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Endobronchial Lipoma: A Rare Cause of Bronchial Obstruction- Case Report

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Abstract: **Case Report**

Endobronchial lipoma is a rare benign tumor of the tracheobronchial tree, representing a very small fraction of pulmonary neoplasms. Despite its benign histological nature, it may lead to significant bronchial obstruction and irreversible pulmonary damage if diagnosis is delayed. Clinical manifestations are nonspecific and frequently mimic common respiratory disorders such as asthma, chronic obstructive pulmonary disease, or malignancy, resulting in delayed recognition. Computed tomography (CT) plays a key role in suggesting the diagnosis by demonstrating a characteristic fat-density endobronchial lesion, while bronchoscopy allows direct visualization, histological confirmation, and therapeutic intervention. The current management paradigm favors minimally invasive bronchoscopic techniques over surgical resection. We report a case of A 62-year-old chronic smoker presented with worsening dyspnea and chest pain; chest CT revealed a well-defined fat-density obstructive lesion in the left main bronchus causing ipsilateral atelectasis and post-obstructive changes. Bronchoscopy identified a smooth yellow endobronchial mass located 2 cm from the carina, which was completely resected endoscopically. Histopathological examination confirmed a benign proliferation of mature adipocytes without atypia, consistent with an endobronchial lipoma. Then we review the imaging features, diagnostic approach, and therapeutic strategies of endobronchial lipoma, with emphasis on CT, endoscopy, and differential diagnosis.

Keywords: Endobronchial Lipoma, Bronchial Obstruction, Computed Tomography (CT), Bronchoscopy, Endoscopic Resection.

INTRODUCTION

Tumors of the tracheobronchial tree are rare, accounting for less than 0.4% of all tumors, and are predominantly malignant in adults [1]. Benign endobronchial tumors represent a minority of these lesions, among which endobronchial lipomas account for only 0.1–0.5% of all pulmonary tumors [2, 3, 5]. These tumors arise from adipose tissue within the bronchial submucosa and typically grow slowly within the bronchial lumen [2, 4]. Despite their benign histology, progressive enlargement can lead to significant airway obstruction and secondary complications such as atelectasis, post-obstructive pneumonia, and bronchiectasis [2, 3]. Because the clinical presentation is nonspecific and often mimics more common respiratory or malignant diseases, diagnosis is frequently delayed, highlighting the importance of imaging and endoscopic evaluation.

Case Report

A 62-year-old male patient, a chronic smoker with a history of insulin-treated type 2 diabetes mellitus, presented to the emergency department with worsening dyspnea associated with chest pain. A chest computed tomography (CT) scan was performed, revealing an obstructive endobronchial nodular lesion located in the left main bronchus. The lesion was oval in

shape, well-defined, with smooth margins, and demonstrated homogeneous fat attenuation (mean density of −97 Hounsfield units). It showed no enhancement after intravenous contrast administration and no visible intralesional calcifications. The lesion measured approximately 12 × 13 × 19 mm. The nodule was attached to the bronchial wall and located approximately 2 cm distal to the carina. The left main bronchus measured 17 mm in diameter proximal to the lesion. This obstruction resulted in atelectasis of the ipsilateral lung parenchyma, associated with cylindrical and cystic bronchiectasis with thickened walls, as well as patchy areas of consolidation and ground-glass opacities in certain regions. These findings were associated with mediastinal shift toward the affected side and compensatory hyperinflation of the contralateral lung. No suspicious pulmonary nodules or micronodules were identified elsewhere. Mediastinal window analysis revealed a few enlarged mediastinal lymph nodes with features suggestive of a reactive or infectious etiology. No suspicious osseous lesions were identified on bone window evaluation. Based on these findings, a diagnosis of obstructive endobronchial lipoma of the left main bronchus with associated atelectasis and signs of superimposed infection was made (Figure 1). Subsequent bronchoscopic evaluation revealed a smooth, yellowish endobronchial mass located in the left main bronchus approximately 2 cm from the carina. Complete endoscopic resection of the lesion was successfully performed. Histopathological examination confirmed the benign nature of the lesion, demonstrating a proliferation of mature adipocytes without cellular atypia, consistent with an endobronchial lipoma.

