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AN UNUSUAL PULMONARY MASS MIMICKING A LUNG TUMOR: A DIAGNOSTIC PITFALL ON THORACIC IMAGING

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ABSTRACT

Pulmonary sequestration is an uncommon congenital lung malformation consisting of non-functioning pulmonary tissue that lacks normal communication with the tracheobronchial tree and receives its blood supply from the systemic circulation. In adults, its clinical and radiological presentation may be atypical and occasionally mimic a pulmonary neoplasm. We report the case of a 52-year-old man with no significant medical history who presented with low-volume hemoptysis. Laboratory findings were unremarkable. Non-contrast chest CT demonstrated a well-circumscribed intrapulmonary mass in the left lower lobe, initially raising concern for a pulmonary tumor. Subsequent CT angiography revealed three aberrant systemic feeding arteries arising directly from the descending thoracic aorta and a single draining vein emptying into the left inferior pulmonary vein, establishing the diagnosis of intralobar pulmonary sequestration. The patient was admitted for further therapeutic management. This case highlights the tumor-like appearance of pulmonary sequestration in adults and emphasizes the pivotal role of CT angiography in avoiding diagnostic pitfalls by accurately identifying the aberrant systemic arterial supply and venous drainage, while providing an essential vascular roadmap for therapeutic planning.

KEYWORDS

Pulmonary sequestration; Intralobar sequestration; Hemoptysis; Computed tomography angiography; Congenital lung malformation.

MAIN ARTICLE

INTRODUCTION

Pulmonary sequestration (PS) is a rare, non-hereditary congenital bronchopulmonary malformation defined as a non-functional segment of lung tissue that lacks normal communication with the tracheobronchial tree and receives an anomalous systemic arterial blood supply. It is thought to result from the development of an accessory lung bud between the fourth and eighth weeks of embryogenesis [1].

Although PS is usually diagnosed during childhood, some patients remain asymptomatic until adulthood, when the condition may be revealed by recurrent pulmonary infections, chest pain, or hemoptysis. Contrast-enhanced CT angiography plays a pivotal role in establishing the diagnosis by accurately depicting the aberrant systemic arterial supply and venous drainage, thereby facilitating therapeutic planning.

CASE REPORT:

A 52-year-old man with no significant past medical history presented with **low-volume hemoptysis**. He denied fever, weight loss, chest pain, or previous episodes of recurrent respiratory infections. Physical examination was unremarkable, and the patient was hemodynamically stable.

Laboratory investigations, including complete blood count, coagulation profile, and inflammatory markers, were within normal limits.

To investigate the cause of hemoptysis, the patient underwent Chest CT angiography, which revealed a well-defined intrapulmonary mass within the left lower lobe, with smooth margins and no separate pleural covering **Figure 1**.

The lesion was supplied by three aberrant systemic arteries arising from the descending thoracic aorta and drained by a single vein emptying into the left inferior pulmonary vein Figure 2, findings consistent with intralobar pulmonary sequestration.

No evidence of active contrast extravasation or other causes of hemoptysis was identified.

Following the diagnosis, the patient was admitted to the thoracic surgery department for further evaluation and definitive management.

DISCUSSION:

Pulmonary sequestration (PS) is a rare, non-hereditary congenital bronchopulmonary malformation, It accounts for approximately 0.15%–6.4% of all congenital pulmonary malformations [2] and is classified into intralobar and extralobar forms according to its pleural investment.

Intralobar sequestration may remain clinically silent until adulthood and is often discovered incidentally on chest imaging. In symptomatic patients, recurrent pneumonia involving the same pulmonary segment is the most common presentation. Other manifestations include persistent cough, chest or back pain, exertional dyspnea, and hemoptysis, the latter being more frequently associated with the intralobar form [3] .

In clinically significant cases, extralobar sequestration typically becomes symptomatic during infancy, presenting with respiratory distress or high-output cardiac failure related to significant shunting; spontaneous pulmonary or pleural hemorrhage may occur less commonly.

Pryce first provided a comprehensive definition of pulmonary sequestration in 1946 and classified it into two anatomical forms intralobar sequestration and extralobar sequestration [4]:

Intralobar sequestration, in which the sequestered lung tissue is embedded within the normal lung and shares its visceral pleura, classified into three subtypes according to the relationship between the aberrant systemic arterial supply and the sequestered lung tissue:

Type I: the only abnormality is a systemic artery supplying an otherwise normal segment of lung parenchyma.

