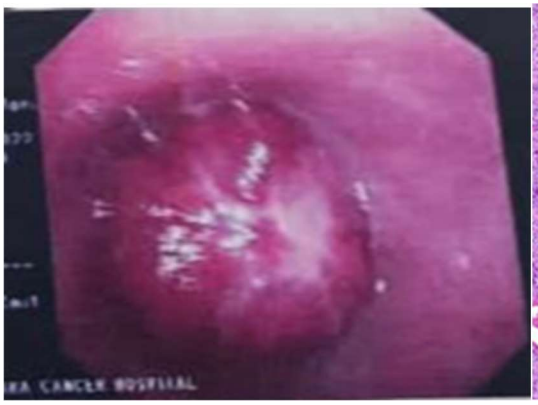
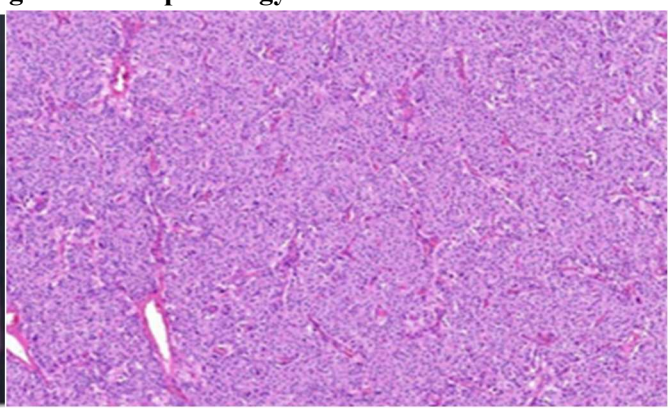


Figure:3 Bronchoscopy



RIGID BRONCHOSCOPY
Fleshy mass seen nearly occluding the distal lumen of left main bronchus, 2.5 cm distal to carina.

figure:4 Histopathology



Polypoid fragments of endobronchial tissue with infiltrating neoplasm with neoplastic cells arranged in nested pattern, cells are uniform in shape with round to oval nucleoli, diffuse granular chromatin and moderate eosinophilic cytoplasm present with no mitotic figures and necrosis seen.

Diagnosis: Based on the clinical presentation, imaging, bronchoscopy, and histopathology, the patient was diagnosed with a **typical endobronchial carcinoid tumor** mimicking refractory asthma.

Management: The patient underwent a Rigid bronchoscopy and debulking of the tumor was done. The procedure achieved complete excision with histologically clear margins. Post-operatively:

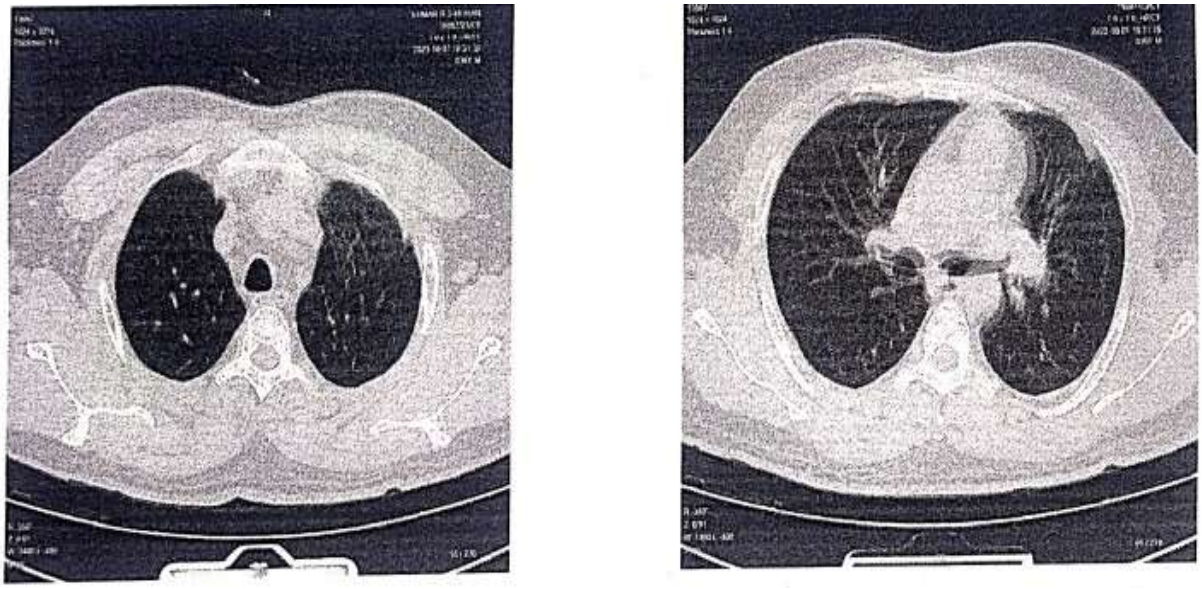
- The patient's symptoms resolved entirely within two weeks.
- Pulmonary function tests showed significant improvement, with FEV1 increasing to 85% of predicted value.

