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Anomalous Systemic Arterial Supply to Normal Basal Segments of the Lung

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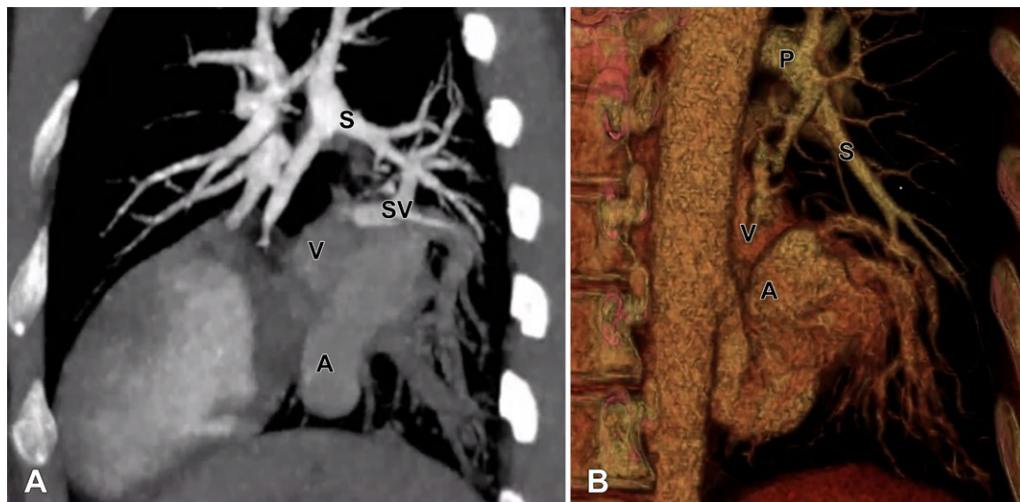


Figure 1: (A) Sagittal oblique multiplanar reformatted maximum intensity projection image from multiphase dynamic perfusion contrast-enhanced chest CT angiography during pulmonary arterial phase demonstrates the enhancing left upper lobe and superior segment of the left lower lobe arteries being supplied by a branch of the left pulmonary artery. There is slightly later enhancement of the basal segments of the left lower lobe being supplied by a large tortuous anomalous artery (A) from the descending aorta. The left lower lobe arteries drain into the enlarged left inferior pulmonary vein (V). A vein draining the superior segment of the left lower lobe (SV) demonstrates earlier enhancement than the remaining left lower lobe veins. There is absence of the left lower lobe basilar artery distal to the origin of the superior segmental branch (S) from the left pulmonary artery (P in B). (B) Volume-rendered image centered at the left lower lobe demonstrates the anomalous artery (A) arising from the descending aorta.

A 34-year-old man with long-standing exercise intolerance underwent CT angiography of the aorta, which demonstrated an anomalous artery from the descending aorta supplying the basilar segments of the left lower lobe. The large artery originated at the T8–T9 level and coursed inferiorly and superiorly in a hairpin configuration prior to giving off several dilated lower lobe segmental branches (Fig 1A, 1B; Movie). There was absence of the left lower lobe basilar artery distal to the origin of the superior segmental branch (Fig 1A, 1B). An enlarged left inferior pulmonary vein drained the basal segments and the superior segment of the left lower lobe. There was normal bronchial anatomy in the left lung (Fig 2A). The patient also underwent a ventilation-perfusion scan, as well as invasive angiography of the aorta and pulmonary artery, which together confirmed the CT findings (Fig 2B, 2C).

Anomalous systemic arterial supply to a normal lung refers to a rare condition in which functioning lung tissue,

typically the basal segments of the left lower lobe, is supplied by an anomalous systemic artery rather than by the pulmonary arteries. While initially categorized in 1946 by Pryce (1) as a type 1 intralobar sequestration, this entity may be differentiated from classic bronchopulmonary sequestration by the presence of normal communication with the tracheobronchial tree (2). Patients may be asymptomatic or may present with hemoptysis, heart murmur, or congestive heart failure (3). In addition to the vascular findings, chest CT may demonstrate volume loss and ground-glass opacity in the lung segments supplied by the anomalous artery, as seen in this case (Fig 2D) (4). Management options include endovascular occlusion and surgical approaches such as vessel ligation, segmentectomy, or lobectomy, depending on the clinical circumstance (2).