Type II: the sequestered lung parenchyma develops from a normal bronchial bud. The aberrant systemic artery supplies both the sequestered lung tissue and a portion of the adjacent normal lung.

Type III: the bronchial bud is normal, but the accessory systemic artery supplies only the sequestered lung tissue.

Extralobar sequestration, which develops from an accessory lung bud, lacks communication with the adjacent normal lung, and possesses its own pleural covering. In addition to these classic forms, several atypical variants have subsequently been described.

The arterial supply of the sequestered lung tissue is provided by an aberrant systemic artery, which most commonly originates directly from the descending thoracic wich represents 73% of cases [5], or abdominal aorta and, less frequently, from one of their major branches [6]. The present case is remarkable for an intralobar pulmonary sequestration receiving its arterial supply from three aberrant systemic arteries arising directly from the descending thoracic aorta, with venous drainage through a single vein into the left inferior pulmonary vein.

The diagnosis is established, CT angiography was performed in our patient by following intravenous administration of 100 mL of iodinated contrast materiel at an injection rate of 3.5 mL/s. A multiphasic protocol including arterial and venous phase acquisitions was used. Thin-section images were obtained and reconstructed in axial, coronal, and sagittal planes, with additional maximum intensity projection (MIP) reconstructions for detailed vascular assessment, as illustrated by the present case, which accurately delineates the aberrant systemic arterial supply, venous drainage, and associated parenchymal abnormalities.

Several conditions mimic the imaging appearance of sequestration but do not have systemic arterial supply to the lung

When pulmonary sequestration especially intra lobar form presents as a well-defined pulmonary mass, particularly in adults with no known history of congenital lung disease, it may closely mimic a primary pulmonary neoplasm. Differentiation on conventional CT can be challenging, especially when the lesion has a predominantly solid appearance. Nevertheless, its typical location in the basal segments of the lower lobes should raise suspicion, prompting careful assessment of the vascular anatomy. The identification of an aberrant systemic arterial supply represents the key diagnostic feature .

CT angiography is therefore essential for confirming the diagnosis, as it allows precise characterization of the origin, number, and course of the systemic feeding arteries, as well as the venous drainage. In intralobar sequestration, the arterial supply most commonly arises from the descending thoracic aorta, while venous drainage typically occurs through the pulmonary veins. Recognition of this characteristic vascular pattern is particularly important before considering percutaneous biopsy, thereby avoiding an unnecessary invasive procedure and its potential hemorrhagic complications.

Other differential diagnoses should also be considered, particularly persistent pneumonia, lung abscess, and congenital pulmonary airway malformation (CPAM)

Persistent or recurrent pneumonia may resemble pulmonary sequestration, especially when the latter is complicated by infection; however, the persistence of an opacity in a typical basal location despite appropriate treatment should prompt further vascular assessment. Lung abscess may also be considered when cavitation, air–fluid levels, or surrounding inflammatory changes are present, but demonstration of an aberrant systemic feeding artery strongly favors pulmonary sequestration. CPAM represents another important congenital differential diagnosis, particularly when the lesion has a predominantly cystic or multicystic appearance [1]. Although pulmonary sequestration and CPAM may occasionally coexist, the identification of a systemic arterial supply remains the hallmark of pulmonary sequestration.

Thus, careful evaluation of both the morphologic appearance and vascular anatomy is essential for distinguishing pulmonary sequestration from neoplastic, infectious, and other congenital pulmonary lesions.

Definitive confirmation may be obtained by surgical resection and histopathological examination. Surgical treatment remains the gold standard, with an excellent prognosis in most patients.

Embolization of the anomalous vessel has been suggested for treatment of extralobar pulmonary sequestration [7].