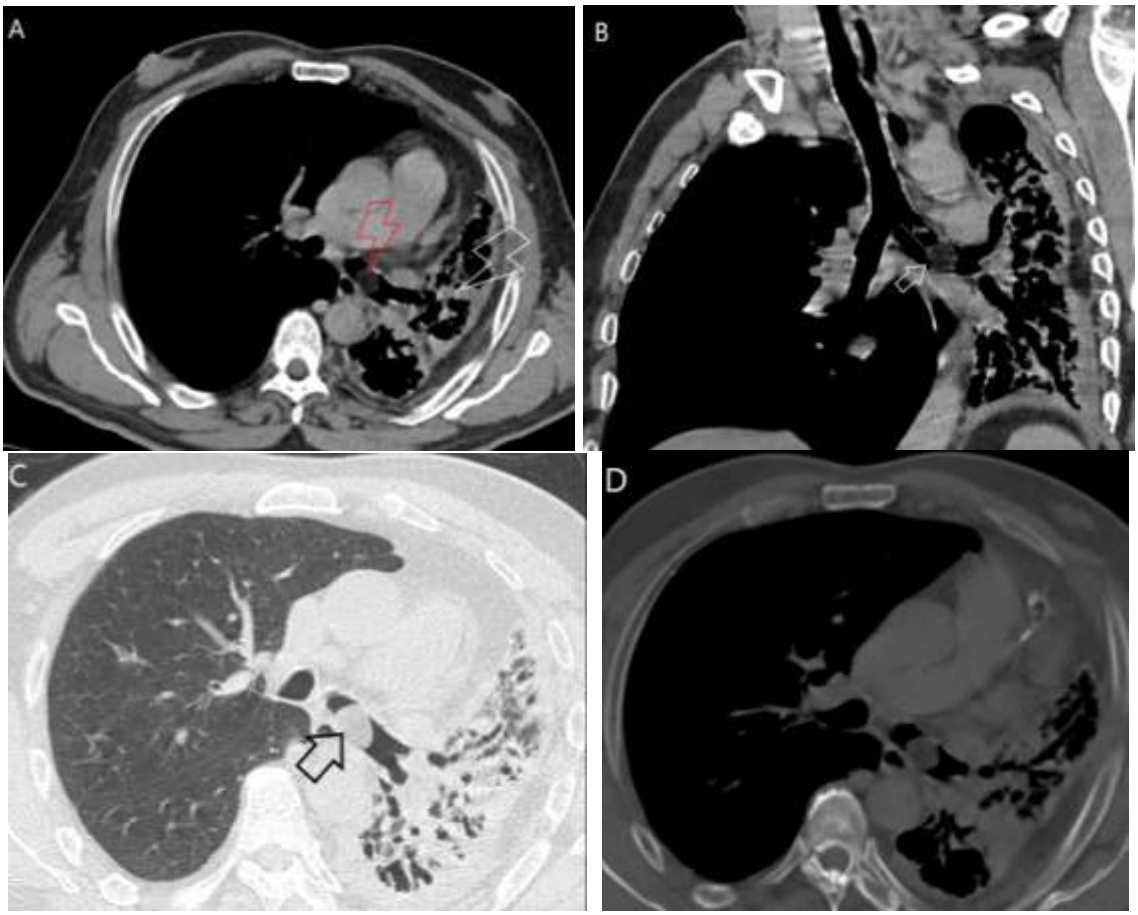

Figure 1: A: Axial CT image showing a homogeneous well-defined fat-density endobronchial nodular lesion (red arrow) with upstream parenchymal atelectasis (white arrow); **B:** Coronal image demonstrating an obstructive nodule located 2 cm from the carina (arrow); **C:** Lung parenchymal window: endobronchial nodular lesion (arrow) with upstream parenchymal atelectasis; **D:** Absence of calcification on bone window

DISCUSSION

Endobronchial lipomas are most commonly diagnosed in middle-aged to elderly patients, with a predominance in males and associations with risk factors such as smoking and obesity [4, 5]. Clinical symptoms are primarily related to bronchial obstruction and include dyspnea, chronic cough, wheezing, recurrent infections, and occasionally hemoptysis [3, 5]. These nonspecific manifestations frequently overlap with asthma, chronic obstructive pulmonary disease, or even bronchogenic carcinoma, often leading to misdiagnosis and delayed treatment [2, 3].

