Scholars Journal of Medical Case Reports
Abbreviated Key Title: Sch J Med Case Rep
ISSN 2347-9507 (Print) | ISSN 2347-6559 (Online)
Journal homepage: https://saspublishers.com

OPEN ACCESS

Radiology

Pulmonary Sequestration Newly Diagnosed in Adult Patients from a Radiological Point of View: About 5 Cases

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DOI: https://doi.org/10.36347/sjmcr.2025.v13i11.003 | **Received:** 10.09.2025 | **Accepted:** 31.10.2025 | **Published:** 04.11.2025

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Abstract **Case Series**

Pulmonary sequestration (PS) is a rare congenital malformation of the lower respiratory tract characterized by non-functional lung tissue lacking communication with the tracheobronchial tree and supplied by an aberrant systemic artery, most often arising from the aorta. Although typically diagnosed in childhood, PS may occasionally be discovered in adults, often incidentally or during evaluation for recurrent respiratory symptoms. Radiologic imaging, particularly contrast-enhanced computed tomography (CT), is essential for diagnosis and surgical planning. We report a case series of five adult patients with pulmonary sequestration.

Keywords: Pulmonary sequestration, pulmonary malformation, chest CT.

INTRODUCTION

Pulmonary sequestration is a rare congenital malformation of the lower respiratory tract characterized by non-functioning lung tissue that lacks a normal connection with the tracheobronchial tree and receives its blood supply from an anomalous systemic artery, typically originating from the aorta. This isolated segment of lung tissue does not participate in normal gas exchange and is prone to recurrent infections, making early diagnosis and management crucial. Pulmonary sequestration is classified into two main types: intralobar sequestration (ILS), where the sequestered tissue lies within the normal lung lobe and shares its pleural covering, and extralobar sequestration (ELS), which is separated from the normal lung and has its own pleura. While the exact cause of pulmonary sequestration remains unclear, it is thought to result from abnormal embryonic development of the foregut. Clinical presentation varies depending on the type and size of the sequestration, ranging from asymptomatic findings on imaging to chronic cough, recurrent pneumonia, or respiratory distress in infants. Accurate diagnosis typically involves imaging modalities such as CT angiography or MRI, and surgical resection remains the definitive treatment in symptomatic cases.

RESULTS

To carry out our study, we conducted a descriptive retrospective analysis spanning 3 years during which we recruited 5 patients aged between 23 and 70 years, with a mean age of 46 years, comprising 20% females and 80% males.

The results showed that none of the patients was priory diagnosed with pulmonary sequestration, and the CT scans were ordered in the context of an etiological work-up for recurrent pneumonia in 20% of cases, mild chronical dyspnea in 20% of cases, haemoptysis in 20%, chest pain in 40%. While 2 patients did not present any clinical symptoms signalling the pulmonary sequestration, and the finding was incidental during a staging work-up for a tumour.

The results confirmed the pulmonary sequestration revealing an extralobar pulmonary sequestration in 20% of cases; showing a subpleural area of the right lower lobe pulmonary parenchyma that is non-aerated and supplied by an arterial branch originating from the descending thoracic aorta, with venous drainage into the right superior pulmonary vein at its junction with the left atrium.

While 80% of the patients presented an intralobar pulmonary sequestration, with the following findings; pulmonary parenchyma destruction 20%, ground glass opacities 20%, areas of consolidation 40% and cystic formations 60%. The constant finding is the systemic vascularization of the sequestrated area (figure 1).

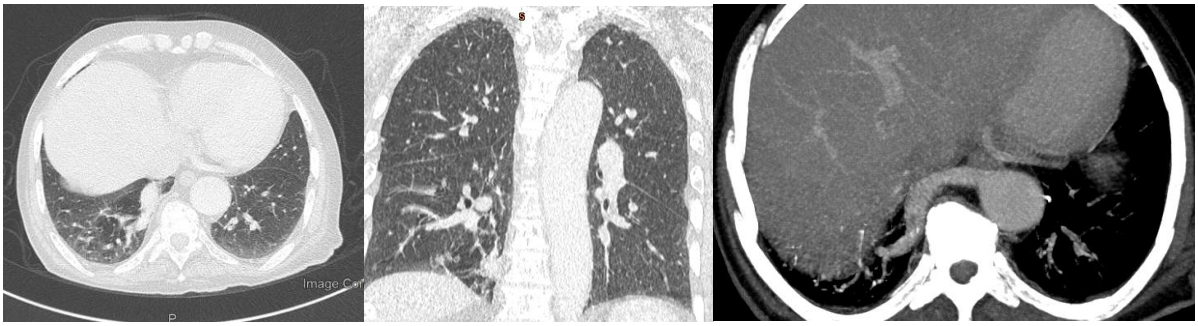

Figure 1 : Intralobar pulmonary sequestration of lower right lobe with a systemic vasculation coming from the thoracic desending aorta

The patients then, ideally, underwent a lobectomy of the sequestered parenchyma, depending on the case and the associated diseases and comorbidities.

DISCUSSION

Pulmonary sequestration (PS) is a rare congenital malformation characterized by non-functional lung tissue that lacks normal communication with the tracheobronchial tree and is supplied by an anomalous systemic artery. Although more frequently diagnosed in children, its presentation in adults is exceptional and often asymptomatic, complicating the diagnostic process.[1]

RADIOLOGICAL ASPECTS:

Contrast-enhanced computed tomography (CT) of the thorax is the imaging modality of choice for preoperative diagnosis. Sequestrations typically appear as homogeneous or heterogeneous masses, often located in the posterior basal segments, with an anomalous artery arising from the descending thoracic aorta. Identification of this systemic artery and the abnormal venous drainage represent a pathognomonic feature of PS and allows differentiation from other pulmonary masses or cystic lesions.[2]

Magnetic resonance imaging (MRI) may be useful in selected cases to assess vascularization without radiation exposure, but its spatial resolution is inferior to CT for detecting small anomalous vessels. Historically, conventional angiography was used, but it has largely been replaced by multidetector CT with 3D reconstructions, enabling precise surgical planning. [2,3]

CLINICAL FORMS AND LOCATION

PS can present in two main forms: Intralobar sequestration (ILS): The sequestered tissue is within a normal pulmonary lobe, usually in the lower lobes. This form is more frequent in adults and is often associated with recurrent pulmonary infections. And extralobar sequestration (ELS): The sequestered tissue is separated from normal lung by its own pleural covering, often located extrapulmonary or subdiaphragmatic ally. This form is more common in children and usually has a benign course. [2-4]

DIFFERENTIAL DIAGNOSIS

PS can be misdiagnosed as other pulmonary conditions, including: [1,3]

- Chronic pulmonary infections: PS may mimic recurrent infections, making imaging crucial for diagnosis.
- Pulmonary tumors: Masses may raise suspicion for malignancy, but the presence of a systemic feeding artery is a key diagnostic clue.
- Vascular malformations: While vascular anomalies may mimic PS radiologically, the absence of bronchial communication and the presence of systemic arterial supply distinguish PS.

MANAGEMENT

Surgical resection, either lobectomy or segmentectomy depending on location and extent, remains the standard treatment. Imaging allows precise identification of vascular and pulmonary anatomy, facilitating safe surgical planning.[4]

CONCLUSION

Adult pulmonary sequestration is a rare but recognizable entity with modern imaging techniques. Contrast-enhanced CT with 3D reconstructions is the gold standard for assessing abnormal vascularization and guiding surgical management. Familiarity with typical radiological signs is essential to reduce diagnostic delay and prevent infectious or hemorrhagic complications.

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