CONCLUSION:

Pulmonary sequestration is a rare congenital bronchopulmonary malformation that may remain clinically silent until adulthood or present with nonspecific respiratory symptoms, including hemoptysis. When presenting as a well-defined pulmonary mass, it may mimic a primary lung neoplasm and should therefore be considered in the differential diagnosis. CT angiography is essential for establishing the diagnosis by demonstrating the characteristic aberrant systemic arterial supply and venous drainage, thereby avoiding potentially unnecessary invasive procedures and providing an accurate vascular roadmap for surgical planning. Our case highlights an unusual intralobar pulmonary sequestration supplied by three aberrant systemic arteries arising from the descending thoracic aorta and emphasizes the importance of recognizing this vascular anatomy in the evaluation of an atypical pulmonary mass.

FIGURES

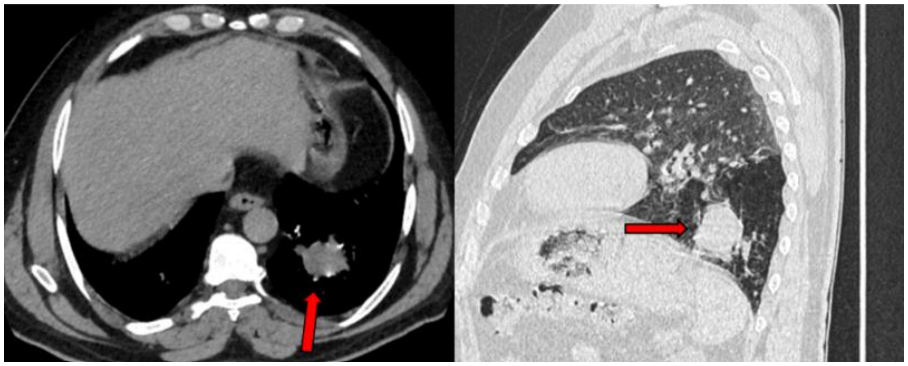

Figure 1. Axial non-contrast chest CT image (mediastinal window) demonstrating a well-defined, lobulated soft-tissue mass in the posterior basal segment of the left lower lobe. The lesion has smooth margins without associated pleural effusion or mediastinal lymphadenopathy.

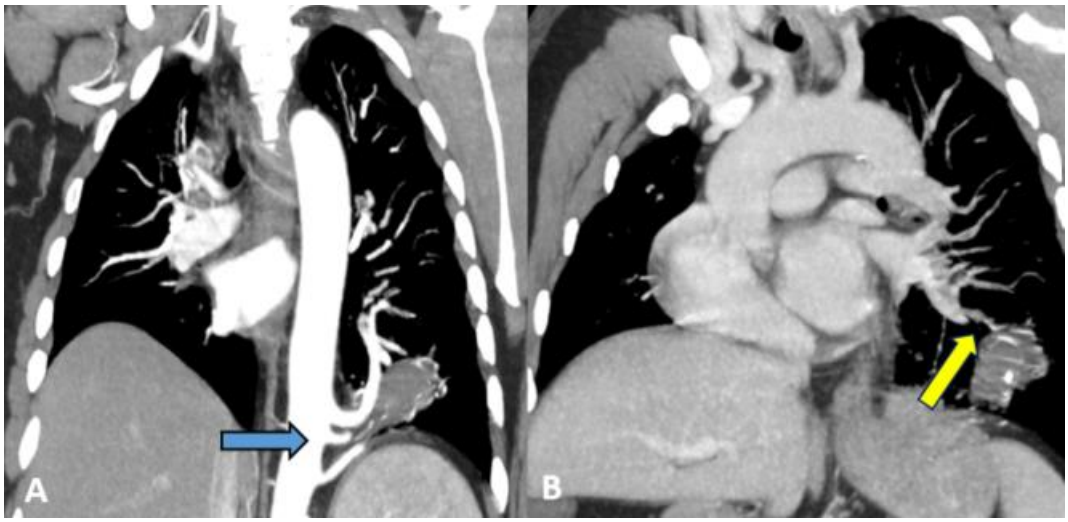

Figure 2. Coronal maximum intensity projection (MIP) CT angiographic reconstructions. (A) Arterial-phase MIP image demonstrating three aberrant systemic feeding arteries (blue arrow) arising from the descending thoracic aorta and supplying the left lower lobe intralobar pulmonary sequestration. (B) Venous-phase MIP image demonstrating the draining vein (yellow arrow) emptying into the left inferior pulmonary vein, characteristic of intralobar pulmonary sequestration.

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