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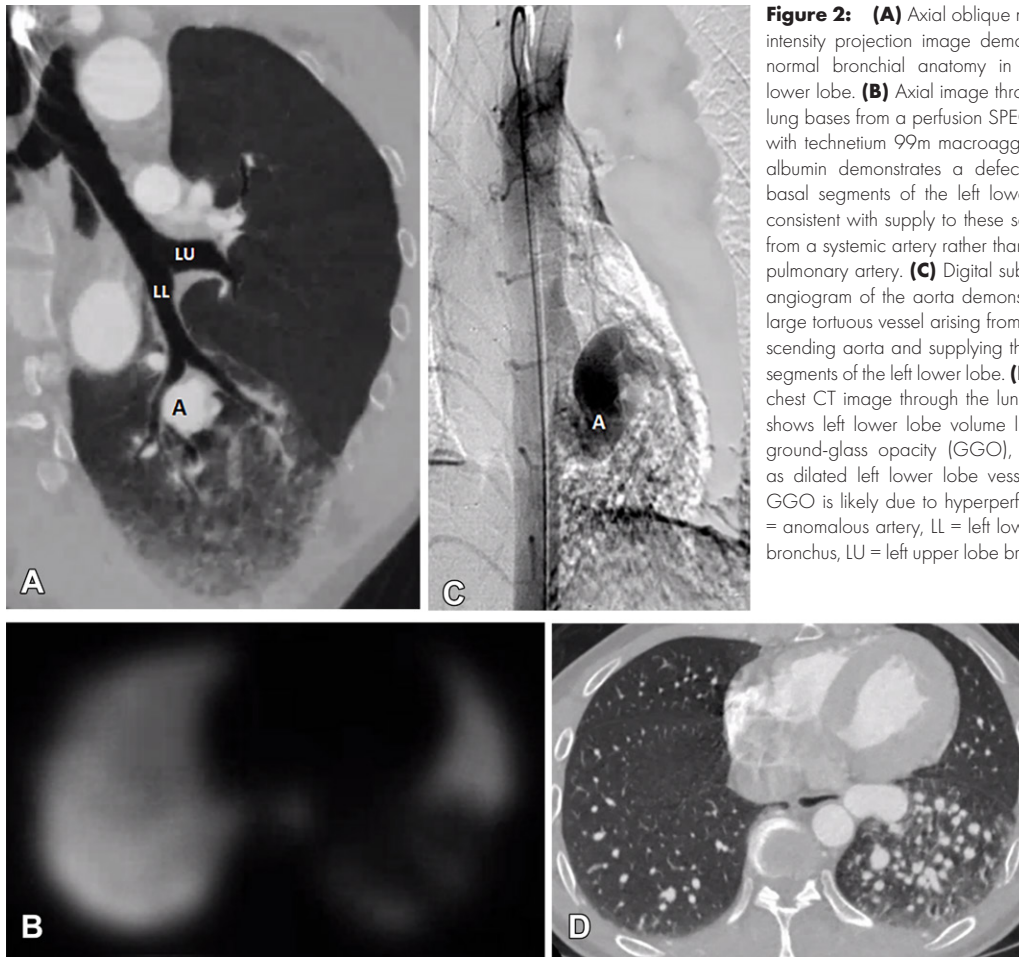


Figure 2: (A) Axial oblique minimum intensity projection image demonstrates normal bronchial anatomy in the left lower lobe. (B) Axial image through the lung bases from a perfusion SPECT scan with technetium 99m macroaggregated albumin demonstrates a defect in the basal segments of the left lower lobe, consistent with supply to these segments from a systemic artery rather than from a pulmonary artery. (C) Digital subtraction angiogram of the aorta demonstrates a large tortuous vessel arising from the descending aorta and supplying the basal segments of the left lower lobe. (D) Axial chest CT image through the lung bases shows left lower lobe volume loss and ground-glass opacity (GGO), as well as dilated left lower lobe vessels. The GGO is likely due to hyperperfusion. A = anomalous artery, LL = left lower lobe bronchus, LU = left upper lobe bronchus.

Keywords

Pulmonary Arteries, Arteries, Lung, CT Angiography

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