Follow-Up:

At six months post-surgery:

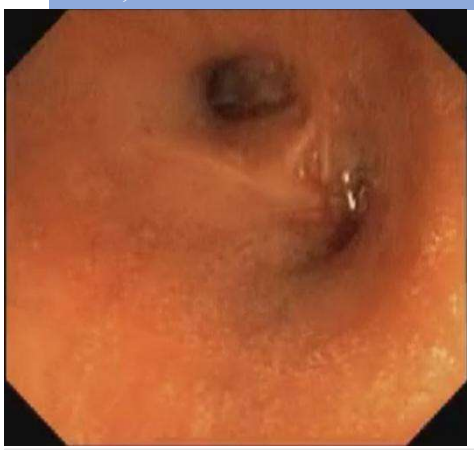
- The patient remained asymptomatic with no recurrence of wheezing or dyspnea.
- Follow-up bronchoscopy revealed no residual or recurrent tumor. imaging, and histopathology.
- Imaging and serum chromogranin A levels were normal, indicating complete remission.

Figure:5



Repeat HRCT thorax was done showed GGO seen in left upper and lingular lobe with normal pleural thickening with pleuro parenchymal fibrotic bands seen in left upper lobe –old infective sequelae.

Figure:6



Repeat Bronchoscopy showed narrowing noted left upper lobe , distal openings seen, Rest of the bronchial tree normal.

Table 1: Differences Between Asthma and Endobronchial Tumors. This table compares the typical features of asthma and endobronchial carcinoid tumors.

Feature	Asthma	Endobronchial Tumor
Symptom Onset	Gradual, often triggered by allergens	Gradual, often insidious
Response to Therapy	Significant improvement with bronchodilators	Minimal or no improvement
Imaging	Typically normal	Obstructive lesion visible on HRCT
Bronchoscopy	Normal airway	Visible mass or obstruction
Histopathology	Not applicable	Confirms neuroendocrine origin

Table 2: Outcomes Following Surgical Management. This table highlights the clinical improvements and follow-up findings post-tumor excision.

Outcome Parameter	Pre-Surgery	Post-Surgery
Symptom Severity	Persistent wheezing, dyspnea	Complete symptom resolution
Pulmonary Function (FEV1)	60% of predicted	85% of predicted
Imaging	Hyperemic mass lesion at left main bronchus	No residual lesion
Follow-Up Duration	-	6 months (asymptomatic)

Discussion: This case highlights the diagnostic challenges of distinguishing uncontrolled asthma from rare conditions like endobronchial carcinoid tumors. The 36-year-old male in this case presented with intermittent wheezing and dyspnea, typical of asthma, but his poor response to therapy prompted further evaluation, ultimately revealing an endobronchial carcinoid tumor. This underscores the importance of maintaining a high index of suspicion for alternative diagnoses in refractory asthma.

Endobronchial Carcinoid Tumors: An Overview: Carcinoid tumors are rare neuroendocrine neoplasms, constituting 1–2% of all pulmonary tumors. They are classified as typical (low-grade) or atypical (high-grade) based on their mitotic

activity and presence of necrosis. Typical carcinoid tumors, as seen in this case, are slow-growing and carry a favorable prognosis **[10]**. They commonly arise in the central airways, causing symptoms through airway obstruction or local irritation rather than systemic hormone secretion **[11]**.

Challenges in Diagnosis: Endobronchial carcinoids often mimic common respiratory conditions such as asthma, leading to frequent misdiagnoses. Symptoms like wheezing, dyspnea, and cough are non-specific and overlap significantly with asthma. In this case, the delayed diagnosis highlights the limitations of relying solely on clinical features for diagnosing asthma and the need for comprehensive evaluations in refractory cases **[12, 13]**.

Key diagnostic steps in this case included:

1. **Imaging and Bronchoscopy**:
    - HRCT identified the endobronchial lesion, while bronchoscopy confirmed its location and morphology, allowing histopathological diagnosis.
2. **Histopathology**:
    - Immunohistochemical markers like chromogranin A and synaptophysin confirmed the neuroendocrine origin of the tumor, distinguishing it from other airway lesions.

Management and Outcomes: Surgical resection is the treatment of choice for localized endobronchial carcinoid tumors. In this case, Debulking of mass lesion achieved complete removal, resulting in symptom resolution and normalization of pulmonary function. Early surgical intervention is critical to prevent complications such as recurrent infections, bronchiectasis, or distal airway obstruction **[14]**.

Clinical Implications

This case underscores several important clinical lessons:

1. **Differential Diagnosis**:
    - Persistent asthma-like symptoms unresponsive to therapy should prompt evaluation for alternative diagnoses, including airway tumors, pulmonary embolism, and vocal cord dysfunction.
2. **Role of Advanced Diagnostics**:
    - Tools like HRCT and bronchoscopy are indispensable in identifying and confirming rare conditions that mimic asthma.
3. **Timely Intervention**:
    - Early diagnosis and surgical management can prevent complications and improve outcomes, as seen in this patient.

Future Directions

1. **Awareness and Training**:
    - Increased awareness among clinicians regarding rare mimics of asthma is essential for reducing diagnostic delays.
2. **Research**:
    - Studies exploring biomarkers for early detection of endobronchial tumors in asthma-like presentations could enhance diagnostic accuracy.

Conclusion: This case demonstrates the importance of considering rare differential diagnoses, such as endobronchial carcinoid tumors, in patients presenting with Uncontrolled asthma -like symptoms. The misdiagnosis of asthma in this 36-year-old male delayed appropriate treatment and emphasized the need for a thorough diagnostic evaluation in such cases.

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