Imaging plays a central role in the diagnostic work-up. Computed tomography is the modality of choice for evaluating suspected endobronchial lesions, as it provides precise information on tumor location, extent, and associated pulmonary changes. Endobronchial lipomas typically appear on CT as well-defined intraluminal masses with homogeneous fat attenuation, usually ranging between −50 and −100 Hounsfield units, and without significant contrast enhancement [2, 5]. These features are highly suggestive of a lipomatous lesion and allow differentiation from malignant tumors, which typically present with soft-tissue density and enhancement. CT may also demonstrate secondary findings such as distal atelectasis, consolidation, or bronchiectasis due to chronic obstruction. More generally, CT is considered the standard imaging modality for tracheobronchial tumors, allowing visualization of polypoid lesions, luminal narrowing, or airway wall thickening, and aiding in treatment planning [1]. The use of multidetector CT with multiplanar and three-dimensional reconstructions further improves diagnostic accuracy by enhancing visualization of the bronchial tree [1]. Fluorodeoxyglucose positron emission tomography may be used in selected cases to differentiate benign from malignant lesions. Benign tumors such as lipomas typically show minimal or no FDG uptake, whereas malignant tumors demonstrate increased metabolic activity [1]. However, PET findings should always be interpreted in conjunction with CT imaging and clinical context. Bronchoscopy is indispensable for both diagnosis and management. Flexible bronchoscopy enables direct visualization of the lesion, which typically appears as a smooth, yellowish, polypoid mass protruding into the bronchial lumen and causing varying degrees of obstruction [2, 4]. It also allows biopsy for histopathological confirmation, which remains the gold standard for diagnosis. Histological examination typically reveals mature adipose tissue covered by normal respiratory epithelium, without cellular atypia [3, 4]. From a differential diagnostic perspective, endobronchial lipoma must be distinguished from other benign endobronchial tumors, particularly hamartomas and hamartochondromas, which may present with similar clinical and endoscopic features. Endobronchial hamartomas are the most common benign tumors of the lung and are composed of varying proportions of cartilage, fat, fibrous tissue, and epithelial elements. On CT imaging, they typically demonstrate a heterogeneous appearance, often containing both fat and calcifications, the latter sometimes presenting as characteristic “popcorn” calcifications, which are highly suggestive of the diagnosis [1]. In contrast to lipomas, which are composed almost entirely of fat and appear as homogeneous low-attenuation lesions, hamartomas exhibit mixed density due to their composite tissue structure. Hamartochondromas, considered a variant of pulmonary hamartomas with a predominance of cartilaginous components, may show more pronounced calcifications and less fat content, making differentiation from other benign or even malignant lesions more challenging. Unlike lipomas, which are usually soft, yellowish, and poorly vascularized at bronchoscopy, hamartomas and hamartochondromas may appear firmer and more irregular due to their cartilaginous matrix. In addition, the presence of calcifications on CT strongly favors hamartoma over lipoma. Other benign tumors such as papillomas or leiomyomas may also

enter the differential diagnosis but generally lack the characteristic fat attenuation seen in lipomas [1]. Therefore, while CT imaging can strongly suggest the diagnosis based on tissue composition, definitive differentiation between these entities often requires histopathological confirmation obtained via bronchoscopic biopsy or resection. This highlights the complementary roles of imaging and endoscopy in establishing an accurate diagnosis and guiding appropriate management. Beyond diagnosis, bronchoscopy has become the cornerstone of treatment. Advances in interventional bronchoscopy have shifted management toward minimally invasive techniques, including electrosurgical snare resection, cryotherapy, laser therapy, and argon plasma coagulation [2-5]. These techniques allow effective tumor removal while preserving lung parenchyma and avoiding major surgical procedures. Bronchoscopic resection is now considered the first-line treatment in most cases, particularly when there is no irreversible distal lung damage. Surgical resection, including segmentectomy or lobectomy, is reserved for selected cases such as those with extensive distal lung destruction, suspicion of malignancy, or failure of endoscopic treatment [2, 4]. Delayed diagnosis may result in irreversible pulmonary damage, emphasizing the importance of early recognition and intervention.

CONCLUSION

Endobronchial lipoma is a rare but clinically significant cause of bronchial obstruction that may mimic a wide spectrum of respiratory and malignant diseases. Computed tomography plays a crucial role in suggesting the diagnosis through identification of characteristic fat-density lesions, while bronchoscopy remains essential for confirmation and treatment. The differential diagnosis includes other benign endobronchial tumors such as hamartomas and hamartochondromas, which can often be distinguished by their heterogeneous composition and calcifications on imaging. Minimally invasive bronchoscopic techniques have become the cornerstone of management, offering effective and lung-sparing therapy. Early diagnosis is essential to prevent irreversible pulmonary damage and to avoid unnecessary surgical intervention.

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